



CALL NO. 100

CONTRACT ID. 171049

PERRY COUNTY

FED/STATE PROJECT NUMBER NHPP 0151(086)

DESCRIPTION KY-15

WORK TYPE GRADE, DRAIN & SURFACE WITH BRIDGE

PRIMARY COMPLETION DATE 480 WORKING DAYS

LETTING DATE: December 08,2017

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN STANDARD TIME December 08,2017. Bids will be publicly announced at 10:00 AM EASTERN STANDARD TIME.

PLANS AVAILABLE FOR THIS PROJECT.

DBE CERTIFICATION REQUIRED - 7%

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

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PART I
SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 10

CONTRACT ID - 171049

NHPP 0151(086)

COUNTY - PERRY

PCN - DE09700151749

NHPP 0151(086)

KY-15 BYPASS IMPROVE SAFETY, UPGRADE GEOMETRICS, AND ADDRESS CAPACITY ISSUES FOR KY-15 IN PERRY COUNTY FROM MORTON BLVD. TO KY-15 BYPASS., A DISTANCE OF 03.40 MILES.GRADE, DRAIN & SURFACE WITH BRIDGE SYP NO. 10-00158.00.

GEOGRAPHIC COORDINATES LATITUDE 37:16:35.00 LONGITUDE 83:12:50.00

COMPLETION DATE(S):

480 WORKING Days

APPLIES TO ENTIRE CONTRACT

CONTRACT NOTES

PROPOSAL ADDENDA

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

BID SUBMITTAL

Bidder must use the Department's Expedite Bidding Program available on the Internet web site of the Department of Highways, Division of Construction Procurement. (www.transportation.ky.gov/construction-procurement)

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

JOINT VENTURE BIDDING

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

UNDERGROUND FACILITY DAMAGE PROTECTION

The contractor 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.

SPECIAL NOTE FOR COMPOSITE OFFSET BLOCKS

Contrary to the Standard Drawings (2016 edition) the Cabinet will allow 6" composite offset blocks in lieu of wooden offset blocks, except as specified on proprietary end treatments and crash cushions. The composite blocks shall be selected from the Cabinet's List of Approved Materials.

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

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

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

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

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

Questions about projects during the advertisement should be submitted in writing to the Division of Construction Procurement. This may be done by fax (502) 564-7299 or email to kytc.projectquestions@ky.gov. 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.

06/01/16

FEDERAL CONTRACT NOTES

The Kentucky Department of Highways, in accordance with the Regulations of the United States Department of Transportation 23 CFR 635.112 (h), hereby notifies all bidders that failure by a bidder to comply with all applicable sections of the current Kentucky Standard Specifications, including, but not limited to the following, may result in a bid not being considered responsive and thus not eligible to be considered for award:

102.02 Current Capacity Rating 102.10 Delivery of Proposals
102.8 Irregular Proposals 102.14 Disqualification of Bidders
102.9 Proposal Guaranty

CIVIL RIGHTS ACT OF 1964

The Kentucky Department of Highways, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252) and the Regulations of the Federal Department of Transportation (49 C.F.R., Part 21), issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the ground of race, color, or national origin.

NOTICE TO ALL BIDDERS

To report bid rigging activities call: 1-800-424-9071.

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

SECOND TIER SUBCONTRACTS

Second Tier subcontracts on federally assisted projects shall be permitted. However, in the case of DBE's, second tier subcontracts will only be permitted where the other subcontractor is also a DBE. All second tier subcontracts shall have the consent of both the Contractor and the Engineer.

DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

It is the policy of the Kentucky Transportation Cabinet (“the Cabinet”) that Disadvantaged Business Enterprises (“DBE”) shall have the opportunity to participate in the performance of highway construction projects financed in whole or in part by Federal Funds in order to create a level playing field for all businesses who wish to contract with the Cabinet. To that end, the Cabinet will comply with the regulations found in 49 CFR Part 26, and the definitions and requirements contained therein shall be adopted as if set out verbatim herein.

The Cabinet, contractors, subcontractors, and sub-recipients shall not discriminate on the basis of race, color, national origin, or sex in the performance of work performed pursuant to Cabinet contracts. The contractor shall carry out applicable requirements of 49 CFR 26 in the award and administration of federally assisted highway construction projects. The contractor will include this provision in all its subcontracts and supply agreements pertaining to contracts with the Cabinet.

Failure by the contractor to carry out these requirements is a material breach of its contract with the Cabinet, which may result in the termination of the contract or such other remedy as the Cabinet deems necessary.

DBE GOAL

The Disadvantaged Business Enterprise (DBE) goal established for this contract, as listed on the front page of the proposal, is the percentage of the total value of the contract.

The contractor shall exercise all necessary and reasonable steps to ensure that Disadvantaged Business Enterprises participate in a least the percent of the contract as set forth above as goals for this contract.

OBLIGATION OF CONTRACTORS

Each contractor prequalified to perform work on Cabinet projects shall designate and make known to the Cabinet a liaison officer who is assigned the responsibility of effectively administering and promoting an active program for utilization of DBEs.

If a formal goal has not been designated for the contract, all contractors are encouraged to consider DBEs for subcontract work as well as for the supply of material and services needed to perform this work.

Contractors are encouraged to use the services of banks owned and controlled by minorities and women.

CERTIFICATION OF CONTRACT GOAL

Contractors shall include the following certification in bids for projects for which a DBE goal has been established. BIDS SUBMITTED WHICH DO NOT INCLUDE CERTIFICATION OF DBE PARTICIPATION WILL NOT BE ACCEPTED. These bids will not be considered for award by the Cabinet and they will be returned to the bidder.

“The bidder certifies that it has secured participation by Disadvantaged Business Enterprises (“DBE”) in the amount of ____ percent of the total value of this contract and that the DBE participation is in compliance with the requirements of 49 CFR 26 and the policies of the Kentucky Transportation Cabinet pertaining to the DBE Program.”

The certification statement is located in the electronic bid file. All contractors must certify their DBE participation on that page. DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted.

DBE PARTICIPATION PLAN

Lowest responsive bidders must submit the *DBE Plan/ Subcontractor Request*, form TC 14-35 DBE, within **5** days of the letting. This is necessary before the Awards Committee will review and make a recommendation. **The project will not be considered for award prior to submission and approval of the apparent low bidder’s DBE Plan/Subcontractor Request.**

The DBE Participation Plan shall include the following:

- 1 Name and address of DBE Subcontractor(s) and/or supplier(s) intended to be used in the proposed project;
- 2 Description of the work each is to perform including the work item , unit, quantity, unit price and total amount of the work to be performed by the individual DBE. The Project Code Number (PCN), Category Number, and the Project Line Number can be found in the “material listing” on the Construction Procurement website under the specific letting;
- 3 The dollar value of each proposed DBE subcontract and the percentage of total project contract value this represents. DBE participation may be counted as follows; a) If DBE suppliers and manufactures assume actual and contractual responsibility, the dollar value of materials to be furnished will be counted toward the goal as follows:
 - The entire expenditure paid to a DBE manufacturer;
 - 60 percent of expenditures to DBE suppliers that are not manufacturers provided the supplier is a regular dealer in the product involved. A regular dealer must be engaged in, as its principal business and in its own name, the sale of products to the public, maintain an inventory and own and operate distribution equipment; and
 - The amount of fees or commissions charged by the DBE firms for a bona fide service, such as professional, technical, consultant, or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials, supplies, delivery of materials and supplies or for furnishing bonds, or insurance, providing such fees or commissions are determined to be reasonable and customary.

- b) The dollar value of services provided by DBEs such as quality control testing, equipment repair and maintenance, engineering, staking, etc.;
 - c) The dollar value of joint ventures. DBE credit for joint ventures will be limited to the dollar amount of the work actually performed by the DBE in the joint venture;
- 4 Written and signed documentation of the bidder's commitment to use a DBE contractor whose participation is being utilized to meet the DBE goal; and
- 5 Written and signed confirmation from the DBE that it is participating in the contract as provided in the prime contractor's commitment.

UPON AWARD AND BEFORE A WORK ORDER WILL BE ISSUED

Contractors must submit the signed subcontract between the contractor and the DBE contractor, the DBE's certificate of insurance, and an affidavit for bidders, offerors, and contractors from the DBE to the Division of Construction Procurement. The affidavit can be found on the Construction Procurement website. If the DBE is a supplier of materials for the project, a signed purchase order and an affidavit for bidders, offerors, and contractors must be submitted to the Division of Construction Procurement.

Changes to DBE Participation Plans must be approved by the Cabinet. The Cabinet may consider extenuating circumstances including, but not limited to, changes in the nature or scope of the project, the inability or unwillingness of a DBE to perform the work in accordance with the bid, and/or other circumstances beyond the control of the prime contractor.

CONSIDERATION OF GOOD FAITH EFFORTS REQUESTS

If the DBE participation submitted in the bid by the apparent lowest responsive bidder does not meet or exceed the DBE contract goal, the apparent lowest responsive bidder must submit a Good Faith Effort Package to satisfy the Cabinet that sufficient good faith efforts were made to meet the contract goals prior to submission of the bid. Efforts to increase the goal after bid submission will not be considered in justifying the good faith effort, unless the contractor can show that the proposed DBE was solicited prior to the letting date. DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted. One complete set and nine (9) copies of this information must be received in the office of the Division of Contract Procurement no later than 12:00 noon of the tenth calendar day after receipt of notification that they are the apparent low bidder.

Where the information submitted includes repetitious solicitation letters it will be acceptable to submit a sample representative letter along with a distribution list of the firms solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal as necessary to demonstrate compliance with the factors listed below which the Cabinet considers in judging good faith efforts. This documentation may include written subcontractors' quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

The Good Faith Effort Package shall include, but may not be limited to information showing evidence of the following:

- 1 Whether the bidder attended any pre-bid meetings that were scheduled by the Cabinet to inform DBEs of subcontracting opportunities;
- 2 Whether the bidder provided solicitations through all reasonable and available means;
- 3 Whether the bidder provided written notice to all DBEs listed in the DBE directory at the time of the letting who are prequalified in the areas of work that the bidder will be subcontracting;
- 4 Whether the bidder followed up initial solicitations of interest by contacting DBEs to determine with certainty whether they were interested. If a reasonable amount of DBEs within the targeted districts do not provide an intent to quote or no DBEs are prequalified in the subcontracted areas, the bidder must notify the DBE Liaison in the Office of Minority Affairs to give notification of the bidder's inability to get DBE quotes;
- 5 Whether the bidder selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise perform these work items with its own forces;
- 6 Whether the bidder provided interested DBEs with adequate and timely information about the plans, specifications, and requirements of the contract;
- 7 Whether the bidder negotiated in good faith with interested DBEs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any rejection should be so noted in writing with a description as to why an agreement could not be reached;
- 8 Whether quotations were received from interested DBE firms but were rejected as unacceptable without sound reasons why the quotations were considered unacceptable. The fact that the DBE firm's quotation for the work is not the lowest quotation received will not in itself be considered as a sound reason for rejecting the quotation as unacceptable. The fact that the bidder has the ability and/or desire to perform the contract work with its own forces will not be considered a sound reason for rejecting a DBE quote. Nothing in this provision shall be construed to require the bidder to accept unreasonable quotes in order to satisfy DBE goals;
- 9 Whether the bidder specifically negotiated with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be subcontracted includes potential DBE participation;
- 10 Whether the bidder made any efforts and/or offered assistance to interested DBEs in obtaining the necessary equipment, supplies, materials, insurance and/or bonding to satisfy the work requirements of the bid proposal; and
- 11 Any other evidence that the bidder submits which may show that the bidder has made reasonable good faith efforts to include DBE participation.

FAILURE TO MEET GOOD FAITH REQUIREMENT

Where the apparent lowest responsive bidder fails to submit sufficient participation by DBE firms to meet the contract goal and upon a determination by the Good Faith Committee based upon the information submitted that the apparent lowest responsive bidder failed to make sufficient reasonable efforts to meet the contract goal, the bidder will be offered the opportunity to meet in person for administrative reconsideration. The bidder will be notified of the Committee's decision within 24 hours of its decision. The bidder will have 24 hours to request reconsideration of the Committee's decision. The reconsideration meeting will be held within two days of the receipt of a request by the bidder for reconsideration.

The request for reconsideration will be heard by the Office of the Secretary. The bidder will have the opportunity to present written documentation or argument concerning the issue of whether it met the goal or made an adequate good faith effort. The bidder will receive a written decision on the reconsideration explaining the basis for the finding that the bidder did or did not meet the goal or made adequate Good Faith efforts to do so.

The result of the reconsideration process is not administratively appealable to the Cabinet or to the United States Department of Transportation.

The Cabinet reserves the right to award the contract to the next lowest responsive bidder or to rebid the contract in the event that the contract is not awarded to the low bidder as the result of a failure to meet the good faith requirement.

SANCTIONS FOR FAILURE TO MEET DBE REQUIREMENTS OF THE PROJECT

Failure by the prime contractor to fulfill the DBE requirements of a project under contract or to demonstrate good faith efforts to meet the goal constitutes a breach of contract. When this occurs, the Cabinet will hold the prime contractor accountable, as would be the case with all other contract provisions. Therefore, the contractor's failure to carry out the DBE contract requirements shall constitute a breach of contract and as such the Cabinet reserves the right to exercise all administrative remedies at its disposal including, but not limited to the following:

- Disallow credit toward the DBE goal;
- Withholding progress payments;
- Withholding payment to the prime in an amount equal to the unmet portion of the contract goal; and/or
- Termination of the contract.

PROMPT PAYMENT

The prime contractor will be required to pay the DBE within seven (7) working days after he or she has received payment from the Kentucky Transportation Cabinet for work performed or materials furnished.

CONTRACTOR REPORTING

All contractors must keep detailed records and provide reports to the Cabinet on their progress in meeting the DBE requirement on any highway contract. These records may include, but shall not be limited to payroll, lease agreements, cancelled payroll checks, executed subcontracting agreements, etc. Prime contractors will be required to complete and submit a signed and notarized affidavit (TC 18-7) and copies of checks for any monies paid to each DBE subcontractor or supplier utilized to meet a DBE goal. **These documents must be submitted within 10 days of being paid by the Cabinet.**

Payment information that needs to be reported includes date the payment is sent to the DBE, check number, Contract ID, amount of payment and the check date. Before Final Payment is made on this contract, the Prime Contractor will certify that all payments were made to the DBE subcontractor and/or DBE suppliers.

The Prime Contractor should supply the payment information at the time the DBE is compensated for their work. Form to use is located at:

<http://transportation.ky.gov/Construction/Pages/Subcontracts.aspx>

The prime contractor should notify the KYTC Office of Civil Rights and Small Business Development seven (7) days prior to DBE contractors commencing work on the project. The contact is Melvin Bynes and the telephone number is (502) 564-3601.

Photocopied payments and completed, signed and notarized affidavit must be submitted by the Prime Contractor to:

- Office of Civil Rights and Small Business Development
- 6th Floor West 200 Mero Street
- Frankfort, KY 40622

DEFAULT OR DECERTIFICATION OF THE DBE

If the DBE subcontractor or supplier is decertified or defaults in the performance of its work, and the overall goal cannot be credited for the uncompleted work, the prime contractor may utilize a substitute DBE or elect to fulfill the DBE goal with another DBE on a different work item. If after exerting good faith effort in accordance with the Cabinet's Good Faith Effort policies and procedures, the prime contractor is unable to replace the DBE, then the unmet portion of the goal may be waived at the discretion of the Cabinet.

1/27/2017

LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC – CARGO PREFERENCE ACT (CPA).

(REV 12-17-15) (1-16)

SECTION 7 is expanded by the following new Article:

102.10 **Cargo Preference Act – Use of United States-flag vessels.**

Pursuant to Title 46CFR Part 381, the Contractor agrees

- To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

- To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph 1 of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

- To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

TRAINEES

In Compliance with the "TRAINING SPECIAL PROVISION" included in Part III of the Proposal, the Contractor will be required to employ a trainee(s) for this contract.

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.

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.

ASPHALT PAVEMENT RIDE QUALITY CATEGORY A

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

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.

**KENTUCKY 15 RELOCATION, KYTC ITEM NO. 10-158.00
WATER, GAS & SANITARY SEWER UTILITY RELOCATION
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**KENTUCKY 15 RELOCATION, KYTC ITEM NO. 10-158.00
WATER, GAS & SANITARY SEWER UTILITY RELOCATION
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**KENTUCKY 15 RELOCATION, KYTC ITEM NO. 10-158.00
WATER, GAS & SANITARY SEWER UTILITY RELOCATION
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1. SPECIAL NOTES:

- A. Crushed stone for backfilling and bedding of pipe is **not a Pay Item**. This additional cost should be reflected in your Unit Price for sewer, gas, and water piping. Additionally, unless specifically noted otherwise, only crushed stone specially listed on the plans will be paid at your Bid Unit Price. The Plans detail the crushed stone refill requirements for all pipe types.
- B. General Concrete used for pipe kickers is **a pay item with the exception of kickers used for caps or plugs**. This reduction in cost should be reflected in your Unit Price for sewer, gas, and water piping. General concrete can include un-formed concrete w/ reinforcement up to a maximum of #5's @ 8" each way, maximum of two mats. Other general concrete which **is a pay item** includes items such as cover caps over pipe where noted on the plans. Reinforced formed concrete is anticipated on this project (at the Fill Zone Gas Station for example) and may be listed or shown as "Detailed" concrete, and is a separate and distinct pay item.
- C. Special attention should be afforded all areas that are marked with 'Pay Limits'. Notes as they appear on the drawings will be strictly adhered to concerning pay items.
- D. Contractors should note the placement of No. 12 copper wire in the location of all plastic force main, gas piping, and water pipe. Substitutes (for tracing) such as line marking tape will not be accepted. Smaller diameter wire will not be accepted. Also note the requirement in all water, force main and gas piping areas for marking tape labeled and colored appropriately shall be used.
- E. Use extreme caution in areas where other utilities are shown. All utility locations as shown on the drawings shall be considered approximate. All known utility crossings (after this determination by the utility) shall be flagged by the appropriate agency. These crossings may require hand digging for discovery and/or clearance.
- F. Contractor shall contact all utilities and arrange for flagging of all existing lines. Contractor shall be responsible for contact and initiation of work with Kentucky 811.
- G. Valve collars shall be required at all valves and cost shall be included in the unit price for the valve and box.
- H. All "TIES" which are bid items shall include all necessary materials required to make the same; see breakdown of "Ties" in these specifications.
- I. The plans serve as the guide to the final line location. The Contractor, because of his extensive knowledge obtained from line installation and roadway work, shall immediately contact the Engineer should construction appear unreasonable,

dangerous, or liable to generate property damage in any location, or to provide an unreasonable conflict with roadway work. This notification shall include likely areas of slip, slide, or other ground movement. The Contractor is responsible for all construction activities and any detrimental result of his construction. The Contractor, in accepting any portion of this Contract, assumes all associated responsibility for any and all construction activity. Additionally, the Contractor shall contact the Engineer if any construction is not practical without producing extended service outage or unreasonable conflict with roadway construction.

- J. Cooperation is critical for this utility relocation to be completed effectively. The drawings note contacts with the City of Hazard Water, Gas, & Sewer Departments and these people should be contacted as directed or as needed.
- K. The general intent of vertical manhole top placement is to have all manhole tops flush with any existing road surface and be 0.2' higher than any existing open ground surface with a slight regrade up to this new elevation.
- L. The Contractor shall work both plans sheets and profile sheets as a unit. What is shown on one shall be considered to be shown on both. Contractor shall report any conflict between the two to the Utility Relo. Engineer.
- M. **Contractor is responsible for all Surveying on the Project.** In all areas Contractor shall be required to survey or resurvey both horizontal and vertical locations for manholes, pipes, etc., determine any possible profile related conflicts, and compare planned horizontal and vertical locations with surveyed. Should a conflict or discrepancy exist, the Contractor shall immediately report this to the Utility Relo. Engineer. Contractor shall do no work in any line segment before this is complete.
- N. **A digital camera shall be used to photograph all valves, or valve groupings** (if valves lay within 5' radius of each other). Each valve or valve grouping photograph shall be named with a descriptive title. For example, if a valve grouping is at the intersection of KY 80 and KY 15, it shall be named "KY 80 KY 15.JPG". Each photograph shall be descriptive in and of itself with background information sufficient for subsequent location of the valve grouping by Water and Sanitary Sewer Department personnel. Two (2) compact disks (CD's) shall be provided to the Engineer after project completion showing all valve or valve groupings. Final payment will not be made until these CD's are submitted. The Contractor shall work with the Relo. Engineer to ensure that correct titles are transferred to "AS-BUILT" drawings.
- O. **Sequence of construction is absolutely critical to this project.** The Contractor shall complete work in the sequences noted on the drawings or as determined in the field so to limit or eliminate service outage. The Utility Relocation Engineer has

made his best effort to show work which can be reasonably completed as the roadway portion is constructed without significant service outage, but certainly does not warrant that this is the case. Changes to sequence, type, layout, etc. may be required to achieve this goal and the Contractor is encouraged to contact the Relo. Engineer for any discussion which eases his roadway construction burden or shortens utility downtime.

- P. Unless noted, all waterline fittings are Mechanical Joint. All mechanical joint fittings (for both water and force main) shall use Grip Rings on every branch, inlet or outlet for pipe 12" and smaller. Water pipe over 12" dia. shall use retainer glands for all fittings and on every branch, inlet or outlet. Unless noted otherwise, all waterline piping on the job is Compression Joint. All polyethylene gas fittings are butt fusion welded. Grip rings or other similar joint restraint may also be required for areas of the sanitary sewer portion if indicated on the plans.
- Q. Shop Drawing submission to the Utility Relocation Engineer is required of the Contractor for review and approval. Items which require Shop Drawing approval include:
- All Pipe, all types, Gas, Water & Sanitary Sewer
 - All Fittings, Gas, Water & Sanitary Sewer
 - Liner Pipes, Casing Spacers, & End Seals
 - Valves, all utilities
 - Gas Test Stations
 - River test Stations
 - ARV's, both Water & Sanitary Sewer
 - Mag Meters, Boxes, Vaults, Etc.
 - All Blowoffs
 - All Water Meters including radio Read Equip.
 - All Manholes including Frames/Lids, Pre-Cast Concrete, H₂S Protection
 - Proposed By-Pass Pumping Equipment
 - Vortex Flow Insert
- R. "Liner Pipe" and "Encasement Pipe" are used interchangeably in this specification.
- S. All plans and details show **42" minimum cover** required for all pipes. **KYTC may have deeper requirements.** Contractor is responsible for installing all lines at the depth required by KYTC. Contractor should confirm cover requirements before Bid.
- T. These specifications may list singular manufactures for a specific item. This listing is only for defining required quality and/or features that are required for the project. In almost all cases, this singular listing will be followed by "or Engineer approved equal". Any item, unless it is an item brand/type that has been standardized by the City of Hazard for operational reasons as a requirement, can be replaced with an item of comparable quality and/or features.

The Utility Relocation Engineer's address is:

H. A. Spalding Engineers, Inc.
651 Skyline Drive
Hazard, KY 41701-1664
(606) 436-2151
Project Engineer, Hank A. Spalding
hank.spalding@haspaldingengineers.com

Engineer prefers the PDF process which will speed approval. Submission shall be complete and shall be in an adequate number (if paper is used) to allow the Engineer to keep two (2) complete sets while allowing the Contractor any required sets for his use.

2. SPECIAL SURFACE RESTORATION NOTE:

The Contractor should understand that returning all surface work areas to their original condition is one of the most important phases of this project. The Contractor will be working in many cases in yard or other sensitive areas. The Contractor shall make every effort to avoid cutting of any trees, shrubs, and other items which are not absolutely required for the construction process (other than the Clear & Grub area). The Engineer will allow for, and in fact will encourage, the Contractor to adjust alignments to miss sensitive structures such as large trees, etc. However, all changes in alignment must be approved before any work is done to insure compliance with project requirements such as allowable grade, angles, etc. Contractor shall utilize mobile drop hammers, or other suitable equipment (other than walk behind tampers), which will compact the trench in all yard, road, and other areas which are considered sensitive. The Contractor shall also use similar compaction equipment and effort around all manholes. The Contractor shall satisfy the Engineer and KYTC with their yard restoration work. KYTC satisfaction with compaction and re-vegetation efforts shall be considered under your one year warranty.

3. INSTALLATION:

Trenching - Trenching shall be done in a true straight line at all times and fittings shall be used only at the direction of the RESIDENT ENGINEER.

Trenching shall include all clearing and grubbing (Clear and Grub is a Unit Price Bid Item for the waterline or gas line areas shown on the plans), including all weeds, briars, trees, and stumps encountered in the trenching. The CONTRACTOR shall dispose of any such material by burning, burial, or hauling away, at no extra cost to the KYTC. All material shall be disposed of by methods which meet all KYTC requirements, local fire officials, and all local, state, and federal requirements. Outside of the clear & grub area, Shrubs, hedges, and small trees (3" in dia.) shall be removed and replanted, at no extra cost to the KYTC. Trenching also includes such items as street, road, sidewalk, pipe and small creek crossings; cutting, moving, or repairing damage to fences, poles, or gates and other surface structures, regardless of whether shown on the Plans.

All material encountered in excavation shall be Unclassified. In areas where rock is encountered, a min. of 2" of crushed stone shall be placed in the bottom of the trench before installation of the pipe. Extra payment will be made for the installation of the crushed stone at your submitted unit price for crushed stone. The price for the pipe in place shall also include hauling off of all excavated material.

The CONTRACTOR shall determine, as far as possible in advance, the location of all existing sewer, culvert, drain, water, electric, and gas pipes and other subsurface structures and avoid disturbing same in opening his trenches. In case of sewer, water, and gas services, and other facilities easily damaged by machine trenching, same shall be uncovered without damage ahead of trenching, and restored immediately after trenching machine has passed, without extra cost to the KYTC except as noted in the bid item Utility Conflicts. The CONTRACTOR shall protect such existing facilities, including power and telephone poles and guy wires, against danger or damage due to settlement of his backfill. It shall be the responsibility of the CONTRACTOR to inform customers of utilities of disruption of service as soon as it is known that it has or will be cut off.

The CONTRACTOR shall at all times during trenching operations on the streets or other areas, carry a stock of pipe and fittings likely to be needed for replacement of water, gas, sewage, or drain pipes to facilitate immediate repair.

Construction equipment will not be approved for use where treads are injurious to paving encountered. Curbs, sidewalks, and other structures shall be protected by the CONTRACTOR from damage by his construction equipment.

In case of damage to any existing structures, repair and restoration shall be made at once and backfill shall not be replaced until this is done. In all cases, restoration and repair shall be such that the damaged structure will be in as good condition and serve its purpose as

completely as before and such restoration and repair shall be done without extra charge, except as set forth under the provisions of the General Conditions. Where there is the possibility of damage to existing utility lines by trenching machine, the ENGINEER may order hand search excavation ahead of machine trenching to uncover same, at no extra cost to the KYTC.

All trenches must be dug neatly to lines. Hand trenching may be required by the ENGINEER, at no extra payment, where undue damage would be caused by existing structures and facilities by machine trenching. Trenches in earth shall be dug to just above grade by machine and shall be finished down to grade by hand, unless otherwise specified.

Where trenching is cut through paving, which does not crumble on edges, trench edge shall be cut to at least two (2") inches deep to straight and neat edges before excavation is started, and care taken to preserve edge to facilitate neat repaving as shown on the Drawings.

All excavation shall be open trenches, except where otherwise called for on the Plans or by special permission of the ENGINEER, for boring or jacking under railroads, sidewalks, and the highway.

When working along the highway the CONTRACTOR shall furnish, install and maintain necessary signs, lights or other warning devices as prescribed by the Kentucky Department of Transportation and shall furnish and employ sufficient flagmen to direct traffic in the construction area all as directed by the Department of Transportation. All signs, devices, flagmen, etc. shall be as prescribed in the "Manual on Uniform Traffic Control Devices, Part VI," latest revision.

The CONTRACTOR shall so coordinate his work as to produce a minimum of interference with normal traffic on highways and streets. He may, with the approval of the ENGINEER and governing agency, close a street to traffic for such length of time considered necessary by the ENGINEER, provided persons occupying property abutting the streets have an alternate route of access to the property which is suitable for their needs during the time closure. It shall be the responsibility of the CONTRACTOR to give 24 hours advance notice to Fire and Police Departments and to occupants of a street which will be closed in a manner approved by the ENGINEER.

The opening of more than 500 feet of trench ahead of the pipe laying and more than 500 feet of open ditch left behind pipe laying before backfilling, will not be permitted except upon written consent of the KYTC or verbal consent from KYTC directly to the Engineer. No trench shall be left open or work stopped on same for a considerable length of time. If such is necessary, trench shall be refilled according to backfill specifications. In crossing a road or street a temporary bridge must be placed over the excavation if traffic conditions require its use before backfilling. Where required or when directed by the ENGINEER, road or street crossings will be limited to one-half of travel width before placing temporary bridge

over the excavated side. Whenever trenching is performed on public ways, the CONTRACTOR shall furnish and maintain barricades, lanterns, warning sign and signals as far as one block ahead or at locations directed by the governing agency as required for public safety. All such necessary bridges, barricades, lanterns, signs and signals shall be provided by and at the expense of the CONTRACTOR. The CONTRACTOR shall maintain road crossings in a passable condition for traffic until the final acceptance of the work at no cost to the KYTC.

Where pipelines run through wooded terrain, cutting of trees within limits of maximum permissible trench width, plus 4' on each side of this trench centerline, will be permitted. However, cutting of additional trees on each side of this 8' total width to accommodate operation of trenching machine will not be permitted. The CONTRACTOR shall obtain specific permission of the OWNER before cutting any tree larger than six (6") inches in diameter.

Sheeting and shoring of trench will be required of this CONTRACTOR where necessary to protect life, property, or any structure from damage or to maintain maximum permissible trench widths at top of pipe. Sheeting, sheet piling, trench jacks, braces, shores, and stringers shall be used to hold trench walls. These shall be withdrawn as the trenches are being backfilled, after backfill has been placed over pipe at least 18". If their removal, before backfill is completed to surface, endangers adjacent structures such as pipelines, street paving, sidewalk and buildings, then they shall be left in place until such danger has passed and then pulled if possible. Voids caused by sheeting withdrawal shall be backfilled and tamped with thin rammers designed for the purpose so as not to form an obstruction at the ground level. Dewatering of the trenches shall be considered a part of trenching at no extra cost to the OWNER. Dewatering of trenches shall include ground water and storm or sanitary sewage. Suitable pumping and other dewatering equipment is to be provided by the CONTRACTOR to insure the installation of the pipeline structure in a dewatered trench and under the proper conditions. Dewatering shall include all practical means available for prevention of surface runoff into trenches and scouring against newly laid pipe.

Piles of excavated material shall be trenched or temporarily piped to prevent, as far as practical, blockage of drainage ditches and gutters and resultant water carriage of excavated materials over street surfaces.

Where subgrade of trench has insufficient stability to support the pipeline and hold it to its original grade, the ENGINEER may order stabilization by various means. Exclusive of dewatering normally required for construction and instability caused by neglect of the CONTRACTOR, it shall be paid for at unit prices set up in the Contract such as extra excavation, crushed rock for pipe bedding, concrete cradle, or piling.

The location of pipe and their appurtenances, as shown, are those intended for the final construction. However, conditions may present themselves before construction of any line is started, that would indicate desirable changes in location. Also, development of property

traversed may require location changes. In such cases, the KYTC reserves that right to make reasonable changes in line and structure location without extra cost except as may be determined by the application of the unit prices bid to the quantities actually involved. The OWNER or KYTC is under no obligation to locate pipelines, so they may be excavated by machine.

The work of uncovering and backfilling required for locating existing sewers, waterlines and other existing facilities for connection of improvements, or avoidance in location of proposed pipeline, where such uncovering and backfilling is not within trench for improvements, shall be at the CONTRACTOR's expense.

The CONTRACTOR will be required to test all pipelines (as described in other areas of these Specifications) before backfilling. Backfilling before testing will be allowed at the discretion of the ENGINEER at points where danger to the public, or other hazards, demand that such be done immediately after pipe is laid. All leakage apparent or other problems after testing must be repaired before backfilling.

Backfilling Trenches:

Backfilling must be started as soon as practicable after pipe has been laid. Packing of earth across and around pipe at six (6') foot intervals and between joints shall be the usual procedure as the laying proceeds. This is in order to avoid danger of misalignment from slide, flooding or other causes. The ENGINEER shall be given a maximum of 24 hours for inspection before backfilling. Only earth, or rock less than 2-1/2" size, shall be used as backfill materials up to six (6") inches above top of pipe. No stones or other hard or heavy substances may be thrown directly upon the pipes or into the trench until the above named cover of earth is obtained. Above the 6 or 12 inches above pipe, rock may be used in the backfill to an extent not greater than one-half of the total backfill materials used. If additional earth is required, it must be obtained and placed by the CONTRACTOR. Filling with rock and earth shall proceed simultaneously in order that all voids in the rock may be filled with earth. Where noted on the Plans and within the shoulder of the Kentucky Highways, the CONTRACTOR shall backfill to finish highway grade with DGA. The DGA shall be tamped in six (6") inch layers in accordance with Department of Transportation Specifications. In these areas (if any) DGA will be a pay item. All material hauled away shall be placed at no cost and at a location specified by the KYTC or if not specified by KYTC at a location obtained by Contractor.

No extra charge shall be made for supplying outside materials for backfill or removing excess excavation material from the site of the work.

Extra cost of compaction of backfill on street and driveway crossings and tunnels shall be included in price bid for pipe.

Where highway slopes, thin grass, or cover crops are destroyed by trenching, laying, or

backfilling operations, and access to them, surface shall be prepared by disking, fertilizing 5 lbs. of 5-10-5 or 6-8-6 per 1,000 square feet and seeding 21 lbs. of Italian Rye Grass per 1,000 square feet, light harrowing, then reseeding with crop destroyed or one part Red Top, three parts certified Kentucky Bluegrass seed mixed together at the rate of 2 lbs. per 1,000 square feet of surface. This shall be included in the price for trenching and backfilling. Requirement of the KYTC, for reseeding shall take precedence over these specifications.

4. CLEANING UP AND REPAIRING DAMAGE:

The Contract will not be considered complete until all construction structures and equipment and rubbish from construction are cleaned from the site of the work.

All damage to existing grounds and structures caused by construction operations must be repaired or the KYTC compensated for such damage before contract will be considered complete. This does not include replacement of sod, but does include required shaping of ground for sodding or planting of grass and the removal and disposition of all rock from blasting three (3") inches or over in size.

5. HAULING AND STORAGE:

The CONTRACTOR will be required to deliver all pipe, fittings, valves and valve boxes and other materials and place same as and where required for laying.

Care must be exercised in the handling of all materials and equipment and the CONTRACTOR will be held responsible for all breakage or damage to same caused by his workmen, agents of appliances for handling or moving. Pipes and other castings shall in no case be thrown or dropped from cars, trucks, or wagons to the ground but same shall be lowered gently and not allowed to roll against or strike other castings and unyielding objects violently. Pipe and special castings may be distributed at places that will not interfere with other building operations as unloaded or yard and distributed as required, as the CONTRACTOR may elect.

Valves, valve boxes, jointing materials, meter box covers, castings, fabricated metal, reinforced steel, etc. shall be yarded or housed in some convenient location by the CONTRACTOR and delivered on the ground, as required.

The cost of all hauling, handling, and storage shall be included in the price bid for equipment and materials in place.

The KYTC takes no risk or responsibility for fire, theft, flood, or damage until after the final acceptance of the work.

6. GENERAL SPECIFICATIONS ON MATERIALS:

All materials specified or planned shall be furnished by the Contractor. Approval of manufacturer's plans of materials and equipment shall not mean final acceptance but they shall be subject to inspection and test on delivery and installation.

The Contractor shall repair, replace or adjust any material or equipment found defective or not operating properly due to improper materials, workmanship and adjustment on his part, for a period of one (1) year after completion and acceptance of his work.

Inclusion of a certain make or type of material or equipment in the Contractor's bid or estimate shall not obligate the KYTC to accept such materials or equipment if it does not meet with requirements of these Plans and Specifications.

The burden of proof of equal quality or service shall be on the Contractor. Proof of inequality is not implied by these specifications and is not a burden of the Engineer. His duty shall be to properly weigh the proven facts of equality in fairness to all parties involved.

7. LAYING NON-PRESSURE PIPE – GENERAL:

A. General

1. All pipe shall be tested for uniform diameter, straightness and defects before laying and rejected pipe shall be removed from the project.
2. All pipe after being inspected and accepted shall be laid to the lines and grades shown on the Drawings. The Contractor shall furnish all labor and materials for staking out lines and grades. All gravity pipelines shall be laid to constant grades between invert elevations shown on the Drawings. Grades shown on drawings are invert of pipe, unless specifically noted otherwise. The pipe lengths shall be fitted together and matched to form a smooth and uniform invert.
3. Subgrade, undercut, bedding and backfilling under, around and over the pipe shall all be in accordance with the details shown on the Drawings. No pipe shall be laid until the subgrade is properly in place.
4. Unnecessary walking upon the completed pipelines shall be avoided until trench has been backfilled to over the top of the pipe.
5. The interior of the pipe shall be cleaned of all dirt, jointing materials and superfluous materials of every description. When laying of pipe is stopped, the end of the pipe shall be securely plugged or capped. Care should be

taken to prevent flotation of the pipe in the event the trench should flood. The Contractor will be responsible for relaying and/or relocating pipe if the pipe is laid before trenching has progressed far enough to eliminate the possibility of grade conflicts or realignment on account of existing structures, pipelines, or conduits.

6. In trench conditions where pipe is in danger of sinking below grade or floated out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe shall be weighted or secured permanently in place.
7. Trench excavation and pipe bedding shall conform with provisions contained elsewhere in Detailed Specifications.
8. Pipes shall be laid free from all structures other than those planned. Openings in and joints to contact walls shall be constructed as shown on the Drawings.
9. Non-pressure pipes entering structures underground and unsupported by original earth for a distance of more than 3', shall be supported by Class "B" concrete, where depth of such support does not exceed 3'. All pipes entering buildings or basins, below original ground, which are higher than 3' depth above subgrade, span more than 3' between wall and original earth, and with more than 24" of cover or under a roadway, shall be supported by concrete beams with piers at 6' intervals between structural wall and edge of excavation for the structure, in order to prevent breakage from settlement of backfill about the structure. Concrete and reinforcing steel for these supports shall be in the lump sum portion of the contract; and no extra payment will be allowed. Pipe entering structures shall have flexible joint within 18" of exterior of structure or from point of leaving concrete support.
10. No backfilling, except for securing pipe in place, shall be done until the Engineer has inspected the joints, alignment, and grade in the section laid. Such inspection, however, does not relieve the Contractor of liability in case of defective joints. Joints that show leakage will not be accepted. If after backfilling and inspection, any joints are found that are allowing groundwater to enter the sewer, such joints shall be sealed by the Contractor.

B. Pipe Bedding

1. Pipe bedding for gravity sewers shall be as shown on the Drawings. Crushed stone used for bedding shall be size shown, and shall comply with State Highway Department Standards.

C. Testing - General

1. On completion of sewer lines, all sewers and manholes will be inspected for foreign matter, including sand brought in by infiltration, and any such matter shall be removed before final acceptance of the lines.
 - a. Testing of the pipe as specified shall be carried out after all appurtenances have been installed. All pipelines shall be tested for compliance with the Specifications. If leaks are discovered, they shall be repaired by the Contractor as part of the work of laying this pipe and appurtenances and as approved by the Engineer. The Contractor shall supply all labor, equipment, material, gauges, pumps, etc., required to conduct the tests.
 - b. All equipment, pipe and appurtenances shall be repaired or replaced and the tests repeated at the Contractor's expense until the pipe, appurtenances and equipment are in satisfactory compliance with these Contract Documents, in the judgment of the Engineer

D. Air Testing

1. Air testing shall be required on all gravity sewer lines.
2. All lines shall be flushed and cleared of debris prior to air testing. The maximum length of line to be air tested at any one time shall be from manhole to manhole.
3. Air shall be slowly supplied to the plugged pipe until the internal pressure reaches 5.0 pounds per square inch (PSI) greater than the average back pressure of any groundwater that may be above the pipe. Two minutes shall be allowed for a stabilization period before proceeding further.
4. The acceptance of the pressure test shall be determined by measuring the time required for the internal pressure to decrease from 0.5 PSI to 1.5 PSI below test pressure. The time for this one PSI loss of air pressure must not be less than 6 minutes per foot of nominal pipe diameter.
5. Tees and service laterals shall be considered as part of the line being tested. All plugs shall be firmly blocked to insure that they will not be displaced during testing. Descriptive literature for all equipment and procedures to be used in air testing must be submitted to the Engineer for acceptance.
6. All defective work, as so proven by the air test, shall be immediately repaired and retested until proven to be satisfactory.

7. Inspection in pipe laying and air testing shall in no way relieve the Contractor of the responsibility for passing subsequent test for infiltration or correcting poor workmanship.

E. Infiltration Testing

1. Before putting new sewer lines into service, weir tests shall be made of flow of water in the sewers from manhole to manhole or up to a maximum of 3,000 foot sections at a time. These tests shall be made when in the Engineer's judgment groundwater level is equal to the highest groundwater condition in a normal year.
2. Maximum allowable infiltration shall not exceed 6,000 gallons per day per mile of pipe for pipe 24 inch diameter or larger, and 250 gallons per day per inch diameter per mile for pipes smaller than 24 inch diameter.

8. TESTING OF WATERLINES:

On all projects involving the installation of water pipeline, the finished work shall comply with the provisions listed below, or similar requirements which will insure equal or better results.

- .a. All water mains shall be given a hydrostatic test to 150 psi (or 1.5 times the service pressure, contact the Relocation Engineer), under which leakage shall not exceed the limits established in Section 4 of AWWA Standard Specifications C600.
- .b. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 3,000 feet.
- .c. Duration of test shall be not less than two hours.
- .d. Where leaks are evident on the surface where joints are covered, the joints shall be re-caulked, re-poured, bolts retightened or re-laid, and leakage minimized regardless of total leakage as shown by test.
- .e. All appurtenances shall be connected and made ready for ultimate service before the pressure test. Specifically, all meter boxes, yokes, and appurtenances (with sole exception of meter unit) shall be installed prior to the pressure test. Additionally, all meter yokes shall be "flowed" to insure that the corp stop has been connected and is in the open position. This flow shall be witnessed by the ENGINEER'S Representative and documented on the project mapping with a date when the flow was observed. All pipe, fittings and other materials found to be defective under test shall be removed and replaced.

.f. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with.

.g. The CONTRACTOR shall furnish a recording gauge and clock used during leakage test and recording pressure charts during duration of test. Recording pressure charts shall remain the property of the ENGINEER at conclusion of test.

The new potable waterlines shall not be placed in service, either temporarily or permanently, until they have been thoroughly disinfected in accordance with the following requirements and to the satisfaction of the ENGINEER.

.h. The CONTRACTOR, in consultation with the KYTC Resident Engineer and the part-time Relocation Observer or Engineer, shall keep, maintain, and update, a color coded project map which shows what lines have been pressure tested, date of test, and result. See below for additional requirements.

After successful pressure testing, a solution of hypochlorite using HTH, or equal, shall be introduced into the section of the line being disinfected sufficient to insure a chlorine dosage of at least 50 ppm in the main. While the solution is being applied the water should be allowed to escape at the ends of the line until tests indicate that a dosage of at least 50 ppm has been obtained throughout the pipe. Open and close all valves and cocks while chlorinating agent is in the piping system. The Chlorinated water shall be allowed to remain in the pipe for 24 hours, after which a residual of at least 25 ppm shall be obtained.

The disinfection shall be repeated until 25 ppm is obtained, after which time the main shall be thoroughly flushed until the residual chlorine content is not greater than 1.0 ppm.

Following disinfection of the line, bacteriological samples shall be collected and analyzed in accordance with the requirements of Kentucky Department of Natural Resources and Environmental Protection. When the samples have been approved, the new line then may be connected to the system. On the map noted above, the Contractor, in consultant with the Resident Engineer, shall keep, maintain, and update the color coded map showing dates samples were collected, and dates where samples were approved.

9. LAYING PIPE IN COMMON DITCH:

A. General

1. Pipelines, force mains and sewers laid in same trench shall, in all cases, be laid on original earth, regardless of divergence in their elevations. Pipe shall never be laid in backfill or one above the other.

10. PRESSURE PIPE INSTALLATION:

A. General

1. Pipe shall be handled with such care as necessary to prevent damage during installation. The interior of the pipe shall be kept clean and the pipe shall be installed to the lines and grades shown on the Drawings. Whenever pipe laying is stopped, the end of the pipe shall be securely plugged or capped.
2. Fittings shall be firmly blocked to original earth or rock to prevent water pressure from springing pipe sideward or upward. Concrete or other blocking material shall be placed such that it does not cover the pipe joints, nuts, and bolts. The means to do this shall be thoroughly wrapping the fitting with suitable plastic to the Engineer's satisfaction.
3. Pipes shall be free of all structures other than those planned. Openings and joints to concrete walls shall be constructed as shown on the Drawings.
4. Pressure pipe, 4 inch diameter or larger, entering a structure below original earth level, unsupported by original earth for a distance of more than 3 feet shall be supported by Class "3000" concrete, where depth of such support does not exceed 3 feet, and by Class "4000" concrete piers each 6 feet, where depth exceeds 3 feet. Class "3000" concrete required will be included in the payment for furnishing and laying the particular pipe, in order to discourage excessive excavation outside the limits of structures. Pipes entering structures shall have flexible joint within 18 inches of exterior of structure, and also from point of leaving concrete support to original earth or crushed stone bedding.

B. Pressure Pipe Laying

1. Pressure pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the manufacturer. A copy of such instructions shall be available at all times at the site of the work.
2. All pipes must be forced and held together, or "homed" at the joints, before sealing or bolting. Pipe must be aligned as each joint is placed, so as to obtain straight lines and grades. Curves and changes in grades shall be laid in such a manner that maximum allowable joint deflection is not exceeded.
3. Trench excavation for pipe laying must be of sufficient width to allow the proper jointing and alignment of the pipe. Trenches in earth or rock shall be dug deep enough to insure 36" minimum cover over top of the pipe, unless otherwise indicated on the Drawings.

4. Trench line stations shall be set ahead of the trenching at least each 100 feet of pipeline. Trenches shall be dug true to alignment of stakes. Alignment of trenches or pipes in trench must not be changed to pass around obstacles such as poles, fences and other evident obstructions without the approval of the Engineer. Lines will be laid out to avoid obstacles as far as possible, consistent with maintenance of alignment necessary to finding the pipeline in the future and avoiding obstruction of future utilities and structures.
5. Cut pieces of pressure pipe 18" or more in length may be used in fitting to the specials and valves and fitting changes in grade and alignment. Cut ends shall be even enough to make first class joints.

C. Testing Pressure Pipe

1. The Contractor shall furnish all necessary equipment for pressure testing.
2. Inspection of pipe laying shall in no way relieve the Contractor of the responsibility for passing tests, stopping leakage, or correcting poor workmanship.
3. The Contractor shall furnish meter or suction tank, pipe test plugs and bypassing piping, and make all connections for conducting the above tests. The pumping equipment used shall be compressed air, centrifugal pump, or other pumping equipment which will not place shock pressures on the pipeline. Power plunger pumps will not be permitted for use on closed pipe system for any purpose.
4. The pipe shall be tested with water to the pressure class of the pipe for 24 hours with pressure recorder. The drop in pressure shall not exceed 5% of the test pressure.

MATERIAL & BID ITEMS:

11. DUCTILE IRON SANITARY SEWER (GRAVITY & FORCE MAIN):

All ductile iron pipe intended for the project (non-water applications) shall be specifically designed for use in sanitary sewer applications. This requirement includes all pipe for both gravity applications and force main applications. The pipe in all cases shall conform to ANSI/AWWA C151/821.51 and ASTM A 746. The thickness of the pipe shall in all cases be no less than Thickness Class 50 w/ a pressure rating of 350 psi. In cases where flanged fittings require a heavier wall it shall be used. The outside pipe coating shall be a minimum of one mil bituminous paint according to ANSI/AWWA C151/821.51 Section 51-8.1. Cement lining (for the Base Bid, see Option below) shall be provided for the pipe interior. This lining shall conform to ANSI/AWWA C104/A21.4 and shall be that normally & customarily provided by the pipe manufacturer. Cracks, other than closed hairline cracks and/or fine crazing, shall not be acceptable. Loose areas of cement lining are not allowable. Fittings (if used) shall be Ductile Iron of appropriate class and in accordance with the requirements of either ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10. Mechanical joints shall conform to ANSI/AWWA C111/A21.11. All fittings (if used) anticipated for line work are Mechanical Joint. All ductile iron pipe shall be U.S. Pipe, Griffin Pipe Products, Clow, or approved equal. The Contractor shall follow all manufacturers literature for pipe installation and field cut ends and all other requirements as stated in the printed literature.

12. PVC PIPE AND FITTINGS (GRAVITY SEWER):

PVC pipe used for gravity sewer applications shall meet all requirements of ASTM Specification D-3034, latest revision for pipe sized 4" thru 15". Pipe and fittings shall meet the extra strength minimum of SDR-26 of that specification and thickness of that dimension ratio. The reason for using SDR-26 for all gravity sewer vs. the lesser strength SDR-35 is the related nearby roadway construction.

All pipe and fittings shall be inspected at the factory and on the job site. Testing of PVC pipe and fittings shall be accomplished in conformance with the latest revision of ASTM D3034, ASTM F477 and ASTM D3212. The manufacturer shall submit five (5) copies of certification of test for each lot of material represented by shipment to the job site.

The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform in color as commercially practical. PVC pipe shall have a ring painted around spigot ends in such a manner as to allow field checking of setting depth of pipe in the socket.

Pipe must be delivered to job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or

stored as close to the final point of placement as is practical. Pipe shall not be stored outside where subject to sunlight.

Jointing of PVC pipe shall be by a natural rubber ring inserted into the belled end of the pipe or double hub joints. Solvent weld joints are not acceptable.

The PVC pipe manufacturer shall provide special fittings, acceptable to the Engineer to make water-tight connections to manholes and for all (if any) service connections.

The pipe shall be equal in all respects to that manufactured by National Pipe Company, North American Pipe Company, JM Pipe, or Diamond Plastics pipe.

13. CL250 PVC PIPE AND FITTINGS (FORCE MAIN):

All pipe designated as PVC shall be PVC type pressure pipe designed ASTM Class 250 of the Integral Bell Joint type. The pipe shall conform to ASTM 2241 for Standard Dimension Ratios, SDR 17 for pressure characteristics. The pipe shall be extruded from clean, virgin, approved class 12454-A PVC compound conforming to ASTM resin Specification D1784. Rubber rings shall conform to ASTM D 1869. This pipe shall be National Pipe Company, North American Pipe Company, JM Pipe, or Diamond Plastics pipe PVC Pressure pipe or approved equal. Laying radius of pipe shall in all cases be equal to, or greater than, that listed by the manufacturer of the pipe. All tees, elbows, and bends shall be Mechanical Joint unless noted on the Plans. All mechanical joint fittings shall be equipped with grip rings. All pipe and fittings shall be inspected at the factory and on the job site. Testing of PVC pipe and fittings shall be accomplished in conformance with the latest revision of ASTM D3034, ASTM F679 T-1, ASTM D2444, ASTM 2412, and ASTM D2152. The manufacturer shall submit five (5) copies of certification of test for each lot of material represented by shipment to the job site. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform in color as commercially practical. PVC pipe shall have a ring painted around spigot ends in such a manner as to allow field checking of setting depth of pipe in the socket. Pipe must be delivered to job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or stored as close to the final point of placement as is practical. Pipe shall not be stored outside where subject to sunlight. Jointing of PVC pipe shall be by a natural rubber ring inserted into the belled end of the pipe or double hub joints. Solvent weld joints are not acceptable. The PVC pipe manufacturer shall provide special fittings, acceptable to the Engineer to make water-tight connections to manholes and for all service connections. The pipe shall be equal in all respects to that manufactured by CertainTeed Corporation, National Pipe Company, North American Pipe Company, JM Pipe, or Diamond Plastics pipe. All PVC force main (and in fact all force main types) shall be marked w/ tape as shown on the drawings to differentiate it from potable water lines.

14. HORIZONTAL DIRECTIONAL DRILLING (HDD), SANITARY & WATER:

All areas designated on the Plans as Horizontal Directional Drilling (HDD) shall be completed using equipment designed for the size and type of pipe noted. All HDD shall be completed using PE 4710 high density polyethylene, DR 9, having a minimum pressure rating of 252 psi, except where noted otherwise on the plans, and in these locations the pipe shall be DR 7 (or DR 7.3), having a minimum pressure rating of 335 psi. **The Unit Price of HDD includes the cost of the pipe itself**, and all else required for a complete and finished installation. Ductile Iron Pipe Size (D.I.P.S.) PE is also used on the project. The Contractor shall have experience in this type of work (HDD) suitable to the Utility Relo. Engineer.

15. POLYETHYLENE (PE) PIPE (WATER & SAN. SEWER):

Polyethylene Pipe shall be manufactured in accordance with AWWA CD01 for sizes 1/2" through 3" and in accordance with AWWA C906 for sizes 4" through 54". All Copper Tubing Size (C.T.S.) PE pipe shall be high density polyethylene (PE 4710) intended for the transportation of potable water. All PE pipe smaller than two inch shall have a minimum pressure rating of 200 psi and have a dimension ratio (DR) of 9 and be copper tubing size (CTS) unless noted otherwise (UNO) on the plans for high pressure areas. All PE pipe larger than 2" shall be Iron Pipe Size (I.P.S.) and shall be high density polyethylene PE 4710, have a minimum pressure rating of 252 psi, and shall have a dimension ratio of 9, except where noted otherwise on the plans, and in these locations the pipe shall be DR 7 (or DR 7.3) in high pressure water areas, having a minimum pressure rating of 335 psi or in the river crossing area (water) shall be Ductile Iron Pipe Size (D.I.P.S. or DIPS) as indicated. The 8" sanitary sewer force in the dual force main area shall be DR 13.5, having a minimum pressure rating of 160 psi, for hydraulic reasons. All PE pipe fittings shall be butt fusion welded per the manufacturer's requirements of the same DR as the pipe it connects. All joints between plain ends of polyethylene pipe shall be made by butt fusion. The Contractor shall follow all requirements in the pipe manufacturer's printed literature for butt fusion welds including test weld requirements and shall use personnel adequately trained and experienced in this work. All PE pipe intended for the transportation of water shall be equipped with a **BLUE stripe**. All PE pipe intended for the transportation of sanitary sewer shall be equipped with a **GREEN stripe**. Installation of incorrect color coding for either utility shall not occur. All transitions from PE pipe to other pipe types shall use the appropriate adapter as detailed on the plans and the concrete restraint/s shall be installed as indicated. Where PE pipe enters or leaves concrete structures it shall be equipped with the special restraints as detailed on the plans to prevent pullout. All PE pipe shall be Plexco, Driscopipe, or approved equal. All PE force main (and in fact all force main types) shall be marked w/ tape as shown on the drawings to differentiate it from potable water lines.

16. LINER PIPE, SANITARY SEWER, GAS, & WATER:

Liner Pipe of the size and location, as shown on the Plans, shall be installed. Liner Pipe is the term longtime used by the Utility Relocation Engineer, and shall in all cases be used synonymously with "Encasement Pipe". The pipe shall be a high quality Wrought Steel Schedule and weights as listed below, with the same properties as determined by the American National Standard for welded and seamless wrought steel pipe. Used pipe will not be accepted unless it is delivered to the job site in as-new condition as determined by the Engineer. The unit price for liner pipe includes the cost of purchasing and installing the casing spacers as detailed on the drawings for multi pipe installations or using Phillips Engineering Model PE-MS 500 plastic casing insulators (or approved equal) for single carrier pipe installations. All casing spacers shall be spaced at a maximum of 8' on center and at each end approximately 2'-0" from the end. Unit price for liner pipe shall also include the placement of casing end seals. End seals may be pre-manufactured models correctly sized or "End Seal Tape" may be used. Where multiple carrier pipes go thru one liner pipe the casing spacers shall be as designated on the drawings, or other approved spacers by the Engineer. The spacing of the casing spacers shall be equal to the casing spacer spacing as shown within the manufacturers submittals or as directed by the Engineer, but in no case shall the spacing exceed 8'-0" on center.

Liner Pipe Table

<u>Pipe Size</u>	<u>Sch. #</u>	<u>Wall (In.)</u>	<u>#/Foot</u>
4"	40 (Std.)	.237	10.8
6"	40 (Std.)	.250	19.0
8"	40 (Std.)	.250	28.6
10"	40 (Std.)	.250	40.5
12"	(Std.)	.250	49.6
14"	30 (Std.)	.250	54.6
16"	30 (Std.)	.383	62.6
18"	(Std.)	.383	70.6
20"	20 (Std.)	.383	78.6
24"	20 (Std.)	.383	94.6
30"	20 (Std.)	.383	

The Liner Pipe shall be either bored & jacked with appropriate equipment or Open Cut as designated on the Plans. The casing pipe sizes shown on the plans are believed to be adequately sized to allow the placement of the carrier pipe/s and associated spacers, but this must be confirmed by the Contractor. Use larger casing (liner) pipe if required by your combination of carrier pipe/casing spacers than shown at no extra cost to the KYTC.

17. SEWAGE COMBINATION AIR/VACUUM VALVE:

At the locations shown on the Drawings the Contractor shall install new combination

air/vacuum sewage valves. This valve shall be an A.R.I D-025 (or Engr. Approved eq.) 2" valve, nylon body, and specifically designed for wastewater. The valve shall be installed in the boxes as shown on the drawings. The valve shall be equipped with a 2" bronze body ball valve with stainless steel ball and Teflon seat as detailed on the Drawings. Service saddle shall be a Smith Blair 317 double strap, equipped with spring washers, or approved equal. The valve shall be supported inside the box as recommended by the manufacturer. The box shall be 24" diameter, length as req. for proper fit-up. Install a Ford MC-24 Monitor Cover with locking lid.

18. MARKING TAPES:

Marking tapes shall be used for all utilities including sanitary sewer force main, all water lines larger than 1" diameter, and all gas lines larger than 1" diameter. All tapes shall be of the "warning" type and detectability is not a requirement. Detectability shall be provided with the installation of #12 AWG copper wire (minimum) as detailed on the drawings. All tapes shall be suitable for underground installation. All tapes shall be a minimum of 6" wide, have a minimum thickness of 5 mils, shall be polyethylene, and shall be marked as follows:

WATER- Blue color with "Buried Waterline Below" imprinted;

GAS- Yellow color with "Buried Gas Line Below" imprinted;

SEWER- Green Color with "Buried Sanitary Sewer Below" imprinted.

Tape is not required for mainline gravity sanitary sewer unless visibility between adjacent manholes is not possible. If this is the case, as adjudged by the KYTC Engineer, Tape shall be used on Sanitary mains. Tape shall be installed in all lateral locations for the entire laying length.

19. MANHOLES:

Only pre-cast or cast-in-place concrete manholes are acceptable. If the Contractor intends to use cast-in-place manholes, reinforcement plans and schedules must be submitted to the Engineer for approval. Pre-Cast manholes of acceptable type are shown on the Drawings. Developed base manholes may be used in locations where applicable. All manhole joints shall be fitted with one (1) run of Conseal Mastic or other acceptable material, installed as detailed in the manufacturers printed literature. All standard manholes shall have Eccentric Conicals. All manholes, unless noted, are 48" min. I.D. as noted in the Schedule. All Pre Cast manholes shall be fitted with PSX or Dura-Seal Gaskets for all lines entering or leaving the manhole. All manhole inverts whether pre-developed or developed in place shall have a one-half to two-thirds pipe diameter flow channel with smooth transition throughout. Specifications and shop drawings for the proposed grout to be used for sealing pipes inside and out and for transition shall be submitted to the Engineer. Shop drawings showing reinforcement of manhole base sections, intermediate sections, conicals, and top slabs shall be submitted for approval on all manhole types. All manholes

shall be waterproofed on the outside. Contractor shall provide one coat of Koppers Bitumastic No. 50 (or eq.) from manhole base to 1" above finished grade.

Type 1 manholes shall be equipped with a top slab versus the eccentric conical for the standard manhole. The top slab shall be equal to Oldcastle Precast EMM4DTOPSLAB W/G and shall be equipped with lid as described below.

CASTINGS & DETAILS:

A. Frames and lids -

Standard manhole castings shall consist of cast iron frames and 22-3/8" dia. clear opening weighing not less than 415 lbs. per frame and cover, dimensioned as shown on the Plans. Manhole lids must be set neatly in the rings, with contact edges machined for even bearing and tops flush with ring edge. They shall have sufficient corrugations to prevent slipperiness and be marked in large letters, "SANITARY SEWER". Lids shall have two pick holes about 1-1/2" wide and 3/4" deep with 3/8" undercut all around. Lids on sanitary sewer manholes must not be perforated. They shall be Neehan Foundry Company No. R 1736-A or approved equal. Manhole frames which do not utilize an extended lip as detailed on the drawings to prevent sliding of frame **shall not be accepted**. The Contractor shall consider these clearance requirements for conical casting.

Type 1 manholes shall be equipped with Neehan R-6050 cover and frame, 310#, marked Sanitary Sewer, or approved equal.

B. Steps -

No steps are used in any manhole for this project.

C. **H₂S Protection** –

Where indicated on the Manhole Schedule on the drawings, manholes shall be provided with hydrogen sulfide protection. Any manhole located downstream of (and on the mainline) the discharge from the Coalfields Industrial Park Dual Force Main shall receive this treatment. The selected method of doing this is to batch the concrete for these manholes using XYPEX Admix C-500 (or C-1000 if indicated) and to provide a finish coating of CCI Spectrum, Inc. Spectrashield, or Engineer approved equal. The concrete batch plant shall provide certification to the Utility Relo. Engineer that the XYPEX Admix C-500 was dosed and applied as recommended by the manufacturer. The Spectrashield shall be installed after the manhole has been placed in its final planned location, and shall be applied by a Manufacturer pre-qualified Applicator. Spectrashield shall be installed in complete conformance with the Manufacturer's written specification dated 2014 or later. The coating shall be warranted by Manufacturer and Applicator against failure for a period of 10 years as described in the Manufacturer's written specification.

D. Manhole Placement Over Existing Line –

The drawings detail how a new manhole is to be placed over existing line. The purpose of this installation is to allow the existing sanitary line to function until the appropriate time when the existing sanitary line can be taken out of service.

E. Manhole Abandon/Remove –

The drawings detail how an existing manhole is to be abandoned or removed. As shown on the drawings additional work is required for both types of this work. Unit price items (for example crushed stone) will be paid at their bid price for this work.

20. TIE @ EXISTING MANHOLE:

The drawings detail the work that is required at existing manhole tie-ins. The tie-ins shall consist of carefully removing the existing pipe and grout and reinserting the new pipe and re-grouting to form a water tight seal. Carefully smooth the entrance with new grout to prevent having rough edges which may collect debris. Install a new NPC Kor-N-Seal II, or approved equal, at each inlet. Review the drawings for time limitations for all tie-ins. Before beginning work for making ties, contact City of Hazard officials so they can notify customers of possible service disruptions.

21. TYPE I SANITARY BLOWOFF:

This bid item pays for the work as detailed on the plans required at blow-offs which are required (only) for system startup. This work includes, but is not limited to:

M.J. tee sized per mainline with 4" branch, PVC pipe and M.J. fittings as detailed, 2" red brass as detailed, 2" thrd. Ball valve with lever, and meter box & lid as detailed. Concrete used will be paid at its separate bid unit price.

22. STANDARD 4" FORCE MAIN CLEANOUT:

This bid item pays for all work and materials as detailed on the drawings. The 4" valve and box and crushed stone will be paid at their bid unit prices. Materials to be provided and installed include a F.M. size x 4" wye and 45° elbow, both fabricated fusion welded if used on PE F.M. or M.J with grip rings if used on PVC, PE to PVC adapter if used on a PE F.M., additional M.J. fittings with grip rings as detailed, and box (same as ARV box) with threaded PVC cap as shown.

23. FORCE MAIN DOUBLE CLEANOUT:

The drawings detail the requirements for this cleanout. As shown, provide (2) PE to PVC adapters if installed on a PE force main, install (2) main size x 4" T-Wyes with grip rings, install (2) 4" M.J. elbows with grip ring on lower end and a tapped plug on the upper end,

install (2) 2" brass threaded nipples, install (2) 2" brass threaded full port ball valves and lever, and install (2) meter boxes & lids as detailed. The required mainline valve & box and any concrete shall be paid at their bid unit price.

24. REMOVE/REPLACE AIR PUMP:

At the location shown on the plans the Contractor shall be require to remove and then to relocate an existing air pump. The air pump shall be re-located to a location specified by the gas station Owner. This Bid Item pays for all work and materials to complete this work.

25. ALL S.S. TIES:

The drawings indicate where tie-ins to existing force mains or gravity lines are to be made, and should give an indication of the work and materials involved to make the same. These ties are listed below and the sheet on which they appear is also listed. .

SEWER TIE #	DESCRIPTION	SHOWN ON
Tie #1	10" fittings as req.	U02
Tie #2	10x10 Tapping Sleeve & 10" Tap. Vlv.	U03
Tie #2a	Tie @ L.S. Wetwell, cored hole, 12" x 45° MJ x PE Bend	U04
Tie #3	Tie @ M.H., cored hole	U07
Tie #4	8" & 6" Fittings as req.	U07
Tie #5	New M.H. over exist. 10" Line	U08
Tie #6	6" Fittings as Req.	U08
Tie #7	4" Fittings as Req.	U03
Tie #8	4" Fittings as Req.	U03
Tie #9	6" & 8" Fused Fittings as Req.	U08

26. S LATERAL SHORT SIDE 06 INCH:

The plans detail locations where laterals will be completed to serve existing sanitary sewer customers. This Bid Item shall pay for the use of a **Licensed Plumber** in the State of Kentucky to complete all of this work, shall pay for all 6" SDR 26 lateral used, pays for the lateral cleanout as detailed, pays for the mainline T-Wye, and pays for all other work and materials used to complete this reconnection to the sanitary sewer. All lateral work shall be completed in accordance with the **Kentucky State Plumbing Code**. All lateral tie-in locations to the mainline shall be carefully documented by the Contractor by measuring from the upstream manhole along the main to the point of tie-in. This measurement will be shown on the red-line set of plans maintained by the Contractor and the **Contract will not be considered to be complete** until this is submitted to the Utility Relo. Engineer for all lateral tie-ins

27. BY PASS PUMPING:

This Bid Item pays for the equipment, materials, and all else to pay for By-Pass pumping at the locations shown on the plans. The Contractor shall provide equipment suitable to adequately pump the required rate of sanitary sewerage without providing backup or creating other issues. Prior to beginning by pass pumping work Contractor shall submit a listing of his equipment proposed including available pumping rate/s to Utility Relo. Engineer for approval.

28. SEWER PIPE JOINT RESTRAINT, LINES W & X:

Sanitary sewer lines "W" and "X" are laid at extreme grade. As shown on the plans, the pipes have significant concrete anchors placed at every other pipe joint. (36' on center). At all other joints (where there is no concrete anchor) for these pipe runs where grade exceeds 25% joint restraint shall be installed. This joint restraint shall consist of Ford Meter Box Company Series 1390-P, the Romac equivalent, sewer pipe restraint, or Engineer approved equal.

29. VORTEX FLOW INSERT:

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Furnish and install Vortex Flow Insert and all associated mounting and connection materials in a drop structure as indicated on the drawings and specified herein.

1.02 REFERENCES

- A. American Water Works Association (AWWA) Standards:
 - 1. C900: Standard for Polyvinylchloride (PVC) Pressure Pipe and Fabricated Fittings, 4 to 12-inch nominal diameter.
 - 2. C905: Standard for Polyvinylchloride (PVC) Pressure Pipe and Fabricated Fittings, 14 to 48-inch nominal diameter.
- B. Canadian Standards Association (CSA) Standards:
 - 1. B137.3: Fabricated Fittings
- C. Canadian General Standards Board (CGSB) Standards:
 - 1. CAN/CGSB-41-22-93: Fiberglass
- D. American Society for Testing and Materials (ASTM) Standards:
 - 1. C581-00: Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service

PART 2 – PRODUCT

2.01 DESIGN REQUIRMENTS

- A. The Vortex Flow Insert consists of a Vortex Top Form, a Vortex Shaft and an Energy Dissipation Pool.

- B. Vortex Flow Insert shall be designed to operate effectively with flows between 15% and 115% of their rated capacity, unless otherwise specified. Design flow is a maximum rate of 1,500 gpm.
- C. Contractor is responsible for securing, supporting and connecting the Vortex Flow Insert to existing influent pipe and manhole structure as shown on the drawings and as specified herein. All attaching hardware shall be constructed of 316 Stainless Steel.

2.02 MANUFACTURING

- A. All Vortex Flow Inserts will be manufactured by IPEX USA L.L.C (1-800-463-9572) or an IPEX authorized Sub-Contractor, or an approved equal (see below). The manufacturer of the equipment on which the design is based is IPEX Inc. The Contractor shall use IPEX Inc. equipment to calculate final cost in his Base Bid. The Contractor is encouraged to list alternate manufacturers and cost for the same or similar equipment in his Bid. Any manufacturer other than IPEX Inc. will be subject to a post bid review for approval.
- B. All pipe sections used in the fabrication of the Vortex Flow Insert must be manufactured to AWWA C900 and/or AWWA C905 standards.
- C. All pipe sections used in the fabrication of the Vortex Flow Insert must be CSA Certified to CSA B137.3
- D. All PVC sheet used in the fabrication of the Vortex Flow Insert is to be of 1/4" minimum thickness. The ramp is made of two layers of ¼ " sheet for structural integrity .
- E. All Roving used in the fabrication of the Vortex Flow Insert is to be 24oz/sqyd minimum.
- F. All Mat used in the fabrication of the Vortex Flow Insert is to be 1-1/2oz/sqft minimum.
- G. All Derakane used in the fabrication of the Vortex Flow Insert will be of minimum grade 470-300.
- H. All resin used in the fabrication of the Vortex Flow Insert will be determined by supplier to meet the specific requirements of the fluid and the temperature.

2.03 QUALITY ASSURANCE

- A. Acceptance at site:
 - 1. The quality of all materials shall be subject to inspection and approval by the Engineer. The Vortex Flow Insert shall be subject to rejection upon delivery on account of failure to meet specification requirements. If any material is damaged between the times of delivery and the completion of installation, it shall be repaired or replaced, at the expense of the Contractor.
 - 2. Materials will be inspected for compliance with specified standards and the specifications herein. In addition, all materials shall be inspected for general appearance, dimensions, and cracks.

3. Minor imperfections may be repaired, at the expense of the Contractor.
All repairs shall be inspected before final approval by the Engineer.

2.04 MOUNTING HARDWARE & SUPPORT STRUCTURE

- A. Contractor shall provide all labor, materials, equipment, services and incidentals as shown or specified and required to furnish and install and place in satisfactory service the Vortex Flow Insert as designed and specified by the Engineer.
- B. All bolts, fasteners, straps, supports and mounting hardware shall be 316 SS, so to provide acceptable corrosion resistance.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install Vortex Flow Insert in accordance with plans.
- B. Align Vortex Flow Insert plumb, true, and correct as recommended by the manufacturer.
- C. Anchor Vortex Flow Insert as shown on the plans and as recommended by the equipment manufacturer.
- D. Provide spacers and supports for Vortex Flow Insert as recommended by the equipment manufacturer.
- E. Provide a watertight connection between Vortex Flow Insert and influent pipe through the use of non-shrink sealant/grout.
- F. Protect Vortex Flow Insert from water and debris entering structure during construction.
- G. Support all work until permanent support has been installed. Contractor is responsible for furnishing and installing temporary and permanent support systems.

30. CRUSHED STONE MATERIALS:

All Crushed Stone materials shall conform to the applicable sections of Standard Specifications for Road & Bridge Construction, KYTC. The Crushed Stone Bid Item shall include all required materials ranging from DGA to #2 stone as indicated in the above specifications. The Engineer will only pay for crushed stone where original delivery tickets are provided for his records. If used, Class II & Class III Stone is Channel Lining, Class II & Class III, as designated in the above specifications. **Contractor should specifically note that crushed stone for backfilling and creating a pipe base is included in his unit price for that piping.**

31. CONCRETE WORK:

(a) Proportioning Mix:

Concrete is to be proportioned in three classes according to use as follows:

Class "A" for reinforced concrete structures, surface courses of highway, and street paving. This concrete type is noted as "**Detail Concrete**" on the plans.

Class "B" for reinforced concrete structures, and special anchors or supports. This concrete type is for use where significant forming and/or reinforcement is required. Batching and strength shall match Class A concrete.

Class "C" for interceptor structures, curbs, gutters, driveways, sidewalks, base courses for highway and street paving, thrust blocks, creek crossings, and valve pads. This concrete type is noted as "**General Concrete**" on the plans and on the Bid Form.

Class "A" concrete is to be proportioned one 94 lb. sack of Portland Cement, 195 lbs. of sand, 270 lbs. of coarse aggregate, and no admixture. These proportions may be varied by the Engineer after the materials supplied have been tested and proportions for the greatest density and workability determined, provided that no more than 7.25 nor less than 6.50 bags of cement per cubic yard of concrete will be required. Class "A" concrete shall have a minimum compressive strength of 4,000 lbs. per square inch in 28 days. Where instructed by the Engineer, the Contractor shall place reinforcement as outlined in special notes of these specifications or as detailed on the drawings.

Class "C" concrete shall have a minimum compressive strength of 3,000 lbs. per square inch and shall contain not less than 5.5 sacks of cement per cubic yard of concrete. The relative amounts of fine and admixture will not be required.

The water used in mixing must be a minimum required for a plastic mix. No water will be permitted to be used for purpose of hastening mixing and reducing of tamping and vibration.

The water content allowed will be at all times subject to regulations by the Engineer. In the case of Class "A" concrete, not more than five and one-half gallons of water to the bag of cement will be allowed in mixing concrete (or proportionately less when slump is about 4" and/or mix is wet), except in cases where, in the judgement of the Engineer, additional water is necessary to obtain proper results.

Batching equipment shall include scales for weighing contents of wheelbarrows and a device for accurately measuring water by the gallon, to be used for proportioning each batch.

In case of ready-mixed concrete, specifications for proportioning of mixes shall be the same, except that from the manufacturer's experience with his own aggregates, he shall vary proportions of sand and coarse aggregate for the greatest density and workability of mix. Prior to actual delivery of concrete, and at any change of proportioning, the manufacturer shall furnish a statement to the Engineer giving the proportion by weight (dry) of cement and of fine and coarse aggregates that will be used in the manufacture of each mix ordered. Proportions must be approved by the Engineer. Otherwise, proportioning of mix and batching plant shall be according to ASTM Designation C-94, latest revision, specifications for ready-mixed concrete.

(b) Forms:

Forms for concrete with exposed surfaces shall consist of dressed and sized lumber or metal and must match on edges sufficiently to prevent leakage of mortar. Forms shall be built to such accuracy and braced to such an extent that they shall not vary from true lines and surfaces where exposed more than 1/4" before pouring concrete, nor more than 3/8" after pouring. Angle strips (3/4" size) shall be placed in all exposed corners of forms.

(c) Steel Reinforcement Placing:

All such steel shall be delivered in new condition either clean or with only a slight coating of rust. If stored on the site it must be kept under shelter or supporting at least 12" above ground to prevent its becoming coated with dirt and when placed in forms it must be free from scale or dirt.

When placing in forms, steel must be tied together to form a rigid frame before pouring concrete and must be secured in the walls or slabs in such a manner as to insure its holding and position designed for it in the finished work by use of form stands, steel or concrete chairs or spacers. As a rule, steel bars must have a minimum covering of 2" when exposed to air and a minimum of 3" when exposed to earth" of concrete, unless otherwise noted on the plans. All splices shall be 24 diameters long and 1" between spliced bars.

(d) Mixing and Placing:

Concrete shall be thoroughly mixed at least two minutes after all materials, including water, are in the mixer drum having a capacity of at least one sack batch.

Concrete must be poured into forms slowly enough to permit thorough tamping and vibrating to eliminate any honeycombed surfaces.

Concrete pouring will not be permitted under conditions where there is danger of freezing or when materials are frozen. After pouring, concrete must be protected from freezing weather for at least 72 hours.

Ready-mixed concrete delivery facilities pledged to the concrete pour shall be

approved by the Engineer before permission will be given to start the pour. The period between termination of placing by one truck and starting by the next shall not be longer than 10 minutes at temperatures above 70° F., nor longer than 20 minutes below 70° F. The concrete in a truck mixer or agitator must be totally discharged within 1-1/2 hours after the introduction of mixing water to the cement and aggregates. The mixing operation shall begin within 30 minutes after the cement has been intermingled with the aggregates. Otherwise, mixing, mixers, agitators, and inspection shall be according to ASTM Designation C-94, latest revision, specifications for ready-mixed concrete. Non-agitating trucks for hauling concrete from central mixing plant will not be accepted.

(e) Tempering:

All concrete must be kept wet or moist for a period of at least 48 hours after pouring in order to prevent too rapid drying out. In dry weather, wooden forms must be thoroughly wet before concrete is placed in them and must also be kept in this condition during the period above mentioned. Concrete must be covered and kept damp to protect it from the sun as soon as the surfaces are firm enough to allow the placing of such covering or protection.

TESTING CONCRETE

(a) Slump Test:

At least one slump test shall be made before first concrete pour, at the start of pouring any concrete and at each 5 cubic yards deposited during one operation. These shall be made from samples as those taken from cylinder tests and records of same kept therewith. Tests shall be made according to ASTM Designation C-143 and as required under ASTM Designation C-94, for ready-mixed concrete. Mix is designed for a slump test of 2" and not more than 4", except in cases where thin sections would indicate, in the opinion of the Engineer, that a wetter mix is more desirable. The **Contractor** shall furnish necessary equipment for the slump tests.

(b) Cylinder Test:

Cylinder tests will be taken on all important structures such as the storage tank or Booster Station. However, on line work for sewer and waterline requiring only small amounts of concrete per pour, the cylinder tests will be waived. However, should the Engineer have reason to doubt that the concrete being furnished meets the strength requirements, he shall have the right to order cylinder tests according to the following specifications:

At the start of concreting or before, if practical, the **Contractor** shall make from a single batch a set of four (4) cylinders per ASTM Designation C-31. Two (2) shall be tested at 7 days and two (2) at 28 days per ASTM Designation C-39.

At each time when five or more cubic yards of concrete are placed during one operation and when the sum of smaller deposits of concrete equal 10 cubic yards since previous test and at any change in the mix four (4) cylinder tests will be required, two tested 7 days and the other two at 28 days per ASTM Designation C-39. In case of ready-mixed concrete, requirement for testing of ASTM Designation C-94 and C-172 shall be added. Class "A" concrete sampled shall show a compressive strength of not less than 3,000 lbs. per square inch in 7 days and 4,000 lbs. per square inch in 28 days. Class "C" concrete shall have a compressive strength of 3,000 lbs. per square inch in 28 days. Seven (7) day tests on Class "C" concrete shall have the same relation to 28 days requirements.

The **Contractor** shall furnish all equipment for sampling and curing on the job and shall bear the cost of laboratory curing and testing.

32. PAVEMENT REPLACEMENT:

All replacement pavement shall conform to the applicable section of Specifications for Road and Bridge Construction, Kentucky Transportation Cabinet. All areas which are to be repaved shall first be sawn to full depth. Pavement edges shall not be broken or ripped by backhoe or other equipment. Paving quantities as shown on the Bid Form are calculated for crossings and/or areas which are designed as constructing under pavement and are not anticipated to be part of the Roadway Construction. Bid quantities do not include pavement repair on the edge of roads damaged by your construction activities. Certain areas of the project may require that unavoidable damage occurs along roadway edges. If this is the case, at the discretion of the Engineer, payment will be made for pavement replacement at your bid unit price. However, should pavement damage be caused by your willful disregard of reasonable construction technique and room existed for pipeline (or other items) placement without damage to the pavement, this **pavement shall be repaired to original or better condition at your sole expense.** The decision of the KYTC Engineer is final.

33. DRAIN CROSSINGS:

- 1) The following Specification will be followed, with no exceptions, to protect the aquatic life within the waters of the Commonwealth.
- 2) When making a drain crossing it shall be completely dry, with no visible flow. The drain shall be excavated to grade, pipe installed, backfill installed, backfill compacted by tread or other methods, to density satisfactory to the Engineer, and cap installed if appropriate. The drain shall, in all cases, whether caused by your work in, nearly, parallel, or upstream, remain clear of sediment.
- 3) The required structures for silt control, as determined by the Engineer, shall be put in place to satisfy Paragraph 2 of this Section.

After this, if required by drain bottom conditions (see Paragraph 4 below) apply drain crossing concrete. After Application of concrete, apply re-vegetation measures to the drain crossing (see other sections of these specifications). If you do not have the ability to complete these operations within a twenty-four (24) hour period, **DO NOT BID THIS PROJECT.**

- 4) All drain crossings as noted on plans shall have a minimum cover of 36" as measured from the original channel floor. Bedding shall be the same as that for "open areas" shown on the "Standard" sheet with the following exceptions:
 - A. Begin at 6" above pipe and refill with removed material.
 - B. 6" from orig. channel floor use Class "C" concrete flush to top of rock.

If channel floor is not of a rocky nature, then this requirement may be waived at the discretion of the Engineer.

34. SURVEY REQUIREMENTS:

The Contractor is responsible for having the proper equipment and personnel adequately skilled and trained to perform all survey requirements. The Contractor is responsible for re-establishing, and establishing, all noted elevations. The Contractor is also responsible for establishing all horizontal locations throughout the project. The Contractor is responsible for comparison of horizontal and vertical location with that planned by running from established bench marks. The Contractor shall report any difference found between that planned and his established horizontal and vertical location to the Utility Relo. Engineer. The Contractor is responsible for determining any gross grade conflicts before he begins any line segment.

35. PVC PIPE FOR WATER - CLASS 250:

All Waterline designated as PVC shall be PVC type pressure pipe designed ASTM Class 250 of the Integral Bell Joint type. The pipe shall conform to ASTM 2241 for Standard Dimension Ratios, SDR 17 for pressure characteristics. The pipe shall be extruded from clean, virgin, approved class 12454-A PVC compound conforming to ASTM resin Specification D1784. Rubber rings shall conform to ASTM D 1869. This pipe shall be North American, JM, or National PVC Pressure pipe or approved equal. Laying radius of pipe shall in all cases be equal to, or greater than, that listed by the manufacturer of the pipe. All tees, elbows, and bends shall be Mechanical Joint unless noted on the Plans. All mechanical joint fittings shall be equipped with grip rings.

36. DUCTILE IRON PIPE FOR WATER:

All pipe designated as ductile iron shall be of Grade 60-42-10 material meeting AWWA C151 Minimum physical properties. Thickness of the pipe shall be determined in accordance with ANSI/AWWA C150/A21.50 and shall be Type 4 Bedding Condition except in high traffic areas where Type 5 Bedding shall be used; all pipe 16" and smaller shall be Pressure Class 350 with the exception of 4" and 3" which shall be thickness Class 51. Joints shall meet the requirements of AWWA C111 for Fastite Joint Pipe ANSI/AWWA C151.51 and Mechanical Joint ANSI/AWWA C111/A21.11. Pipe shall be equal to that manufactured by the U. S. Pipe Company or approved equal. All tees, elbows, and bends shall be Mechanical Joint. All mechanical joint fittings shall be equipped with grip rings, or in the case of 16" pipe retainer glands. The exterior of the pipe shall be furnished with an asphaltic coating. Installation shall be as recommended by the manufacturer in their printed manual. Pulling devices and tie-in devices shall be that normally furnished by the manufacturer for this type of installation. Where ductile iron pipe is being used to cross areas which may be contaminated with gasoline or gasoline type substances (these areas clearly shown on the plan), the Contractor shall use gasket material recommended by the pipe manufacturer as being impervious or highly resistive to degradation from gasoline type chemicals. Nitrile Rubber Gaskets are satisfactory. Pipe which is noted as D.I.M.J. shall be ductile iron, mechanical joint. Where the Plans designate 3" ductile iron pipe, except where 3" ductile iron pipe is designated within the Pay Limits of a special vault or Booster or Pressure Stations, may substitute, at his convenience, 4" ductile iron pipe. The Unit Price shall be the same regardless. Should the Contractor elect to use 4" D.I. vs 3" D.I., any associated valve or fitting shall be paid at the 3" Unit Price.

37. POLYETHYLENE (PE) PIPE (WATER):

See this same section under the sanitary sewer portion. Same specification with differences of use of type of marking tape and pipe stripe. There are several areas of the project which use differing schedules of pipe. Generally, all polyethylene upstream of the large booster station located along KY 15 shall be DR 9, 250 psi rated pipe. All areas downstream of the booster station shall be DR 7 (or 7.3), ~335 psi rated pipe.

38. VALVES < 14" WATER & SANITARY SEWER:

All valves must be of ductile iron with bronze mountings, unless otherwise specified. Only makers of well-known and approved standings who have been making similar devices for a period of at least ten (10) years, prior to the bid date, will be considered. Also, maker shall be prepared to furnish through the bidder, within one (1) week after award is made, complete catalogues or other descriptive matter giving complete details and dimensions of valves they proposed to furnish.

All valves shall be provided with suitable operating devices and adapted for operation in the position in which they are shown on the plans. All screw operated valves shall open by

turning to the left.

All valves shall have mechanical joints both ends (unless noted on the Plans) and shall conform to A.W.W.A Specifications D-150, N.R.S. complying to A.W.W.A. C222 and ANSI A21.11.

All 4" through 12" Gate valves shall be resilient seat Gate valves, 250 psi max working pressure, 400 psi test pressure, Mueller A-2370-20, Clow or Kennedy equivalent, or approved equal. 3" and smaller Gate valves shall be double disc, parallel seat, bronze faces and disc rings with wedging mechanism simple and direct, Mueller A-2380-20, or approved equal. 1", 1-1/4", and 1-1/2" Gate valves shall be Mueller H-10914, bronze Gate valve with solid wedge and F.I.P. thread with appropriate fittings and hand wheel. All valves shall conform to the latest revision of "Specifications for Gate Valves for Ordinary Water Works Service," adopted by A.W.W.A.

39. VALVES, 14" & LARGER:

All valves 14" and larger shall be Butterfly Valves. Valves shall be manufactured in accordance with the latest revision of AWWA C504, Class 150B, and conformed to NSF Standard 61. All butterfly valves for waterline service shall be Mechanical Joint (MJ) unless noted otherwise. Valve body shall be ASTM A126, Class B Cast Iron. Valve seat shall be rubber. Valve bearings shall be self lubricating non metallic material to effectively isolate the disc-shaft assembly from the valve body. The valve disc shall be designed to afford minimal pressure drop and line turbulence. The valve disc shall be constructed of ASTM A126, Class B Cast Iron with a stainless steel type 316 edge. The valve shaft shall of stainless steel Type 304. The valve shall be equipped with an operating nut manual actuator and shall be designed to hold the valve in any intermediate position between fully opened and fully closed without creeping or fluttering. Actuator shall be equipped with devices to prevent over travel of the disc in the open and closed positions. The valve shall be designed for a working pressure of 150 psi. The valve shall be a Mueller Line Seal III, Pratt 2MII, or Engineer approved equal. The Contractor is responsible for determining any clearance issues associated with the installation of these Butterfly Valves.

40. VALVE BOXES:

Valve Boxes for 1" through eight (8") inch valves shall be telescope type with screw top, of extension length suitable for the cover/s noted on the plans. Ten (10") inch and twelve (12") inch valve boxes shall have an extension length ranging from eighteen (18") inches to twenty-four (24") inches. These minimum valve box lengths redefine depth of cover over pipe at valve locations. These requirements shall be maintained. Pieces of scrap PVC or ductile iron pipe with lid installed **shall not** be acceptable. Valve boxes shall be Tyler 461-S for ten (10") inch and twelve (12") inch valves, Tyler 562-S for one (1") inch through eight (8") inch valves and for 16" valves, the Sigma equivalent, or approved equal. All valve boxes shall have a minimum inside diameter of 4-1/4" for intersection with an arc base. **In**

high traffic areas only all valve box lids shall be cast iron and manufactured by the same firm as the box and marked WATER. **In all other areas**, use plastic lid manufactured by Bingham & Taylor, NCUL5LWRDLT with locking tab, H2O load rated, or approved equal. All valve boxes shall have installed a valve box collar similar in all respects to the Cloud Company U-235 Valve Retainer Ring, alternate as shown on the detail sheet, or approved equal.

41. TYPE I, 3" BLOW-OFF:

Type I, 3" Blow-off's shall be self-draining, non-freeze, compression type with 2-1/4" main valve opening. Inlet connection shall be 3" Mechanical Joint. Outlet size shall be 2-1/2" NST. Blow-offs shall have cast iron box, locking lid, and 3" Ductile Iron Riser Pipe. Principal operating parts shall be Brass and be removable from the blow-off for servicing without excavation. Blow-offs shall be set in four cubic feet min. of crushed stone to allow for proper drainage. The blow-off shall be M&H Style 333 Flush Type, the Kupferle equivalent, or approved equal.

42. TYPE II, 3" BLOW-OFF:

Type II, 3" Blow-off's shall be self-draining, non-freeze, compression type with 2-1/4" main valve opening. Inlet connection shall be 3" Mechanical Joint. Outlet size shall be 2-1/2" NST. Blow-offs shall have 3" Ductile Iron Riser Pipe. Principal operating parts shall be Brass and be removable from the blow-off for servicing without excavation. Blow-offs shall be set in four cubic feet min. of crushed stone to allow for proper drainage. The blow-off shall be M&H Style 33 Post Type, the Kupferle equivalent, or approved equal. No pay difference for the blow-off will be made where incoming line is smaller than 3". Any valve used will be paid as a separate unit price item.

43. WATER AIR RELEASE VALVES:

Air Release Valves shall be simple lever, float operated. The body and cover shall be cast iron. The float shall be stainless steel with bronze linkage. All connection sizes shall be as shown on the Plans. The air relief valve shall be so designed as to operate at a pressure of 150 psi. The maximum venting capacity shall be 22 cubic feet of free air per minute. The valve shall be Valmatic 15A, the A.R.I. equivalent, or approved equal. The valves shall be rigidly installed within the box as detailed on the drawings or as recommended by the Valve Manufacturer.

44. WATER ARV BOX AND COVER:

All ARV's shall be installed within a circular plastic meter box of nominal 18"x30" interior dimensions. The properties of the box shall be equal to Mid-States Meter MS 183010. The cover shall be Ford, Type C, appropriately sized, or approved equal.

45. LARGE RIVER TEST STATION:

Large river test stations shall be installed where shown on the Drawings. Where undesignated test stations are shown, they shall be "small" river test stations. Detail for the large test station is shown on Sheet U26 of the Drawings. This river test station consists only of the materials herein specified. The valve is paid at your bid unit price for that item. The river test station consists of a 24" diameter meter box, extension, and the cover as detailed on the drawings. Use 1-1/2" K soft copper for the service tubing, Badger Recordall 1-1/2" Model 120 for the meter, Mueller 1-1/2" No. H-1422-00 copper setter with (2) lock wing meter stops with meter flanges, Mueller H-13000 series service saddle, and Mueller B-25005 Corp stops at the main. All the above materials shall be as specified or approved equal.

46. CAPS OR PLUGS, 2" THROUGH 16":

Where designated on Plans, Mechanical Joint Caps or Plugs, size 2" through 16" shall be installed. These caps shall be equipped with grip rings. No unit price difference will be made between any size or whether a cap or plug.

47. HYDRANT:

At the location/s indicated on the Plans the Contractor shall install new hydrant/s. be required to remove existing fire hydrants. All Fire Hydrants connected to 6" water mains shall have six (6") inch Mechanical Joint connections, use 6" line valve, and be 5-1/4" sized Fire Hydrants. All shall have two hose outlets and one streamer connection designed for 150 pounds working pressure and test of 300 pounds hydrostatic pressure and shall conform to the latest specifications of the A.W.W.A. All working parts shall be bronze. Streamer nozzle shall be National Standard Threads. The two 2-1/2" hose nozzles shall be National Standard Threads. Hydrants shall be designed so that no water will be lost when they are broken off and so they can be repaired in a few minutes with repair kit that is to be furnished.

Design, materials and workmanship shall be similar and equal to the latest stock pattern ordinarily produced by the manufacturer. Length of barrel shall be such to provide thirty (30") inch minimum cover over connecting lines. Working drawings and full description of proposed hydrants shall be submitted to the Engineer before ordering. Hydrant size to be 5-1/4".

Hydrants shall be painted one (1) coat of red paint and two (2) finishing coats of an approved paint of the color directed by the Engineer.

One (1) hydrant wrench and one (1) repair kit including tools for breakable top hydrant shall be furnished. Hydrants shall be set at such elevations that the connecting pipe will have the same depth of cover as the distribution mains. The hydrant shall be set as

shown on the Typical Drawings for fire hydrant setting. The back of the hydrant, opposite the pipe connection, shall be firmly wedged against the vertical face of the trench to prevent the hydrant from blowing off the line. All fire hydrants shall use bridle rods and rod stock shall be installed and shall be protected by a coat of acid-resisting paint. Not less than seven cubic feet of broken stone shall be placed around the base of the hydrant to insure drainage. The backfill around hydrants shall be thoroughly compacted to the grade line in a manner satisfactory to the Engineer. Hydrants shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the hydrant shall be inspected in opened and closed positions to see that all parts are in working condition.

Hydrants shall be Mueller Super Centurion 200, Cat. No. A-423, with two (2) hose nozzles and one (1) pumper nozzle, or approved equal.

NOTE: All fire hydrants to be connected using same type (PVC, C900, or D.I.) line as to the main to which they connect. Contractor shall also review the project Drawings to see the requirements for tying all hydrants back to mainline tees. This tying shall consist of either duc-lugs and all-thread or grip rings when PVC pipe is used. When ductile iron pipe is used, retainer glands (or grip rings) will be considered equal to the above.

48. ALL WATER TIES COMPLETE:

The drawings indicate where tie-ins to existing waterlines are to be made, and should give an indication of the work and materials involved to make the same. These ties are listed below. Additionally listed is the plan sheet where these tie-ins occur.

WATER TIE #	DESCRIPTION	SHOWN ON
Tie #1,	16x16 Tapping Sleeve & 16" Tapping Vlv.	U03
Tie #2,	16x6 Tapping Sleeve & 6" Tapping Vlv., 16" Cap	U03
Tie #3,	6x6 Tapping Sleeve & 6" Tapping Vlv., 6" cap	U03
Tie #4,	8x8 Tapping Sleeve & 8" Tapping Vlv., 8" cap	U03
Tie #5,	16x16 Tapping Sleeve & 16" Tapping Vlv., 16" cap	U04
Tie #6,	6" Fittings as Req.	U04
Tie #7,	16x6 Tapping Sleeve & 6" tapping Vlv.	U07
Tie #8,	16x16 Tapping Sleeve & 16" Tapping Vlv., 16" cap	U07
Tie #9,	6x6 Tapping Sleeve & 6" Tapping Vlv., 6" cap	U08
Tie #10,	2" fittings as req.	U08
Tie #11,	8x8 Tapping Sleeve & 8" Tapping Vlv., 8" cap	U09
Tie #12,	16" Tie-in to Exist. 16" Stubout w/ cap	U08

49. SERVICE BORE:

At the location/s shown on the Drawings, the Contractor shall construct service bores under roadway or other structures as indicated. All service bores shall be completed using equipment specifically designed for this work. The pay for completing this work is included under the KYTC Bid Item "W Service Long Side ¾" (or 1") which also includes the service line and reconnection work..

50. CHECK VALVE VAULT:

At the location Shown on the plans the Contractor shall construct a check valve vault. The vault is detailed on Sheet U03 of the plans. As shown, use an 8" flanged Mueller A-2600-6 Lever & Weight swing check valve, bronze face. Install (2) 8" D.I. Flgd.x PE spool pieces to allow placement of the 8" valves (paid at their Bid Unit Price) as shown. Install the check valve in a 36" diameter plastic meter box with depth adequate to give the 36" of cover as indicated. Provide and install a Ford MC-36 Monitor Cover with locking lid. All materials listed in this specification are for setting the standard of quality only, or approved equal applies to all cases.

51. TAPPING SLEEVES & TAPPING VALVES:

PVC pipe wet taps shall use "wrap around" sleeves which shall be stainless steel equipped with 304 L stainless steel outlet flange and shall be Mueller H-304SS, Cascade Extra Heavy, or Engineer's approval equal. All "wrap around" sleeves shall be rated for 250 psi working pressure. All "wrap around" sleeves shall be the longest laying length of any model and size offered by a particular manufacturer in their standard production line.

All Ductile Iron (D.I.) pipe wet taps shall use "**Full Body**" Mueller catalog number H-615 mechanical joint tapping sleeve, the Kennedy equivalent, or Engineer approved equal.. Tapping sleeve shall be rated for 250 psi maximum working pressure.

Regardless of pipe and sleeve type, Contractor shall carefully clean the entire pipe area where the sleeve will cover and an additional 6" on each side of the sleeve so to ensure a good seal for the sleeve.

All tapping valves 12" and smaller shall be Mueller T-2360, flanged x M.J., equipped with grip ring on the M.J. end, the Kennedy equivalent, or Engineer's approval equal. All tapping valves 14" and larger shall be Mueller T-2361, flanged by M.J., equipped with grip ring on the M.J. end. All tapping valves shall have a rated working pressure of 250 psi minimum.

52. SERVICE OR METER RETIES (¾" & 1" SERVICE CONNECTION):

At the locations indicated on the Plans, and other locations as may become apparent,

provide 3/4" and 1" re-connection of existing 3/4" or 1" water meters. Replacement of the meter, meter box, or reading equipment is not included in this bid item. KYTC uses a Bid Item entitled "W Service Short Side (3/4" or 1")" for this same work. As indicated on the detail given in the plans, when using ductile iron pipe it shall be directly tapped for the appropriate size using AWWA taper. Following this use a Mueller B-25008 ball valve in the tap. This ball valve is equipped with a compression fitting on the discharge side. As indicated on the drawing, thoroughly compact the DGA (if used vs flowable fill) under the tap so no undue stress is placed upon the tap. Service tubing, concrete, pavement and other items necessary to complete this tie will be paid at your bid unit price.

53. STANDARD METER SETTING EQUIPMENT:

Meter yoke to be Mueller 1404-2 with non-approved Dual Check Valve feature, 7" to 9" riser height with valve for 5/8" x 3/4" meter unit. Unit shall be copper. Service saddle shall be bronze, Mueller Single Strap H-13000 Series. Corp. Stop to be Muller 15008. All the above materials shall be as specified or approved equal.

54. METERS, STANDARD:

All meters shall be Badger Model 25, or approved equal, with bronze case, suitable for operation with remote meter reading system. Meter shall be designed to permit the use of either a straight reading, environmentally sealed local register and remote reading electronic register. The registration reading shall be US Gallons. The register shall not be in contact with the water being measured. The transmitter/register devices shall be designed to permit removal and exchange without the removal of the meter from the service installation or interruption of service water supply.

The transmitter shall use the most current and up to date battery/s available from the manufacturer as a power source and said battery/s shall be guaranteed for a minimum of ten (20) years from initiation of operation. The transmitter shall be guaranteed for a minimum of twenty (20) years.

This unit shall be capable of providing optional leak detection when no two hour window of no usage within a 24 hour period is detected. It shall also be capable of tamper detection such as a cut wire. The meters and meter reading software shall be fully compatible with the existing City of Hazard meter reading software and hardware and shall be compatible with existing City of Hazard billing software. All meters shall have a production date no earlier than 6 months prior to their installation.

55. REMOVE/RELOCATE WATER METERS:

Sheets U5 of the plans shows two (2) water meters which may have to be removed and then relocated in a nearby location. If this is required, this Bid Item pays for the work

associated with this effort.

56. GEOTEXTILE

SCOPE

This work shall consist of furnishing and placing geotextile beneath ditches, around subsurface drains, and/or other applications as directed by the ENGINEER.

MATERIALS

Geotextile used on the project shall be a non-woven, polyester or polypropylene fabric meeting the following minimum physical properties.

Minimum Physical Properties Geotextile	
Property	Value
Burst Strength	300 psi
Grab Strength	160 lbs.
Permeability	3×10^{-1} cm/sec
Apparent Opening Size	0.21 - 0.15

The CONTRACTOR shall submit, for each roll of geotextile material delivered, a certification that the delivered products meet or exceed the values specified in this section, and all supporting data.

INSTALLATION

The surface to receive geotextile and aggregate shall be prepared to a relatively smooth condition free of obstructions, debris, or sharp objects that may puncture the fabric. The fabric shall be placed with long dimension parallel to the flow line and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. If more than one strip is necessary, the strips shall overlap (longitudinally) a minimum of 24 inches. Transverse overlaps shall be a minimum of 18 inches and shall be placed so the upstream strip overlaps the downstream strip. Fastener pins shall be installed through the midpoint of the lap and at any other locations as necessary to prevent slippage of the geotextile.

The geotextile shall not be exposed to sunlight for a period greater than two weeks. If the fabric is damaged during construction, the torn or punctured section shall be repaired by placing a piece of fabric that is large

enough to cover the damaged area and meet the overlap requirement.

The geotextile shall be protected from damage due to the placement of the channel lining by limiting the height of drop of the material to no greater than three (3) feet, or by placing a cushioning layer of sand on top of the fabric before dumping the material, at the CONTRACTOR'S option. Fabric shall not be placed until it can be covered with stone promptly to avoid damage from water, wind, and deterioration from undue exposure. The CONTRACTOR shall demonstrate that the placement technique will not damage the fabric.

MEASUREMENT AND PAYMENT

No payment will be made for the geotextile as it considered incidental to all other items of work.

57. D.I. PIPE FIELD LOCK GASKETS:

Where indicated on the plans (on both ends of any significant length HDD run) the Contractor shall use joint restraint for push-on joint ductile iron pipe. The field lock gaskets shall be installed at the first three joints of ductile pipe following the transition from PE to D.I. or a minimum length of 54', whichever is longest. The field lock gasket shall be U.S. Pipe Field Lok Gasket, or Engineer approved equal.

58. LINE & VALVE MARKERS:

At the locations noted on the drawings, line and valve markers shall be placed for water, gas, and sanitary sewer. The markers shall be Carsonite Composites CRM3-066-08 (blue) with white graphics for water, CRM3-066-02 (yellow) with black graphics for gas, and CRM3-072-07 (white) with green graphics for sanitary sewer, or Engineer approved equal. All markers shall be equipped with optional anchor barb.

59. TEMPORARY PIPE SUPPORT (GAS & WATER):

Sheet U04 of the plans shows the area where a 6" PE water line and a 4" PE gas line must be temporarily supported as a new 60" storm pipe is to be constructed crossing KY 550. This Bid Item pays for the work and materials involved to complete this effort. The pipes shall be supported in a manner which does not put undo strain on either pipe.

60. GAS VALVE AND BOX:

Gas valve to be constructed of Marlex TR 418 material. Valve to be Rockwell Polyvalve Ball Valve, #82211, or approved equal. Valve Boxes for 1-1/4" to ten (10") inch valves shall be telescope type with screw top, of length for thirty-three (33") inch to forty-two (42") inch pipe cover over the top of the pipe. They shall have a minimum inside diameter of 4-1/4" for intersection with an arc base. Valve boxes shall be Mueller No.

H-10366 as manufactured by the Mueller Co., Decatur, Ill., or approved equal. Valve box lids shall be Mueller H-10369 or approved equal and marked "**GAS**". All valve boxes not installed in pavement (bituminous or concrete) shall have installed a valve box collar similar in all respects to the Cloud Company U-235 Valve Retainer Ring, alternate as shown on the detail sheet, or approved equal.

61. PE GAS PIPE AND FITTINGS:

Gas pipe and fittings shall be polyethylene PE 2406 (Yellow) SDR 11. The pipe shall conform to ASTM D 1248, and ASTM D 3350 for a PE 2406 material. All pipe and fittings shall meet requirements outlined in currently approved ASTM D 2513 specifications, ASTM D 3261 specification, and Department of Transportation Title 49, Part 192. 90 degree elbows to be socket type. All pipe and fittings to be Drisco Pipe 6500 (PE 2406), or approved equal. All PE pipe shall be fused in strict accordance with manufacturers instructions. Contractor is responsible for having personnel adequately trained for this installation.

62. GAS SERVICE TUBING:

All gas service tubing to meet ASTM D2513 and SDR 11, be of Yellow P.E. 2406 material. All service line to be Drisco Pipe 6500, or approved equal.

63. GAS LINER PIPE:

Liner Pipe of the size and location as shown on the Plans shall be placed and has been previously specified. Differences for spacers and end seals are discussed as follows: The unit price for gas liner pipe includes the cost of purchasing and installing Phillips Engineering Model PE-MS 500 plastic casing insulators (or approved equal), spaced at five feet on center, and located no farther than two feet from each end of the liner pipe, and for the installation of casing end seals. These end seals shall be Phillips Engineering Company (PECO) Model C Custom, or approved equal. All liner pipes for gas shall slope up to the vent end at 4% minimum grade. If this minimum slope cannot be obtained vent both ends of the liner pipe.

64. GAS LINE VENTS:

Gas line vents shall be of the arrangement as shown on the Plans. Size of all anticipated gas line vents is 2" inside diameter. All gas line vent pipe shall be Schedule 40 Welded and seamless wrought steel pipe. All vent pipe shall be new. Where gas line vents are exposed, they shall receive two (2) coats of "Safety Yellow" epoxy paint. This epoxy paint shall extend to a min. of one foot below regrade. All fittings shall be Full Weld type including the return bend as detailed. The return bend shall be equipped with stainless steel insect screen to prevent insect entry. The insect screen shall be installed to enable it to be periodically cleaned. The top of the return bend shall be installed 48" above finished

grade. The final bend up to the vertical portion of the vent shall be a minimum of 24" below finished grade. This final vertical vent portion shall be adequately tamped and braced per good construction technique. All vents shall be placed in a location which does not present a traffic hazard.

65. GAS TIE-INS:

All gas tie-ins are proposed to be completed by squeezing off both sides of the line where the tap is planned to go, then accurately cutting the pipe for the planned tie-in type. The Contractor shall use only tools approved and designed for this use and for this pipe type, and shall use these approved tools in a manner that is appropriate for this work. All planned tie-ins are in areas where PE pipe has been used. Should Contractor discover any other pipe type he shall immediately contact the Relo. Engineer. Contractor shall use devices which will accurately cut and align (milling and alignment jigs) all tie-ins.

The drawings indicate where tie-ins to existing gas lines are to be made, and should give an indication of the work and materials involved to make the same. These ties are listed below. Also listed is the plan sheet where these gas line tie-ins occur.

GAS TIE #	DESCRIPTION	SHOWN ON
Tie #1,	4" Fittings as Req.	U04
Tie #2,	4" Fittings as Req.	U04
Tie #3,	4" Fittings as Req.	U05
Tie #4,	2" Fittings as Req.	U06A
Tie #5,	4" Tee into exist. Line	U06B

66. SPECIAL REQUIREMENTS FOR GAS LINE WORK:

- A. Contractors must have personnel adequately trained and certified for installation of fusion welded Polyethylene Gas Pipe. Contractor shall also have personnel adequately trained for welding and other work associated with steel liner pipe. Contractor shall have personnel adequately qualified per Code of Federal Regulations 49 CFR 192.283 and 192.285. These specifications are included by reference herein.
- B. The Contractor should note the gas line requirements as shown on the Drawings concerning documents which outline complete gas line construction specification. The Contractor in accepting any portion of this bid is presumed to be familiar with these requirements. The project will be constructed in accordance with those requirements. These requirements specifically include the GUIDANCE MANUAL FOR OPERATORS OF SMALL GAS SYSTEMS, USDOT, 1991, and Code of Federal Regulations (49CFR Parts 190-199).
- C. Contractor is responsible for contact with Mr. Darrell Cornett, City of Hazard Gas Utilities, before any gas line construction, 606-216-0621.

- D. Valve collars are required at all gas valves. The cost of the valve collars is included in your bid price for valves.
- E. Contractor shall install all liner pipes and vents at depths which will insure protection from his work and lack of conflict with final and temporary roadway requirements.
- F. The Contractor is responsible for preparation of "marked up drawings" which show the final As-Built locations of all gas facilities. These drawings shall be delivered to the office of the Utility Relocation Engineer when the gas facilities are complete. The Contract will not be considered complete until this submission is made.

67. ONE YEAR GUARANTEE:

The Contractor, and through him each subcontractor, in accepting the Contract for this construction, or respective portions of the construction covered by these Plans and Specifications, does hereby agree to replace and make good, without expense to the KYTC or to the City of Hazard, any work or material which may be found to be defective within one year from the date of the final certificate of payment to said Contractor. The deterioration due to ordinary use and wear and failure of materials furnished by the Owner (or KYTC) are excepted from this guarantee.

This guarantee shall include damage done by settlement of backfills and filling regrade elevations, such damage and sinking of fills being considered as defective workmanship. This shall also include paint failure.

The Contractor shall reimburse the Owner for cost of damage, if any, as well as cost of replacing defective materials or workmanship. If replacements are not made within ten (10) days in case of materials, then Owner may make replacements and charge cost of same to the Contractor or his bondsman.

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SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SCOPE OF WORK COVERED BY THE CONTRACT

- A. These SPECIFICATIONS and the accompanying DRAWINGS describe the WORK to be done and the materials to be furnished for construction of the Perry County Sanitation District No. 1, Chavies Wastewater Collection System.
- B. The proposed WORK is located primarily along KY 28 and along adjacent county roadways. The new force main is to be constructed at the location shown on the drawings.
- C. Contract WORK includes but is not limited to:
 - 1. Approximately 1,100 LF of 8-inch Force Main Sewer Lines.
 - 2. Approximately 1,530 LF of 6-inch Force Main Sewer Lines.
 - 3. Approximately 250 LF of 4-inch Force Main Sewer Lines.
 - 4. Approximately 470 LF of 1½-inch Force Main Sewer Lines.
 - 5. Approximately 80 LF of 16-inch Steel Casing Pipe, Bore & Jack method of installation for Force Main Sewer Lines.
 - 6. Approximately 580 LF of 14-inch Steel Casing Pipe, Bore & Jack method of installation for Force Main Sewer Lines.
 - 7. Horizontal Directional Drilling method of installation for Force Main Sewer Line River Crossing.
 - 8. Six (6) four (4) foot diameter Pre-Cast Manholes with Lids.
 - 9. One (1) Duplex Grinder Pump and Installation.
 - 10. Combination Air Release Valve and Various Pressure Sewer System Appurtenances.
 - 11. Three (3) Duplex Non-Clog Pumping Station including Pumping Equipment and Controls.

1.02 RELATED REQUIREMENTS

- A. Refer to the CONTRACT AGREEMENT for a listing of the CONTRACT DOCUMENTS.
- B. Refer to Section 00700, paragraph 25 for coordination with other contractors.

1.03 WORK SEQUENCE

- A. This project includes WORK that must be properly sequenced and collection system and all other utilities. Sequencing information in this Section is intended to identify constraints with respect to maintenance of existing service, and to assist the CONTRACTOR in planning the WORK. This information does not relieve the CONTRACTOR from his responsibility to complete the WORK on time.
- B. All existing sewer services must remain active during construction and residential and commercial traffic flow shall be maintained during construction.

Existing septic systems serve all of the area now and will remain in service until final hook-up to the completed collection system.

- C. The CONTRACTOR shall plan, schedule and accomplish the WORK of this Contract to avoid interruption of system service. Should any such interruptions become necessary, the CONTRACTOR shall notify the OWNER and ENGINEER in writing of such need as far ahead of the interruption as possible, but in no case less than one (1) week. The CONTRACTOR must state in his notification of need to interrupt the existing system at least the following:
 - 1. Construction sequence to minimize the interruption time, and propose time-of-day that WORK would be accomplished.
 - 2. Expected length of time of the interruption.
 - 3. Alternate procedures in the event the expected time is exceeded.
 - 4. List of all equipment and material that must be on hand to complete the WORK.
- D. The ENGINEER shall review the CONTRACTOR'S written notification, and the ENGINEER and OWNER must concur that the proposed interruption is acceptable prior to commencement of the interruption

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all necessary labor, machinery, tools, apparatus, equipment, materials, service, other necessary supplies and perform all work including all excavation and backfilling (without additional compensation, except where specifically set out in these specifications) at the unit or lump sum bid price for the items or work described under PART 2 of this section.

1.02 PROGRESS AND PAYMENTS SCHEDULES

- A. Within fifteen (15) days after the date of formal execution of the AGREEMENT, the Contractor shall prepare and submit to the Engineer, for approval, a construction schedule which depicts the Contractor's plan for completing the contract requirements and show work placement in dollars versus contract time. **The Contractor's construction schedule must be approved by the Engineer before any payments will be made on this contract.**
- B. Within fifteen (15) days after the date of formal execution of the CONTRACT AGREEMENT, the Contractor shall prepare and submit to the Engineer, for approval, a periodic estimate which depicts the Contractor's cost for completing the contract requirements and show by major unit of the project work, the Contractor's dollar value for the material and the labor (two separate amounts) to be used as a basis for the periodic payments. The Contractor's periodic estimate must be approved by the Engineer before any payments will be made on this contract.
- C. The Engineer's decision as to sufficiency and completeness of the Contractor's construction schedule and periodic estimate will be final.
- D. The Contractor must make current, to the satisfaction of the Engineer, the construction schedule and periodic estimate each time he requests a payment on this contract.
- E. The Contractor's construction schedule and periodic estimate must be maintained at the construction site available for inspection and shall be revised to incorporate approved change orders as they occur.
- F. When the Contractor requests a payment on this contract, it must be on the approved periodic estimate and be current. Further, the current periodic estimate and construction schedule (both updated and revised) shall be submitted for review and approval by the Engineer before

monthly payments will be made by the Owner. The Contractor shall submit six (6) current copies of each (periodic estimate and construction schedule) when requesting payment.

1.03 CONDITIONS FOR PAYMENT

- A. The Owner will make payments for acceptable work in place and materials properly stored on-site. The value of payment shall be as established on the approved construction schedule and periodic estimate, EXCEPT the Owner will retain ten percent (10%) of the work in place and a percentage as hereinafter listed for items properly stored or untested.
- B. No payment will be made for stored materials unless a proper invoice from the supplier is attached to the pay request. Further, no item whose value is less than \$1,000.00 will be considered as stored materials for pay purposes.
- C. Payment for pipeline items shall be limited to eighty percent (80%) of the bid price until the pipeline items have been tested and accepted by the Engineer.
- D. Payment for equipment items shall be limited to eighty-five percent (85%) of their scheduled value (materials portion only) until they are set in place. Eighty-five percent (85%) payment for stored materials and equipment shall be contingent on proper on-site storage as recommended by the manufacturer or required by the Engineer.
- E. Payment for equipment items set in-place shall be limited to ninety percent (90%) of their scheduled value until they are ready for operation and have been certified by the manufacturer. Ninety percent (90%) payment for installed equipment shall be contingent on proper routine maintenance of the equipment in accordance with the manufacturer's recommendations.
- F. Payment for equipment items set in place and ready for operation shall be limited to ninety-five percent (95%) of their scheduled value until all acceptance tests have been completed and the required manufacturer's pre-startup operator's training has been completed.
- G. Payment for the labor portion of equipment items will be subject only to the degree of completeness and the appropriate retainage.
- H. The Owner may reduce the percent of retainage once the project has achieved satisfactory progress and is at the fifty percent (50%) mark. If the percent of retainage is reduced, the dollar amount of retainage for work-in-place will not be reduced but will remain constant following the fifty percent (50%) constructed status. The retainage on the equipment items shall be determined as defined hereinbefore.
- I. Additionally, the Owner may reinstate the retainage to a full ten percent

(10%) of the scheduled value of work-in-place and material items should the Owner, at its discretion, determine that the Contractor is not making satisfactory progress or there is other specific cause for such withholding.

1.04 CLAIMS FOR EXTRA WORK

- A. If the Contractor claims that any instructions by Drawings or otherwise involve extra cost, he shall give the Engineer written notice of said claim within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.
- B. Claims for additional compensation for extra work, due to alleged errors in spot elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material, or performing more work than would reasonably be estimated from the Drawings and/or topographical maps issued.
- C. Any discrepancies which may be discovered between actual conditions and those represented by the topographical maps and/or Drawings shall at once be reported to the Engineer, and work shall not proceed, except at the Contractor's risk, until written instructions have been received by him from the Engineer.
- D. If, on the basis of the available evidence, the Engineer determines that an adjustment of the Contract Price or time is justifiable, the procedure shall then be as provided herein for "Changes in the Work".
- E. By execution of this Contract, the Contractor warrants that he has visited the site of the proposed work and fully acquainted himself with the existing site conditions relating to construction and labor, and that he fully understands the facilities, difficulties, and restrictions attending the execution of the work under this Contract. The Contractor further warrants that he has thoroughly examined and is familiar with the Drawings, Specifications and all other documents comprising the Contract. The Contractor further warrants that by execution of this Contract his failure when he was bidding on this Contract to receive or examine any form, instrument or document, or to visit the site and acquaint himself with conditions there existing, in no way relieves him from any obligation under the Contract, and the Contractor agrees that the Owner shall be justified in rejecting any claim based on facts regarding which he should have been on notice as a result thereof.

1.05 DETERMINATION OF THE VALUE OF EXTRA (ADDITIONAL) OR OMITTED WORK

- A. The value of extra (additional) or omitted work shall be determined in one or more of the following ways:

1. On the basis of the actual cost of all the items of labor (including on-the-job supervision), materials, and use of equipment, plus a maximum 15 percent for added work or a minimum 15 percent for deleted work which shall cover the Contractor's general supervision, overhead and profit. In case of subcontracts, the 15 percent (maximum for added work and minimum for deleted work) is interpreted to mean the subcontractor's supervision, overhead and profit, and an additional 5 percent (maximum for added work and minimum for deleted work) may then be added to such costs to cover the General Contractor's supervision, overhead and profit. The cost of labor shall include required insurance, taxes and fringe benefits. Equipment costs shall be based on current rental rates in the areas where the work is being performed but, in no case shall such costs be greater than the current rates published by the Associated Equipment Distributors, Chicago, Illinois.
 2. By estimate and acceptance in a lump sum.
 3. By unit prices named in the Contract or subsequently agreed upon.
- B. Provided, however, that the cost or estimated cost of all extra (additional) work shall be determined in advance of authorization by the Engineer and approved by the Owner.
- C. All extra (additional) work shall be executed under the conditions of the original Contract. Any claim for extension of time shall be adjusted according to the proportionate increase or decrease in the final total cost of the work unless negotiated on another basis.
- D. Except for over-runs in contract unit price items, no extra (additional) work shall be done except upon a written Field Order Directive, or Change Order from the Engineer, and no claim on the part of the Contractor for pay for extra (additional) work shall be recognized unless so ordered in writing by the Engineer.

PART 2 – PRODUCTS

2.01 8” SDR-21 FORCE MAIN (Bid Item #1)

Payment for **8” SDR-26 Force Main** will be made at the contract unit price per linear foot in place, which shall include compensation for all labor, material and equipment required for furnishing and installing pipe; excavation (including rock excavation); dewatering; bedding material; laying; jointing; pipe anchoring; erosion control measures; temporary trench shoring; sheeting and bracing; initial and final backfill, seed and straw of all areas disturbed during construction activities;

replacement of existing landscaping removed or damaged; sewer line marker posts; testing of the completed line and any utility relocation if necessary. Incidental to the construction of the force main shall be traffic control, crushed stone, asphalt, or concrete surface replacement (in kind), replacement or repair to drainage ditches, rip rap ditches, curb and gutter, and sidewalks.

Miscellaneous fittings required to complete the installation as shown on the drawings shall be incorporated into the unit price per linear foot of pipe. Such fittings include but are not limited to elbows, tees, wyes and mechanical restraint.

Payment shall also include all other tasks, materials, and construction not specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #1.

2.02 6" SDR-21 PVC FORCE MAIN (Bid Item #2)

Payment for **6" DIJP PVC Force Main** will be made at the contract unit price per linear foot in place, which shall include compensation for all labor, material and equipment required for furnishing and installing pipe; excavation (including rock excavation); dewatering; bedding material; laying; jointing; pipe anchoring; erosion control measures; temporary trench shoring; sheeting and bracing; initial and final backfill, seed and straw of all areas disturbed during construction activities; replacement of existing landscaping removed or damaged; tracer wire; detectable tape; terminal for tracer wire; sewer line marker posts; testing of the completed line and any utility relocation if necessary. Incidental to the construction of the force main shall be traffic control, crushed stone, asphalt, or concrete surface replacement (in kind), replacement or repair to drainage ditches, rip rap ditches, curb and gutter, and sidewalks.

Miscellaneous fittings required to complete the installation as shown on the drawings shall be incorporated into the unit price per linear foot of pipe. Such fittings include but are not limited to elbows, tees, wyes and mechanical restraint.

Payment shall also include all other tasks, materials, and construction not specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #2.

2.03 4" SDR-21 PVC FORCE MAIN (Bid Item #3)

Payment for **4" SDR-21 HDPE Force Main** will be made at the contract unit price per linear foot in place, which shall include compensation for all labor, material and equipment required for furnishing and installing pipe; excavation (including rock excavation); dewatering; bedding material; laying; jointing; pipe anchoring; erosion control measures; temporary trench shoring; sheeting and bracing; initial and final backfill, seed and straw of all areas disturbed during construction activities; replacement of existing landscaping removed or damaged; tracer wire; detectable tape; terminal for tracer wire; sewer line marker posts; testing of the completed line and any utility relocation if necessary. Incidental to the construction of the force main shall be traffic control, crushed stone, asphalt, or concrete surface replacement (in kind), replacement or repair to drainage ditches, rip rap ditches,

curb and gutter, and sidewalks.

Miscellaneous fittings required to complete the installation as shown on the drawings shall be incorporated into the unit price per linear foot of pipe. Such fittings include but are not limited to elbows, tees, wyes and mechanical restraint.

Payment shall also include all other tasks, materials, and construction not specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #3.

2.04 1 1/2" SDR-21 PVC FORCE MAIN (Bid Item #4)

Payment for **1 1/2" SDR-21 PVC Force Main** will be made at the contract unit price per linear foot in place, which shall include compensation for all labor, material and equipment required for furnishing and installing pipe; excavation (including rock excavation); dewatering; bedding material; laying; jointing; pipe anchoring; erosion control measures; temporary trench shoring; sheeting and bracing; initial and final backfill, seed and straw of all areas disturbed during construction activities; replacement of existing landscaping removed or damaged; tracer wire; detectable tape; terminal for tracer wire; sewer line marker posts; testing of the completed line and any utility relocation if necessary. Incidental to the construction of the force main shall be traffic control, crushed stone, asphalt, or concrete surface replacement (in kind), replacement or repair to drainage ditches, rip rap ditches, curb and gutter, and sidewalks.

Miscellaneous fittings required to complete the installation as shown on the drawings shall be incorporated into the unit price per linear foot of pipe. Such fittings include but are not limited to elbows, tees, wyes and mechanical restraint.

Payment shall also include all other tasks, materials, and construction not specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #4.

2.05 Highway Crossing 16" Steel Casing (Bore and Jack) and 8" PVC Pipe (Bid Item #5)

Payment for the **Highway Crossing 16" Schedule 40 Steel Casing (Bore & Jack) and 8" PVC Pipe** will be made at the contract unit price per linear foot, which shall include compensation for all labor, material and equipment required for furnishing and installing highway bore; excavation (including rock excavation); dewatering; crushed stone bedding material; laying; jointing; pipe anchoring; **carrier pipe**; casing spacers; end seals; erosion control measures; temporary trench shoring; sheeting and bracing; initial and final backfill, seed and straw of all areas disturbed during construction activities; tracer wire; marker posts; terminal for tracer wire; testing of the completed lines; and any utility relocation if necessary. Incidental to the bore and jack shall be crushed stone, asphalt or concrete surface replacement (in kind), replacement or repair to drainage ditches, rip rap ditches, curb and gutter, gate valve concrete collar and sidewalks.

Payment shall also include all other tasks, materials, and construction not

specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #5.

2.06 Highway Crossing 14" Steel Casing (Bore and Jack) and 6" DIJP Pipe (Bid Item #6)

Payment for the **Highway Crossing 14" Schedule 40 Steel Casing (Bore & Jack) and 6" DIJP Pipe** will be made at the contract unit price per linear foot, which shall include compensation for all labor, material and equipment required for furnishing and installing highway bore; excavation (including rock excavation); dewatering; crushed stone bedding material; laying; jointing; pipe anchoring; **carrier pipe**; casing spacers; end seals; erosion control measures; temporary trench shoring; sheeting and bracing; initial and final backfill, seed and straw of all areas disturbed during construction activities; tracer wire; marker posts; terminal for tracer wire; testing of the completed lines; and any utility relocation if necessary. Incidental to the bore and jack shall be crushed stone, asphalt or concrete surface replacement (in kind), replacement or repair to drainage ditches, rip rap ditches, curb and gutter, gate valve concrete collar and sidewalks.

Payment shall also include all other tasks, materials, and construction not specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #6.

2.07 4" HDPE RIVER CROSSING, DIRECTIONALLY DRILLED (Bid Item #7)

Payment for **4" HDPE River Crossing Directionally Drilled** will be made at the contract Lump sum, which shall include compensation for all labor, material and equipment required for furnishing and installing pipe, excavation (including rock excavation), dewatering, bedding material, laying, jointing, pipe anchoring, erosion control measures, temporary trench shoring, sheeting and bracing, and initial and final backfill, seed and straw of all areas disturbed during construction activities, tracer wire; waterline markers; testing of the completed lines, and any utility relocation if necessary.

Miscellaneous fittings required to complete the installation as shown on the drawings shall be incorporated into the unit price. Such fittings include but are not limited to adapters, elbows, tees, wyes and mechanical restraint.

Payment shall also include all other tasks, materials, and construction not specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #7.

2.08 PRE-CAST CONCRETE MANHOLES WITH LIDS

Payment for **Pre-Cast Concrete Manholes with Lids** will be made at the contract Lump Sum, which shall include compensation for all labor, material and equipment required for excavation (including rock excavation), dewatering, bedding material, jointing, pipe anchoring, erosion control measures, temporary trench shoring, sheeting and bracing, and initial and final backfill, seed and straw all areas disturbed during construction activities, repair of asphalt surfaces where

disturbed during construction activities and any utility relocation if necessary.

1. Furnish and install a precast concrete wet well with hatch as specified and shown on the drawings.
2. Furnish and install all appurtenances as specified and shown on the drawings.
3. Furnish and install 8" PVC pipe and a manhole as specified and shown on the drawings.
4. Backfill and regrade the site as shown on the drawings.
5. Install crushed stone surface as shown on the drawings.
6. Test wet well for leaks.

Payment shall also include site clearing and grubbing; excavation (including rock excavation); dewatering; bedding material; temporary shoring, sheeting, and bracing; all mechanical and structural components; any necessary asphalt or concrete pavement restorations; seed and straw of all areas disturbed during construction activities; erosion control measures; and all other materials not specifically delineated herein, but necessary to complete the tasks outlined herein for a complete working Item #8.

2.09 GRINDER UNIT (Bid Item #9)

Payment for **Grinder Units** will be made at the contract unit price for this item, which shall include:

1. Furnish and install manhole with pipe, pump, discharge elbow, valves, guiderails, brackets, hardware, lid, floats, cables, wiring, ballast, etc., as specified and shown on the drawings.
2. Furnish and install connection to electrical panel, disconnect, simplex control panel, control panel post, and related electrical wiring and conduit as specified and shown on the drawings.
3. Furnish spare cores.
4. Make connection to new force main.
5. Backfill and regrade the site.
6. Restore existing surfaces.
7. Test wet well for leaks.
8. Start-up and test new pump and controls.

Payment shall also include coordination with the electrical inspector; any electrical inspection fees; site clearing and grubbing; excavation (including rock excavation); dewatering; bedding material; temporary shoring, sheeting, and bracing; all mechanical and structural components; any necessary asphalt or concrete pavement restorations; seed and straw of all areas disturbed during construction activities; erosion control measures; and all other materials not specifically delineated herein, but necessary to complete the tasks outlined herein for a complete working Item #9.

2.10 COMBINATION AIR RELEASE VALVE AND VAULT AND VARIOUS FITTINGS FOR SEWER PIPING (Bid Item # 10)

Payment for the **Combination Air Relief Valve and Vault** will be made at the contract unit price per assembly, which shall include compensation for all labor, material and equipment required for furnishing and installing valves, manhole; excavation (including rock excavation); dewatering; bedding material; laying; jointing; pipe anchoring; erosion control measures; temporary trench shoring; sheeting and bracing; initial and final backfill, seed and straw of all areas disturbed during construction activities; tracer wire; terminal for tracer wire; and any utility relocation if necessary. Incidental to the installation of the air release valve shall be valve box, crushed stone, asphalt, or concrete surface replacement (in kind), replacement or repair to drainage ditches, rip rap ditches, curb and gutter, sidewalks.

Miscellaneous fittings required to complete the installation as shown on the drawings shall be incorporated into the unit price. Such fittings include but are not limited to as adapters, elbows, tees, wyes and mechanical restraint.

Payment shall also include all other tasks, materials, and construction not specifically delineated herein, but necessary to complete the tasks outlined herein and in the Drawings and Specifications for a complete Item #10.

2.11 DUPLEX NON-CLOG PUMPING EQUIPMENT AND CONTROLS (Bid Item #11)

Payment for the **Duplex Non-Clog Pumping Equipment and Controls** will be made at the contract unit price for this item, which shall include:

1. Furnish and install pipe, pumps, discharge elbows, guiderails, brackets, hardware, hatch, floats, cables, wiring, etc., as specified and shown on the drawings.
2. Furnish and install electrical panel platform, meter pole, electrical service, disconnect, control panel and related electrical wiring, conduit and appurtenances as specified and shown on the drawings.
3. Make connection to existing force mains.
4. Backfill and regrade the site as shown on the drawings.
5. Install crushed stone surface as shown on the drawings.
6. Start-up and test new pumps and controls.

Payment shall also include coordination with the power company; any power company fees; site clearing and grubbing; excavation (including rock excavation); dewatering; bedding material; temporary shoring, sheeting, and bracing; all mechanical and structural components; any necessary asphalt or concrete pavement restorations; seed and straw of all areas disturbed during construction activities; erosion control measures; and all other materials not specifically delineated herein, but necessary to complete the tasks outlined herein for a complete working Item #11.

PART 3 QUANTITIES OF ESTIMATE

- A. Wherever the estimated quantities of work to be done and materials to be furnished under this contract are shown in any of the documents, including the Bid Proposal, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated by this contract, and such increase or diminution shall not give cause for claims or liability for damages. The Engineer will not be financially responsible for any omissions from the Contract Documents and therefore not included by the Contractor in his proposal.

- B. Aerial photographs utilized for plan sheets in the Contract Documents are indicated at an approximate scale and shall not be scaled for quantity take-offs. The quantities listed in the bid schedule are given for use in comparing bids and may not be the actual quantities to be installed. It is the Contractor's responsibility to field verify the bid item quantities to be installed prior to the ordering of materials. Payment on unit price contracts are based on actual quantities installed. The Owner or Engineer will not be financially responsible for any shortage of the bid items or overrun of bid items ordered for the quantities.

- C. The actual quantities of all materials to be used for this project shall be field verified prior to the Contractor ordering the necessary materials. The quantity listed in the bid schedule is given for use in comparing bids and may increase or diminish as may be deemed necessary or as directed by the Owner. Any such increase or diminution shall not give cause for claims or liability for damages. The Engineer or Owner will not be financially responsible for any charges incurred for restocking of materials ordered.

- END OF SECTION -

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 ACCESS TO WORK

- A. The representative of the OWNER, the ENGINEER, the U.S. Environmental Protection Agency, the Kentucky Division of Water, Appalachian Research Commission, OSHA and related agencies shall have access to the WORK wherever it is in preparation or progress, and the CONTRACTOR shall provide proper facilities for such access and inspection.

1.02 LOCAL GOVERNMENT REQUIREMENTS

- A. The CONTRACTOR and all SUBCONTRACTORS and SUPPLIERS shall fully comply with all local government requirements.
- B. Construction debris must be disposed in accordance with the local Solid Waste Management Plan, and with DWM regulatory requirement.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.01 PRE-CONSTRUCTION CONFERENCES

- A. Prior to commencing the work, a pre-construction conference will be held and representatives of the following organizations shall have at least one (1) representative in attendance:

OWNER, ENGINEER, CONTRACTOR, major Subcontractors, and representatives of the appropriate State and Federal agencies as they choose.

- B. The pre-construction conference will be for the purpose of reviewing procedures to be followed concerning the orderly flow of required paperwork; coordination of the various parties involved with the project, review of shop drawing submittals, contract time, liquidated damages, payment estimates, change orders, and other items to the parties involved.

1.02 PROGRESS MEETINGS

- A. A progress meeting will be held once each month to review progress of the work, discuss problems encountered or foreseen, coordinate for the following month with the OWNER, and answer any questions as they arise. Attendance by the CONTRACTOR shall be mandatory.
- B. The organizations listed under 1.01 above shall have at least one representative in attendance at each meeting.

1.03 SCHEDULE UPDATE MEETINGS

- A. Schedule update meetings shall be in accordance with schedule requirements in Division 1, Section 01310.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

01200-1

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This section specifies the general methods and requirements of submissions applicable to the following WORK-related submittals:

1. construction schedule
2. schedule of submittals
3. SHOP DRAWINGS, product data, samples
4. construction photographs
5. inspection videotape recordings.

Additional general submissions requirements are contained in paragraphs 5.1 through 5.7 of the General Conditions. The CONTRACTOR is responsible for the submittal of all weekly payrolls, monthly utilization and other required forms and reports, including reports and forms from his SUBCONTRACTORS. The prompt submittal of all required reports and forms will help to insure the timely processing of pay request. Detailed submittal requirements will be specified in the technical SPECIFICATIONS sections.

1.02 CONSTRUCTION SCHEDULE

- A. In addition to the progress schedule requirements specified in Article 3 of the General Conditions, the CONTRACTOR shall, within ten (10) days after the NOTICE TO PROCEED provide and submit to the ENGINEER for review the schedule he plans to maintain in order to successfully construct the WORK within the time allotted. The schedule shall account for all WORK of the CONTRACTOR and his SUBCONTRACTORS.
- B. The CONTRACTOR shall update the schedule information monthly and submit the update information to the ENGINEER at the same time the pay estimate is prepared. The schedule shall contain all of the items of the periodic estimate and pay schedule.
- C. The CONTRACTOR bears full responsibility for scheduling all phases and stages of the WORK including his SUBCONTRACTOR WORK to insure its successful prosecution and completion within the time specified in accordance with all provisions of these SPECIFICATIONS.
- D. Refer to Section 01310 for additional requirements.

1.03 SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND O & M INSTRUCTIONS

A. SHOP DRAWINGS

1. SHOP DRAWINGS, as defined in the General Conditions, and as specified in the technical SPECIFICATIONS include, but are not necessarily limited to custom-prepared data such as fabrication and erection/installation DRAWINGS, scheduled information, setting diagrams, actual shop WORK manufacturing instructions, custom templates, special wiring diagrams, coordination DRAWINGS, individual system of equipment inspection and test reports including performance curves and certifications, as applicable to the WORK.
2. All details on SHOP DRAWINGS submitted for review shall show clearly the relation of the various parts to the main member and lines of the structure, and where correct fabrication of the WORK depends upon field measurements, such measurements shall be made and noted on the SHOP DRAWINGS before being submitted for review by the ENGINEER.
3. Unless otherwise specified, the CONTRACTOR is not required to resubmit SHOP DRAWINGS on existing equipment. The CONTRACTOR shall, however, be responsible for obtaining all SHOP DRAWINGS and/or other information from the manufacturer necessary to complete the installation and startup of existing equipment.

B. Product Data

1. Product data as specified in individual sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare parts listing, and printed product warranties, as applicable to the WORK.

C. Samples

1. Samples specified in individual sections, included, but are not necessarily limited to, physical examples of the WORK such as sections of manufactured or fabricated WORK, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effects, graphic symbols, and

units of WORK to be used by the ENGINEER or OWNER for independent inspection and testing, as applicable to the WORK.

- D. Operation and Maintenance Instructions
 - 1. O&M instructions shall conform to Article 5 of the General Conditions (Section 00710) and the particular requirements of the individual sections.

1.04 CONTRACTOR'S RESPONSIBILITY

- A. The CONTRACTOR shall review SHOP DRAWINGS, product data and samples prior to submission to determine and verify the following:
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
 - 4. Conformance with the SPECIFICATIONS.
- B. All SHOP DRAWINGS submitted by SUBCONTRACTORS for review shall be sent directly to the CONTRACTOR for preliminary checking. The CONTRACTOR shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.
- C. The CONTRACTOR shall check all SUBCONTRACTOR'S SHOP DRAWINGS regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the DRAWINGS and SPECIFICATIONS. DRAWINGS found to be inaccurate or otherwise in error shall be returned to the SUBCONTRACTORS for correction before submission thereof.
- D. Each shop drawing, WORKING drawing, sample and catalog data submitted by the CONTRACTOR shall have affixed to it a certification statement, signed by the CONTRACTOR. The certification shall state that the CONTRACTOR represents that he has determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and has checked and coordinated each item with other applicable review SHOP DRAWINGS and all Contract requirements.
- E. The CONTRACTOR shall notify the OWNER in writing, at the time of submittal, of any deviations in the submittals from the requirements of the CONTRACT DOUCMENTS.
- F. The CONTRACTOR should include the notation "Critical Path" on critical path submittals.

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- G. The review of SHOP DRAWINGS, samples or catalog data by the ENGINEER shall not relieve the CONTRACTOR from his responsibility with regard to the fulfillment of the terms of the Contract.
- H. No portion of the WORK requiring a shop drawing, WORKING drawing, sample or catalog data shall be started nor shall any materials be fabricated or installed prior to the review or qualified review SHOP DRAWINGS and data shall be at the CONTRACTOR'S risk. The OWNER will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
- I. PROJECT WORK, materials, fabrication, and installation shall conform with reviewed SHOP DRAWINGS, WORKING DRAWINGS, applicable samples, and catalog data.

1.05 SUBMISSION REQUIREMENTS

- A. The CONTRACTOR shall make submittals promptly in accordance with the accepted schedule, and in such sequence as to cause no delay in the WORK or in the WORK of any other CONTRACTOR.
- B. Number of submittals required:
 - 1. SHOP DRAWINGS: Submit six (6) copies.
 - 2. Operation and Maintenance Instructions: Submit six (6) copies.
- C. Submittals shall contain:
 - 1. The date of submission and the dates of any previous submissions.
 - 2. The PROJECT title, contract number, and submittal number.
 - 3. CONTRACTOR identification.
 - 4. The names of:
 - a. CONTRACTOR
 - b. SUPPLIER
 - c. Manufacturer
 - 5. Identification of the product, with the specification section number.
 - 6. Field dimensions, clearly identified as such.
 - 7. Relation to adjacent or critical features of the WORK or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.
 9. Identification of revisions on re-submittals.
 10. An 8-inch x 3-inch blank space for CONTRACTOR'S and ENGINEER'S stamps.
- D. Submittals shall be clear and legible. Submittals with facsimile copies will be automatically rejected.

1.06 RESUBMISSION REQUIREMENTS

- A. The CONTRACTOR shall make any corrections or changes in the submittals required by the ENGINEER and resubmit until accepted, in accordance with the following:
1. SHOP DRAWINGS and Product Data:
 - a. Revise initial DRAWINGS or data, and resubmit as specified for the initial submittal.
 - b. Indicate any changes which have been made other than those requested by the ENGINEER.
 2. Samples:
 - a. Submit new samples as required for initial submittal.

1.07 CONSTRUCTION PHOTOGRAPHS

- A. Miscellaneous photographs as directed by the ENGINEER or OWNER.
1. Photographs are required on this PROJECT and are the responsibility of the CONTRACTOR. Photographs shall be 3" x 5" color snapshots taken with a standard 35mm camera. CONTRACTOR shall be responsible for the taking, development, labeling and organizing of the photographs. All photographs shall be identified as to location, date and subject matter. Photographs shall be arranged in a photo album(s) by location, subject matter and date taken.
 2. The CONTRACTOR, before final payment is made, shall deliver one (1) set of photographic prints and negatives to the OWNER one (1) set of prints to the ENGINEER. Both sets of prints shall be arranged in a photo album(s) and labeled as outlined above.
 3. No pay item has been set up for the photographs. The CONTRACTOR shall allow for a minimum of 300 - 3" x 5" color photographs (taken and arranged as outlined above) in his BID.

1.08 GENERAL PROCEDURES FOR SUBMITTALS

A. Coordination of Submittal Times:

The CONTRACTOR shall prepare and transmit each submittal sufficiently in advance of performing the related WORK or other applicable activities, or within the time specified in the individual WORK section of the SPECIFICATIONS, so that the installation will not be delayed by processing times including disapproval and re-submittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the WORK.

1.09 SCHEDULE OF VALUES AND PAYMENTS

- A. Within the (10) days after award of the Contract the CONTRACTOR shall submit to the OWNER in triplicate, a breakdown of the pay items, including a schedule of values and a schedule of payments. This breakdown shall be subject to approval by the OWNER, and when so approved shall become the basis for determining progress payments and for negotiation of CHANGE ORDERS, if required.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01310

PROGRESS SCHEDULES

PART 1 GENERAL

1.01 GENERAL

A. Scheduling Responsibilities

1. In order to provide a definitive basis for determining job progress, a construction schedule of a type approved by the OWNER will be used to monitor the PROJECT.
2. The CONTRACTOR shall be responsible for preparing the schedule and updating on a monthly basis. It shall at all times remain the CONTRACTOR'S responsibility to schedule and direct his forces in a manner that will allow for the completion of the WORK within the contractual period.
3. **The initial progress payment will not be made without an approved schedule.**

B. Construction Hours

1. No WORK shall be done between 8:00 p.m. and 7:00 a.m. nor on Sundays or legal holiday without the written permission of the OWNER. However, emergency work may be done without prior written permission.
2. If the CONTRACTOR, for his convenience and at no additional cost to the OWNER, should desire to carry on his WORK at night or outside the regular hours, he shall submit a written request to the ENGINEER and shall allow nine (9) days for satisfactory arrangements to be made for inspecting the WORK in progress. If permission is granted, the CONTRACTOR shall light the different parts of the PROJECT as required to comply with all applicable Federal, State and local regulations. The CONTRACTOR shall also revise his schedule as appropriate at the next monthly schedule update meeting to reflect the changes in working hours.

C. Progress of the WORK

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

2. The CONTRACTOR agrees that whenever it becomes apparent from the current monthly Schedule update that delays have resulted and, hence, that the Contract completion date will not be met or when so directed by the OWNER, he will take some or all of the following actions at no additional cost to the OWNER.
 - a. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of WORK.
 - b. Increase the number of working hours per shift, shifts per working day or days per week, the amount of construction equipment, or any combination of the foregoing to substantially eliminate the backlog of WORK.
 - c. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities, and comply with the revised schedule.
 - d. The CONTRACTOR shall submit to the OWNER or the OWNER'S representative for review a written statement of the steps he intends to take to remove or arrest the delay to the critical path in the accepted schedule. If the CONTRACTOR should fail to submit a written statement of the steps he intends to take or should fail to take such steps as required by the Contract, the OWNER may direct the level of effort in manpower (trades), equipment, and work schedule (overtime, weekend and holiday work, etc.), to be employed by the CONTRACTOR in order to remove or arrest the delay to the critical path in the accepted schedule, and the CONTRACTOR shall promptly provide such level of effort at no additional cost to the OWNER.

1.02 CONSTRUCTION SCHEDULE

A. Schedule Submissions

1. With ten (10) calendar days of the NOTICE TO PROCEED, the CONTRACTOR shall submit to the ENGINEER five (5) copies of his proposed schedule. The schedule will be the subject of a schedule review meeting with the CONTRACTOR, the ENGINEER and the OWNER or the OWNER'S representative within one (1) week of its submission. The CONTRACTOR will revise and resubmit schedule until it is acceptable and accepted by the OWNER or the OWNER'S representative.

1.03 SCHEDULE UPDATES

A. Monthly Meetings

1. A monthly Schedule Update Meeting will be held in conjunction with the applicable progress meeting at the construction site to review and update the Schedule. The Schedule Update Meetings will be chaired by the OWNER or the OWNER'S representative and attended by the CONTRACTOR and the ENGINEER. Actual progress of the previous month will be recorded and future activities will be reviewed. The duration of activities and their logical connections may be revised as needed. Decisions made at these meetings and agreed to by all parties are binding with the exception that no contractual completion dates will be modified without formal written requests and acceptance as specified herein.

B. Conditions Requiring Revisions are as follows:

1. When a delay in completion of any WORK item or sequence of WORK items results in an extension of the PROJECT completion.
2. When delays in submittals or deliveries or work stoppages are encountered which make re-planning or rescheduling of the WORK necessary.
3. When the schedule does not represent the actual prosecution and progress of the PROJECT.

1.04 CONTRACT COMPLETION TIME

A. Causes for Extensions

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

B. Request for Time Extension

1. Each request for change in any Contract completion date shall be initially submitted to the OWNER within the time frame stated in the General Conditions. All information known to the CONTRACTOR at that time concerning the nature and extent of the delay shall be transmitted to the OWNER at that time. Within the time frame stated in the General Conditions but before the date of final payment under this Contract, all information as required above concerning the delay must be submitted to the

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OWNER. No time extension will be granted for requests which are not submitted within the foregoing time limits.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SANITARY FACILITIES

- A. The CONTRACTOR shall construct and maintain sanitary facilities for his employees and employees of the subcontractors. The CONTRACTOR shall, at completion of the Contract Work, properly dispose of these sanitary facilities.

1.02 UTILITIES

- A. The CONTRACTOR shall be totally responsible for installation, maintenance and cost of his and his sub-contractor's telephone service.
- B. The CONTRACTOR shall install meters at all his points of use of electric, water, and natural gas utilities. The CONTRACTOR shall pay the monthly billed cost from the servicing utility for the CONTRACTOR'S use of these utilities. The CONTRACTOR shall pay any initial installation costs.
- C. If CONTRACTOR requires other utilities, he shall obtain and pay for them.

1.03 MAINTENANCE OF SERVICE IN EXISTING UTILITIES

- A. Where the existing utilities must be disturbed during construction under this Contract, their operation and function shall be maintained by the CONTRACTOR to such a degree that service to customers will be interrupted for minimum time periods only. Such disturbances and any maintenance use of these lines shall constitute no cost to the OWNER. The OWNER shall be notified of interruptions in sufficient time to prepare for them and shall agree to the hour, date, and duration of them before they are undertaken.
- B. Should shutdowns in service be in excess of the time of duration agreed upon, and such excessive shutdown time be due to the CONTRACTOR'S negligence, faulty Work and/or inability to perform, then and in that event, the CONTRACTOR shall be held liable to the OWNER for any and all damages that may accrue to the OWNER, by reason of such excessive shutdown periods.
- C. Digging through services with trenching machines will not be permitted. Upon damage to utility services, such services shall be repaired immediately and tested to the satisfaction of the ENGINEER. The CONTRACTOR shall notify all utility users of impending interruption of service and shall notify all utility users of impending interruption of service

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and shall be responsible for all damage resulting from same. Payment for necessary disconnection and reconnection of utility services shall be included as a part of the CONTRACTOR'S bid and no extra compensation will be made for same.

- D. The CONTRACTOR shall at all times maintain on hand an adequate supply of repair materials and tools with which to make repair to damaged water, gas and sewer lines. Should the CONTRACTOR inadvertently damage existing utilities, he shall make immediate repair thereto and in no event shall he leave the site before such repair has been made and proven to be successful.
- E. As far as possible, the locations and sizes of existing utility lines are indicated on the drawings; however, exact locations, pipe materials and sizes cannot be guaranteed. It shall be the responsibility of the CONTRACTOR to locate and uncover existing utility lines. The CONTRACTOR shall provide all connecting fittings of the correct size and type for each connection to existing lines.

1.04 PROPERTY PROTECTION

- A. Care is to be exercised by the CONTRACTOR in all phases of construction, to prevent damage and/or injury to the OWNER'S and/or other property.
- B. The CONTRACTOR shall avoid unnecessary injury to trees and shall remove only those authorized to be removed by written consent of the OWNER. Fences, gates, and terrain damaged or disarranged by the CONTRACTOR'S forces shall be immediately restored in their original condition or better.
- C. Temporary fences shall be provided at no extra cost to the OWNER wherever necessary to keep livestock away from the construction area. All fences disturbed for construction purposes shall be temporarily replaced in a timely fashion and maintained daily throughout the project.
- D. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Damaged limbs shall be trimmed and damaged tree trunks shall be treated with wound dressing.

1.05 CONSTRUCTION WARNING SIGNS

- A. The CONTRACTOR shall provide construction warning signs for each location where he is working in the state highway right-of-way or in City or County streets. He will further provide flag men as required and shall abide by all Kentucky Transportation Cabinet, Department of Highways safety rules, including size, type and placement of construction signs.

1.06 RESIDENT OBSERVER OFFICE

Not Required

01500-2

1.07 EXCAVATION

- A. No separate payment for solid rock excavation will be made under this Contract, unless specifically noted on the Bid Form. All excavation shall be considered unclassified, except in locations where solid rock excavation is paid for on a unit price basis.

1.08 ACCESS ROADWAYS

- A. The CONTRACTOR shall construct all access roadways needed during construction, and the planned access roadways for the completed project. The CONTRACTOR shall maintain access roadways continuously during the construction period.
- B. The CONTRACTOR shall maintain all existing roadways within the project site which are used for any purpose by construction operations. The degree and frequency of maintenance shall be adequate to keep existing roadways in a condition at least equal to their condition prior to construction. Road maintenance shall include dust control and sweeping.

1.09 RESPONSIBILITY FOR TRENCH SETTLEMENT

- A. The CONTRACTOR shall be responsible for any settlement caused by the construction, that occurs within one (1) year after the final acceptance of this Contract by the OWNER. Temporary fences shall be provided at no extra cost to the OWNER wherever necessary to keep livestock away from the construction area. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Damaged limbs shall be trimmed and damaged tree trunks shall be treated with wound dressing.

1.10 DAMAGE TO CROPS, LIVESTOCK AND VEGETATION

- A. The CONTRACTOR shall protect crops, livestock and vegetation against damage or injury from construction operations at all times. Crops damaged or equipment access obtained outside of the easements provided shall be the responsibility of the CONTRACTOR. Temporary fences shall be provided at no extra cost to the OWNER wherever necessary to keep livestock away from the construction area.
- B. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Damaged limbs shall be trimmed and damaged tree trunks shall be treated with wound dressing.

1.11 WASTE DISPOSAL

- A. The CONTRACTOR shall dispose of waste, including hazardous waste, off-site in accordance with all applicable laws and regulations.

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1.12 CONTRACTOR'S TRAILERS AND MATERIAL STORAGE

- A. The location of the CONTRACTOR'S and Subcontractor's office, work trailers and parking areas for the project shall be subject to the OWNER'S approval.
- B. The CONTRACTOR'S and Subcontractor's material storage yards for the project shall be subject to the OWNERS approval.

1.13 JURISDICTIONAL DISPUTES

- A. It shall be the responsibility of the CONTRACTOR to pay all costs that may be required to perform any of the work shown on the Drawings or specified herein in order to avoid any work stoppages due to jurisdictional disputes. The basis for subletting work in question, if any, shall conform with precedent agreements and decisions on record with the Building and Construction Trades Department, AFL-CIO, dated June, 1973, including any amendments thereto.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

01500-4

SECTION 01510

SURFACE WATER POLLUTION PREVENTION PLAN

PART 1 GENERAL

1.01 EROSION CONTROL MEASURES

All disturbed areas require erosion control. Erosion control shall consist of both natural and manmade barriers to the transport of sediment from the project area to surrounding areas not disturbed under this project.

This specification focuses on the requirement to avoid introduction of sediment into streams and other natural and manmade waterways and conveyances. A second focus is to prevent the deposition of sediment onto traffic surfaces.

All storm water run-offs from the project area shall be intercepted by the construction of silt fences between the disturbed area and the receiving stream. Silt fence placement shall be approved by the OWNER or his representative. Prior to beginning construction a silt fence will be constructed downstream from the construction or excavation area.

Run-on diversion ditches will be constructed and lined as required in the PLANS and SPECIFICATIONS around the project area to intercept surface run-off from adjacent areas and prevent this run-off from impacting the project area. Run-on ditches will be constructed in the locations and to the dimensions shown on the PLANS.

PART 2 BEST MANAGEMENT PRACTICES

1.01 TEMPORARY BMP'S FOR

On-site storage tanks – On site storage tanks shall have a containment structure constructed around the tank. The containment structure shall be impervious to the substance stored in the tank and shall have a volume equal to 1.5 times the volume of the storage tank. Provisions shall be made to evacuate any water accumulation inside the containment structure to prevent loss of containment volume.

Stockpile areas – Stockpile areas shall have a silt fence constructed at the lower portion of the stockpile area to trap any sediment generated from the stockpile area.

Parking areas – Parking areas shall have a silt fence constructed at the lower perimeter of the parking area to trap any sediment generated from the parking area. Additionally, should the parking area be adjacent to a paved public road, a gravel pad shall be constructed at the entrance from the public road to the parking area to prevent tracking of sediment onto the paved public road.

Equipment maintenance areas – Equipment maintenance areas shall have a silt fence constructed along the lower perimeter of the maintenance area to trap any sediment generated from the maintenance area.

Excavation areas – Excavation areas shall have a silt fence constructed at the lower perimeter of the excavation area to trap any sediment generated from the excavation area.

All temporary BMP's shall be maintained in accordance with the operations and maintenance plan until such time as permanent BMP's are constructed and completed, or until such time as the controlled area has been regraded, mulched, seeded and vegetation has been restored to the area.

1.02 PERMANENT BMP'S

Permanent BMP's shall consist of diversion ditches, sediment control structures, vegetation restoration and leachate containment lagoon.

1.03 OPERATIONS AND MAINTENANCE PLAN

The CONTRACTOR shall implement the following Best Management Practices (**BMP**) and shall maintain these BMP's until no longer needed or the completion of the project. The CONTRACTOR shall not remove any BMP without the agreement of the OWNER or his representative.

The CONTRACTOR shall have the sole responsibility for compliance with the requirements of the Storm Water Pollution Prevention Plan (**SWPPP**) as described in these BID DOCUMENTS, and shall be required to have a full and complete understanding of the SWPPP and the required BMP's contained in the SWPPP. It shall also be the responsibility of the CONTRACTOR to submit to the Kentucky Division of Water a completed Notice of Intent (**NOI**) prior to beginning work on this project and to submit a completed Notice of Termination (**NOT**) to the Kentucky Division of Water at the completion of this project.

The required BMP's, the locations to be used, inspection frequency, and approved maintenance actions are shown in the following table.

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Location	BMP	Inspection Frequency	Maintenance Action
On-site Storage Tanks	Containment Structure	1. Daily 2. After rain event	Remove captured water, check for leakage
Stockpile Areas	Silt Fence	1. Weekly 2. After rain event 3. Prior to forecast storm	Clean out surplus silt, repair fence as needed
Parking Areas	Silt Fence Gravel Entrance Pad	1. Weekly 2. After rain event	Clean out surplus silt, repair fence as needed. Add gravel to pad as needed
Equipment maintenance areas	Silt Fence	1. Weekly 2. After rain event	Remove surplus silt, repair fence as needed.
Excavation Areas	Silt Fence	1. Weekly 2. After rain event 3. Prior to forecast storm	Remove surplus silt, repair fence as needed
Project Perimeter	Diversion Ditch	1. Weekly 2. After rain event	Remove accumulated sediment, install erosion protection after completion

1.04 CONTINUING EDUCATION

All personnel actively involved in this project, whether associated with the Design A/E or the General Contractor, shall be notified of this SWPPP and shall be given the opportunity to review the S.O.P. prepared by the DOE for SWPPP's.

The General Contractor (CONTRACTOR), before beginning work, shall formally review the SWPPP with his site management staff, including the site superintendent, key foremen, safety officers, designated workmen, etc., as well as with any subsequent replacements. Failure to understand the details of the SWPPP will not be accepted as an excuse for violations.

1.05 OPERATION AND MAINTENANCE GUIDELINES

The CONTRACTOR's jobsite superintendent and project manager shall familiarize themselves with the SWPPP and the requirements of the SOP developed by the DOE.

The CONTRACTOR shall assemble a Maintenance Log Book to be kept on site and accessible by DOW, Project A/E, DOE, etc. Log Book shall include the following:

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- a. Copy of the NOI
- b. Copy of the General Permit
- c. Copy of the SWPPP (may be kept separate if sheet size dictates)
- d. Maintenance Log Sheets

The CONTRACTOR shall inspect all BMP's on the project at intervals as stipulated on the SWPPP or in the Log Book.

The Contractor shall promptly repair, clean out, replace, or otherwise perform required maintenance of every BMP at stipulated intervals or after a significant rain event. The CONTRACTOR shall make formal notification to the A/E of any BMP's that do not appear to be functioning properly or that may need review.

END OF SECTION

SECTION 01570

PROTECTION OF ENVIRONMENT

PART I GENERAL

1.01 SUMMARY

- A. CONTRACTOR, in executing Work, shall maintain Work areas on- and off-site free from environmental pollution that would be in violation of federal, state or local regulations.
- B. Submit Stormwater Discharge Plan in accordance with Section 01300.

1.02 PROTECTION OF STORM SEWERS

- A. Prevent construction material, pavement, concrete, earth or other debris from entering existing storm sewer or sewer structure.

1.03 PROTECTION OF WATERWAYS

- A. Observe rules and regulations of State of Kentucky and agencies of U.S. government prohibiting pollution of lakes, streams, rivers or wetlands by dumping of refuse, rubbish, dredge material or debris.
 - 1. Permits obtained by OWNER are on file with OWNER.
 - 2. Other permits shall be obtained by CONTRACTOR at CONTRACTOR'S cost.
- B. Provide holding ponds or approved method which will divert flows, including storm flows and flows created by construction activity, -to prevent excessive silting of waterways or flooding damage to property.
- C. Comply with procedures outlined in U.S. EPA manuals entitled, "Guidelines for Erosion and Sedimentation Control Planning and Implementation," Manual EPA-72-015 and "Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity," Manual EPA 43019-73-007.

1.04 STORMWATER DISCHARGE AND EROSION CONTROL

- A. CONTRACTOR shall, if required by State regulation, prepare a Stormwater and erosion control plan which shall be submitted to Kentucky Department for Environmental Protection, Division of Water (DOW), and the ENGINEER. Stormwater control and erosion control methods to be used are to be coordinated with the means, methods and procedures which the CONTRACTOR will use on the project and

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according to specific site criteria. The CONTRACTOR alone has the ability to determine which methods of control are appropriate to use and will not conflict with his operations. As such the CONTRACTOR alone shall prepare the plan and implement the plan in accordance with the best control technologies available. It is anticipated that silt fencing, ditch checks on steep slopes, culvert and inlet protections with silt fence or hay bales, and temporary seeding in areas not completed will all be required.

- B. CONTRACTOR shall, if required, comply with Kentucky DOW, KPDES Storm Water permit for construction site activities. The CONTRACTOR is required to prepare the permit application, submit application and documentation as required by Kentucky DOW, revisions requested by regulatory agencies or the OWNER, and comply with following.
 - 1. Notice of Intent (NOI).
 - 2. Storm Water Pollution Plan.
 - 3. Erosion Control Plan: Temporary and Permanent Measures

1.05 DISPOSAL OF EXCESS EXCAVATED AND OTHER WASTE MATERIALS

- A. Excess excavated material not required or not suitable for backfill and other waste material shall be disposed of in accordance with local regulatory requirements.
- B. Provide watertight conveyance for liquid, semi-liquid or saturated solids which tend to bleed during transport. Liquid loss from transported materials is not permitted, whether being delivered to construction site or hauled away for disposal. Fluid materials hauled for disposal must be specifically acceptable at selected disposal site.

1.06 PROTECTION OF AIR QUALITY

- A. Minimize air pollution by requiring use of properly operating combustion emission control devices on construction vehicles and equipment and encourage shutdown of motorized equipment not in use.
- B. Do not burn trash on construction site.
- C. If temporary heating devices are necessary for protection of Work, they shall not cause air pollution.

1.07 THAWING OF FROZEN GROUND

- A. Obtain permit from appropriate local authority before building fire to thaw frozen ground, and comply with conditions of permit.
- B. Use fuel which does not create air pollution or inconvenience public.

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- C. ENGINEER reserves right to prohibit fires for thawing whenever deemed undesirable.

1.08 USE OF CHEMICALS

- A. Chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall be approved by U.S. EPA or U.S. Department of Agriculture or any other applicable regulatory agency.
- B. Use and disposal of chemicals and residues shall comply manufacturer's instructions.

1.09 NOISE CONTROL

- A. Conduct operations to cause least annoyance to residents in vicinity of Work, and comply with applicable local ordinances.
- B. Equip compressors, hoists, and other apparatus with mechanical devices necessary to minimize noise and dust. Equip compressors with silencers on intake lines.
- C. Equip gasoline or oil-operated equipment with silencers or mufflers on intake and exhaust lines.
- D. Line storage bins and hoppers with material that will deaden sounds.
- E. Conduct operation of dumping rock and of carrying rock away in trucks so as to cause minimum of noise and dust.
- F. Route vehicles carrying rock, concrete or other material over such streets as will cause least annoyance to public and do not operate on public streets between hours of 6:00 p.m. and 7:00 a.m., or on Saturdays, Sundays or legal holidays unless approved by OWNER.

1.10 DUST CONTROL

- A. Due to close geographic location of Project to other off-site facilities take special care in providing and maintaining temporary site roadways, OWNER'S existing roads, and public roads used during construction operations in clean, dust free condition.
- B. Comply with local environmental regulations for dust control. If CONTRACTOR'S dust control measures are considered inadequate by ENGINEER, ENGINEER may require CONTRACTOR to take additional dust control measures.

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1.11 FUELS AND LUBRICANTS

- A. Comply with local, state and federal regulations concerning transportation and storage of fuels and lubricants.
- B. Fuel storage area and fuel equipment shall be approved by OWNER prior to installation. Submit containment provisions to OWNER for approval.
- C. Report spills or leaks from fueling equipment or construction equipment to OWNER and cleanup as required.
- D. OWNER may require CONTRACTOR to remove damaged or leaking equipment from Project site.

1.12 PILE AND SHEATHING DRIVING NOISE

- A. If piles are required, use only pile-driver hammers with mufflers capable of significantly reducing noise and use barriers or shielding techniques as necessary to comply with applicable federal, state, and local ordinances.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

END OF SECTION

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SECTION 01740

CLEANING

PART 1 GENERAL

1.01 SUMMARY

- A. Execute cleaning during progress of Work and at completion of Work.
- B. Refer to specification sections for specific cleaning for Products or Work.

1.02 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to property and persons or damage surfaces of material to be cleaned.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Comply with General Conditions.

3.02 CLEANING

- A. Complete following cleaning before requesting inspection for certification of substantial completion of entire Project or portion of Project.
 - 1. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight exposed interior and exterior surfaces.
 - 2. Wash and shine glazing and mirrors.
 - 3. Polish glossy surfaces to clear shine.
 - 4. Ventilating Systems:
 - a. Clean permanent filters and replace disposable filters if units were operated during construction.

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- b. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - 5. Electrical Systems:
 - a. Leave electrical equipment rooms broom clean.
 - b. Clean interior of panel cabinets, pull boxes, and other equipment enclosures.
 - c. Clean lighting fixtures, lamps, and other electrical equipment soiled during installation.
 - d. Touch-up paint or repaint damaged finishes on electrical items delivered to Project with finish coat of paint. ENGINEER will make final determination of items to be repainted or touched-up.
 - 6. Vacuum carpeted areas and broom clean interior hard surface floors and exterior paved surfaces; rake clean other surfaces of grounds.
 - 7. Clean out existing or new sewers to remove sediment and other materials that have entered during construction.
 - 8. Clean haul roads and streets used as haul roads during construction of accumulated material. Clean paved streets with water.
 - B. Prior to substantial completion or OWNER occupancy, CONTRACTOR with ENGINEER and OWNER, shall conduct inspection of sight-exposed interior and exterior surfaces and work areas to verify Work and site is clean.
- 3.03 CLEANING
- A. Wet wells, tanks, and basins shall be washed down and swept before water allowed to enter.

END OF SECTION

SECTION 01785

OPERATION AND MAINTENANCE (O&M) DATA

PART I GENERAL

1.01 SUMMARY

- A. Compile data and related information in manuals appropriate for OWNER'S operation and maintenance (O&M) of each item of equipment identified in other Specification sections.

1.02 QUALITY ASSURANCE

Preparation of data shall be performed by personnel:

- A. Trained and experienced in O&M of described equipment.
- B. Familiar with requirements of this section.
- C. Skilled as technical writer to extent required to communicate essential data.
- D. Skilled as drafter competent to prepare required drawings.

1.03 FORM OF MANUALS

- A. Components:
 - 1.. Size: 8-1/2 in. by 11 in., or 11 in. by 17 in. folded, with standard 3-hole punching.
 - 2.. Paper: 20-lb minimum, white, for typed pages.
 - 3. Text: Manufacturer's printed data, or neatly typewritten. Handwritten data is not acceptable.
 - 4. Drawings:
 - a. Bind in with text.
 - b. Fold larger drawings and place in clear plastic pockets punched for inserting into binder. Place identification on outside of each pocket.
- B. Cover Label: Label each binder cover and spine with typed or printed title "OPERATION AND MAINTENANCE INSTRUCTIONS" and following:
 - 1. Project title.

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2. Name(s) of applicable building(s) or structure(s) as shown on Drawings in which equipment located.
 3. Name of equipment as set forth in Contract Documents.
 4. Specification section number for equipment as set forth in Contract Documents.
- C. Binders:
1. Commercial quality D-Ring binder with durable and cleanable plastic covers. Paperboard and laminated paperboard covers are not acceptable.
 2. Do not fill binders to more than 75% of capacity.
 3. When multiple binders are used for an item of equipment, organize contents into related groupings. Each binder cover shall bear identification of specific contents.

1.04 SUBMITTAL SCHEDULE

- A. Submit 4 copies of complete O&M data, bound in binders bearing identification label, for review within 30 days after time CONTRACTOR receives approved Shop Drawings and other submittals for equipment from ENGINEER.
- B. ENGINEER'S review and acceptance of O&M data will be only for conformance with requirements of this section, for form of submittal and organization of data and completeness of information provided, but not for technical content or coordination between individual suppliers of equipment or system(s).
- C. CONTRACTOR shall review O&M submittal and complete Form 1, Contractor Submittal Form, attached to this section indicating requirements of this section have -been met before submitting to ENGINEER. ENGINEER will reject submittals without completed Form 1.
- D. ENGINEER will be sole judge of completeness of data.

1.05 PAYMENTS

- A. Progress payment for equipment delivered, stored or installed under these Contract Documents will not be made until O&M data is approved by ENGINEER.
- B. Progress payments for control systems packaged with equipment will not be made until O&M data incorporated into equipment and control system manual is approved by ENGINEER.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.01 GENERAL CONTENTS OF DATA

- A. Each manual shall contain equipment data pertaining to not more than one Specification section number indicated in Contract Documents.
- B. Title Sheet: First page in data listing following:
 - 1. Title: "OPERATION AND MAINTENANCE INSTRUCTIONS."
 - 2. Title of Project: As shown on Contract Documents.
 - 3. Name(s) of applicable building(s) or structure(s) in which equipment is located.
 - 4. Name of equipment as described in Contract Documents.
 - 5. Specification section number for equipment.
 - 6. CONTRACTOR'S name, address, and telephone number.
 - 7. Subcontractor's name, address, and telephone number if equipment is provided by Subcontractor.
 - 8. CONTRACTOR'S or Subcontractor's purchase order number, manufacturer's shop order number or other such numbers required for parts and service ordering.
 - 9. Manufacturer's name, address, and telephone number.
 - 10. Name, address, and telephone number for local source of supply for parts and service.
- C. Equipment List: Immediately following title sheet containing following:
 - 1. Completed Form 1, Contractor's Submittal Form.
- D. Table of Contents: Immediately following equipment list. Arrange in logical, systematic order and shall include as minimum each tabbed divider. Each page shall be numbered.
- E. Tabbed Dividers: Insert tabbed section dividers between each major section.

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1. Provide title of section on each tab.
 2. Provide table of contents for each tabbed section, arranged in systematic order.
- F. Equipment Data Sheets: Provide catalog sheets showing configuration, manufacturer's specifications, models, options, and styles of equipment and major components being provided. Product data sheets will show project specific information with inapplicable information deleted by crossing out or removal. Include in tabbed section(s).
- G. Text:
1. Include only those sheets applicable to Project.
 2. Each sheet shall:
 - a. Identify specific equipment or part installed.
 - b. Identify text applicable to equipment or part installed.
 - c. Do not include inapplicable information.
- H. Drawings: .
1. Supplement text with drawings to clearly illustrate following:
 - a. Equipment and components.
 - b. Relations of component parts of equipment and systems.
 - c. Control and flow diagrams.
 2. Actual drawings of equipment from manufacturer. "Typical" drawings are not acceptable, unless they accurately illustrate actual installation.
- I. Specially written information, as required to supplement text for particular installation.
1. Provide explanation of interrelationships of equipment and components, and effects one component has on another or entire system.
 2. Provide overall instructions and procedures for equipment tying in instructions and procedures for separate components into unified instructional package.
 3. Provide glossary of special terms used by manufacturer.
 4. Organize in consistent format under separate headings for

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different procedures.

5. Provide logical sequence of instructions for each procedure.
- J. Copy of each warranty, bond or service contract issued.
1. Provide information sheet for OWNER'S personnel to explain following.
 - a. Proper procedures in event of failure or malfunction to prevent voiding warranty.
 - b. Instances affecting validity of warranties or bonds.

3.02 SPECIFIC DATA FOR EACH EQUIPMENT AND SYSTEMS

- A. For each item of equipment and system include:
1. Completed Equipment Data Form typewritten on copy of Form 2 to Section 01785.
 2. Description of equipment and component parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, and tests as applicable.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - d. Complete nameplate data.
 - e. P&ID numbers for equipment as indicated on Drawings.
 3. Operating Procedures:
 - a. Startup, break-in, and normal operating instructions.
 - b. Regulation, control, stopping, shutdown, and emergency instructions.
 - c. Summer and winter operating instructions, as applicable.
 - d. Special operating instructions.
 4. Maintenance Procedures:
 - a. Routine maintenance operations.

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- b. Guide to troubleshooting.
 - c. Disassembly, repair, and reassembly instructions.
 - d. Alignment, adjusting, and checking instructions.
 5. Servicing and Lubrication Schedule:
 - a. List of lubricants required and quantity to be applied.
 - b. Schedule of lubrication.
 - c. Schedule for other routine maintenance.
 6. Manufacturer's printed instructions regarding safety precautions for both (a) protection of personnel operating equipment and systems and (b) prevention of damage to equipment and systems.
 7. Description of sequence of operation of controls.
 8. Manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts and quantities of same.
 9. Approved control diagrams such as ladder diagrams, instrumentation loop diagrams, and electrical schematics as appropriate.
 10. Bill of material.
 11. Other data as required under applicable Specification sections.
- B. Each electric and electronic system, as applicable to equipment such as switchgear, motor control centers, panelboards, switchboards, starters, breakers, and relays shall include:
 1. Description of System and Component Parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, rating tables, and tests as applicable.
 - c. Complete nomenclature and commercial number of replaceable parts.

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- d. Complete nameplate data.
 - e. P&ID numbers for equipment as set forth on Drawings.
 2. Circuit Directories of Panelboards:
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
 3. Complete instrumentation loop diagrams with tabulated listing of components in each control circuit or loop.
 4. Operating Procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 5. Maintenance Procedures:
 - a. Routine maintenance operations.
 - b. Guide to troubleshooting.
 - c. Disassembly, repair, and reassembly instructions.
 - d. Adjustment and checking instructions.
 6. Manufacturer's printed instructions regarding safety precautions for both (a) protection of personnel operating equipment and systems and (b) prevention of damage to equipment and systems.
 7. List of original manufacturer's spare parts and recommended quantities maintained in storage.
 8. Other data as required under pertinent sections of Specifications.
- C. Prepare and include additional data when need for such data becomes apparent during instruction of OWNER'S personnel or as requested by OWNER.

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FORM 1 TO SECTION 01785 Page 1 of 5			
CONTRACTOR SUBMITTAL FORM			
TO: (Engineer) (Address) (City, State, Zip) (Attn:)		DATE:	
		SPECIFICATION SECTION TITLE:	
		SECTION NO.;	
		MANUFACTURER/ VENDOR:	
FROM: (Contractor) (Address) (City, State, Zip)		NO. OF COPIES SUBMITTED TO ENGINEER:	
		SIGNATURE OF CONTRACTOR:	
<p>GENTLEMEN: We have checked the O&M manual submittal dated, _____, 20_____, and have found it to be in accordance with the requirements of Specification Section 01785 as noted below.</p>			
<p>FORMAT Size: 8-1/2 x 11 or 11x17 Paper: 20-lb minimum Text: Printed data/neatly typed Drawings: Standard size bound in text; in text-size labeled envelopes Tabbed Section Dividers Cover Label: Title Project name Building/structure ID Equipment name Specification section Binders: Plastic Cover</p>			

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FORM 1 TO SECTION 01785 Page 2 of 5			
CONTRACTOR SUBMITTAL FORM			
Provided	Not Applicable	Page No.	
<i>GENERAL CONTENTS</i>			
			• One specification only
			• Title Page
			- Title
			- Project title
			- Building/structure ID
			- Equipment name
			- Specification section number
			- Contractor ID
			- Subcontractor ID
			- Purchase order data
			- Manufacturer ID
			- Service/parts supplier ID
			• Product List
			• Table of Contents
			• Tabbed Sections
			- Pertinent data sheets
			- Annotated as needed
			• Text
			- Pertinent to project
			- Annotated
			• Drawings
			- Illustrate product and components
			- Control and flow diagrams

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FORM 1 TO SECTION 01785 Page 3 of 5			
CONTRACTOR SUBMITTAL FORM			
Provided	Not Applicable	Page No.	
<i>GENERAL CONTENTS</i>			
			• Special Information
			- Interrelationships of equipment and components
			- Instructions and procedures provided
			- Instructions organized in consistent format
			- Instructions in logical sequence
			- Glossary
			• Warranty, Bond, Service Contract
<i>SPECIFIC CONTENTS (EQUIPMENT/SYSTEMS ONLY)</i>			
			• Description of Unit and Components
			- Equipment functions
			- Normal operating characteristics
			- Limiting conditions
			- Performance curves
			- Engineering data
			- Test data
			- Replaceable parts list (with numbers)
			- Nameplate data
			- P&ID numbers
			• Operating Procedures
			- Startup
			- Routine/normal operation
			- Regulation and control
			- Stopping and shutdown
			- Emergency

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FORM 1 TO SECTION 01785 Page 4 of 5			
CONTRACTOR SUBMITTAL FORM			
Provided	Not Applicable	Page No.	
<i>SPECIFIC CONTENTS (EQUIPMENT/SYSTEMSONLY)</i>			
			• Operating Procedures (continued)
			- Seasonal operation
			- Special instructions
			• Maintenance Procedures
			- Routine/normal instructions
			- Troubleshooting guide
			- Disassembly/reassembly/repair
			• Servicing and Lubrication
			- List of lubricants
			- Lubrication schedule
			- Maintenance schedule
			• Safety Precautions/Features
			• Sequence of Operation of Controls
			• Assembly Drawings
			• Parts List and Illustrations
			- Predicted life
			- Spare parts list
			• Control Diagrams/Schematics
			• Bill of Materials
			• Completed Equipment Data Form per Specification
			• Other Data as Required

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FORM 1 TO SECTION 01785 Page 5 of 5
CONTRACTOR SUBMITTAL FORM

Provided	Not Applicable	Page No.	
<i>SPECIFIC CONTENTS (EQUIPMENT/SYSTEMS ONLY)</i>			
			• Description
			- Equipment functions
			- Normal operating characteristics
			- Performance curves
			- Engineering data
			- Test data
			- Replaceable parts list (with numbers)
			- Nameplate data
			- P&ID numbers
			• Panelboard Directories
			- Electrical
			- Controls
			- Communications
			• Instrumentation Loops
			- Diagrams
			- Components list each circuit/loop
			• Maintenance Procedures
			- Routine/normal instructions
			- Troubleshooting guide
			- Disassembly/reassembly
			- Adjusting and checking
			• Safety Precautions/Features
			• Spare Parts List
			• Additional Data

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FORM 2 TO SECTION 01785		Page 1 of 4	
EQUIPMENT DATA FORM			
PROJECT NAME			
CONTRACT NO.			
CONTRACTOR			
EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	
LOCATION			
MANUFACTURER			
PURCHASED FROM			
VENDOR ORDER NO.		PURCHASE \$	
DATE OF PURCHASE			
LOCAL SUPPLIER			
ADDRESS			
PHONE NO.			
MODEL NO.			
NO. OF UNITS	SERIAL NOS.		
*By Owner			

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FORM 2 TO SECTION 01785		Page 2 of 4	
EQUIPMENT DATA FORM			
<i>NAMEPLATE DATA</i>			
ELECTRIC MOTOR		PUMP/HVACUNIT	
MANUFACTURER		MANUFACTURER	
TYPE	<input type="checkbox"/> AC <input type="checkbox"/> DC	TYPE	
HORSEPOWER		SIZE	
RPM		CAPACITY	
VOLTAGE		PRESSURE	
AMPERAGE		ROTATION	
PHASE		IMPELLER SIZE	
FRAME		IMPELLER MATERIAL	
DRIVE/REDUCER		OTHER (I&C)	
MANUFACTURER		MANUFACTURER	
TYPE	<input type="checkbox"/> GEAR <input type="checkbox"/> V-BELT <input type="checkbox"/> CHAIN <input type="checkbox"/> VARIDRIVE	TYPE	
		SIZE	
SERVICE FACTOR		CAPACITY	
RATIO		RANGE	

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FORM 2 TO SECTION 01785 Page 3 of 4	
EQUIPMENT DATA FORM	
<i>MAINTENANCE SUMMARY</i>	
EQUIPMENT NO.	ASSET NO.*
DESCRIPTION	MAINT. NO.*
MAINTENANCE OPERATION:	FREQUENCY:
List briefly each maintenance operation required and refer to specific information in Manufacturer's Manual, if applicable. Refer by symbol to "Lubricant List" for Lubrication Operation.	List required frequency of each maintenance operation.
*By Owner	

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FORM 2 TO SECTION 01785 Page 4 of 4				
EQUIPMENT DATA FORM				
<i>LUBRICANT/RECOMMENDED SPARE PARTS LIST</i>				
EQUIPMENT NO.		ASSET NO.*		
DESCRIPTION		MAINT.NO.*		
LUBRICANT LIST				
REFERENCE SYMBOL	LUBRICANT TYPE (MILITARY STANDARD)	RECOMMENDED LUBRICANT AND MANUFACTURER		
List symbols in "maintenance operation" (Page 3).	List general lubricant type.	List specific lubricant name, viscosity, and manufacturer.		
RECOMMENDED SPARE PARTS LIST				
PART NO.**	DESCRIPTION	UNIT	QUANTITY	UNIT COST
ADDITIONAL DATA AND REMARKS				
<ul style="list-style-type: none"> • By Owner • ** Identify parts provided by this contract with two asterisks. • Note: Attach additional sheets if necessary; identify each sheet at top with equipment number and description. 				

END OF SECTION

SECTION 01788

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Maintain at site one record copy of:
1. Drawings.
 2. Project Manual.
 3. Addenda.
 4. Change orders and other modifications to Contract.
 5. ENGINEER field orders, written instructions, or clarifications.
 6. Approved submittals.
 7. Field test records.
 8. Construction photographs.
 9. Associated permits.
 10. Certificates of inspection and approvals.

1.02 SUBMITTALS

- A. At Substantial Completion:
1. Deliver one marked up set of Drawings to ENGINEER for use in preparation of record drawings.
- B. Accompany submittals with transmittal letter containing following.
1. Date.
 2. Project title and number.
 3. CONTRACTOR'S name and address.
 4. Title of record document.
 5. Signature of CONTRACTOR or authorized representative.

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PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.01 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in CONTRACTOR'S field office on-site apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide secure storage space for storage of samples.
- B. Maintain documents in clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents and samples available for inspection by ENGINEER or OWNER.
- D. Failure to properly maintain record documents may be reason to delay a portion of progress payments until records comply with Contract Documents.

3.02 RECORD DOCUMENTS

- A. Label each document "PROJECT RECORD" in neat, large printed letters.
- B. Maintain record set of Drawings and Specifications legibly annotated to show all changes are made during construction.
 - 1. Graphically depict changes by modifying or adding to plans, details, sections, elevations, or schedules.
 - 2. Make changes on each sheet affected by changes.
- C. Record information concurrently with construction progress.
 - 1. Do not conceal Work until required information is recorded.
 - 2. Record changes made by Written Amendment, Field Order, Change Order or Work Directive Change.
 - 3. Give particular attention to concealed equipment and materials that would be difficult to measure and record at later date.

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D. Drawings:

1. Graphically depict changes by modifying or adding to plans, details, sections, elevations, or schedules.
2. Make changes on each sheet affected by changes.
3. Dimensions:
 - a. Depths of various elements of foundation in relation to finish first floor datum.
 - b. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
4. Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
5. Details not on original Drawings.
6. Location and identification of exposed interior piping, including those shown schematically on Drawings.
7. Size of equipment and location including connections.
8. Electrical and Instrumentation:
 - a. Horizontal and vertical locations and size of underground cable, conduit, and duct runs dimensioned from established building lines.
 - b. Plan location and size of interior concealed and exposed feeders.
 - c. Size and location of access panels.
 - d. Variations from original Drawings.

E. Specifications:

1. Mark Specification sections to show substantial variations in actual Work performed in comparison with text of Specifications and modifications.
2. Include variations in products delivered to site and from manufacturer's installation instructions and recommendations.

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3. Give particular attention to substitutions and selection of options and similar information.
4. Note related record drawing information and Product Data.

END OF SECTION

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SECTION 02110

SITE CLEARING AND GRUBBING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish all labor and equipment required and perform all clearing, grubbing and stripping of topsoil complete as shown on the DRAWINGS and as specified herein.

1.02 RELATED WORK

Not applicable to this CONTRACT.

1.03 SUBMITTALS

Not applicable to this CONTRACT.

PART 2 PRODUCTS

Not applicable to this CONTRACT.

PART 3 EXECUTION

3.01 GENERAL

- A. The proposed areas designated for embankment construction, impoundments, ditches and channel changes, borrow pits, etc., (except any portions thereof that may be reserved) shall be cleared of all trees, timbers, brush, stumps, rubbish and other debris. All this material, unless otherwise specified, shall be burned or otherwise removed, as may be directed and without injury to adjoining property. Burning must be in compliance with any applicable regulations covering open burning and smoke abatement. Where clearing is to be done, all stumps and roots shall be grubbed. No debris will be allowed to be left under or in the embankments. In felling trees near structures and wire lines, necessary precaution must be exercised in order to prevent damage to wire lines, structures, the facilities of others. Payment for all clearing and grubbing shall be incidental to the prices bid for doing other work.

3.02 TREES

- A. Trees (3" caliper and larger) shall not be disturbed by construction without written permission from the OWNER, except in those areas to be cleared. Trees disturbed by construction shall be replaced by the CONTRACTOR with same size and type at no additional cost to the OWNER.
- B. Trees and shrubs disturbed by construction shall be replaced by the

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CONTRACTOR with the same size and type at no additional cost to the OWNER. Trees and shrubs shall be purchased locally from a reputable nursery specializing in this field.

END OF SECTION

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SECTION 02140

DEWATERING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish all labor and equipment required to dewater all excavations. Dewatering of all excavations shall be the responsibility of the CONTRACTOR, and no additional compensation will be allowed for same unless specifically included as a BID item.

1.02 RELATED WORK

- A. Earthwork is included in Division 2, Section 02200.

1.03 SUBMITTALS

Not applicable to this CONTRACT.

PART 2 PRODUCTS

Not applicable to this CONTRACT.

PART 3 EXECUTION

3.01 GENERAL

- A. Dewatering equipment shall be of adequate size and quantity to assure maintaining proper conditions for installing pipe, concrete, backfill or other material or structure in the excavation. Dewatering shall include proper removal of any and all liquid, regardless of its source, from the excavation and the use of all practical means available to prevent surface runoff from entering any excavation. No extra payment shall be made for dewatering.
- B. No sanitary sewer shall be used for the disposal of water from trenches or other excavations. (From "10-States' Standards)

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of earthwork is indicated on the DRAWINGS.

1. Preparation of sub-grade for embankments and outlet works is included as part of this WORK.
2. Engineered fill course for support of concrete slabs is included as part of this WORK.
3. Backfilling of structures, headwalls, channels, manholes and trenches is included as part of this WORK.

B. Excavation for Mechanical/Electrical WORK

Excavation and backfill required in conjunction with underground mechanical and electrical appurtenances is included as WORK of this Section.

C. Definition

“Excavation” consists of removal of material encountered to sub-grade elevations indicated and subsequent disposal of materials removed.

1.02 RELATED WORK

A. Dewatering is included in this Division, Section 02140.

B. Erosion and sedimentation control is included in this Division, Section 02270.

C. Piping is included in this Division, Section 02700.

D. Landscaping is included in this Division, Section 02900.

1.03 QUALITY ASSURANCE

A. Codes and Standards

Perform excavation WORK in compliance with applicable requirements of governing authorities having jurisdiction.

B. Testing and Inspection Services

Employ, at CONTRACTOR'S expense, testing laboratory acceptable to the OWNER and the ENGINEER to perform soil testing and inspection service for quality control during earthwork operations.

1.04 SUBMITTALS

A. Test Reports

Submit following reports directly to the ENGINEER from the testing services, with copy to CONTRACTOR:

1. Test reports on borrow material.
2. Verification of each cutoff trench elevation and embankment sub-grade elevation.
3. Field density test reports, one per 3,000 S.F. per lift.
4. One optimum moisture-maximum dry density curve for each type of soil encountered, per ASTM D-698.

1.05 JOB CONDITIONS

A. Site Information

1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that OWNER will not be responsible for interpretation or conclusions drawn therefrom by CONTRACTOR. Data are made available for convenience of CONTRACTOR.
2. Additional test borings and other exploratory operations may be made by CONTRACTOR at no cost to OWNER.

B. Existing Utilities

Locate existing underground utilities in areas of WORK. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

C. Use of Explosives

Do not bring explosives onto site or use in WORK without prior written permission from authorities having jurisdiction. Contact Kentucky Department of Mines and Minerals for information. CONTRACTOR is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

D. Protection of Persons and Property

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

- a. Operate warning lights as directed by authorities having jurisdiction.
- b. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

A. Definitions

1. Sub-base material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.
2. Backfill and fill materials: Satisfactory soil materials free of debris, waste, frozen materials, vegetable, and other deleterious matter.
3. Embankment Materials

All fill materials shall be obtained from required excavations and from the proposed borrow areas if shown on the CONTRACT DRAWINGS. The selection, blending, routing and disposition of materials shall be subject to the approval of the ENGINEER.

a. Materials - Impervious Clay Core

Core fill materials shall consist of residual overburden soils within the proposed excavation and borrow areas. These soils consist primarily of brown clays classified as CH or CL using the Unified Soil Classification System.

Fill materials shall contain no sod, organic topsoil, brush, roots or other deleterious materials. Fill material shall be rock free and shall be approved by the ENGINEER prior to fill placement.

b. Materials - Random Earth and Rock Zones

Fill material shall consist of non-organic soil or weathered rock with a maximum particle size of 12 inches. Rock materials from the borrow area shall be excavated by ripping methods. No blasting will be allowed without written permission from the OWNER.

2.02 EMBANKMENT DRAINAGE MATERIALS

- #### **A. No. 57 crushed stone is specified in this Division, Section 02255.**

B. Filter fabric for use with the embankment drain location at the downstream face of the impervious core, where called for in this Section, on the DRAWINGS or as determined by the ENGINEER shall be Mirafi 140N, Skaps GT142, Carthage Mills FX-45HS or equal.

PART 3 EXECUTION

3.01 STRIPPING AND TOPSOILING

A. Before excavation and grading is commenced for structures, the embankment, outlet works or other WORK described hereinafter (except pipelines and manholes) or before material is removed from borrow pits, (impoundment area) the topsoil shall be removed from the areas affected and stockpiled. When final grading is accomplished, the topsoil shall be spread evenly over the disturbed area, except within the impoundment area. Rough grading shall have been carried approximately 6 inches below finished grade (except solid rock, where it shall be carried 12 inches below finished grade) and brought back up to grade with topsoil as set out herein.

3.02 EXCAVATION

A. All excavation to be unclassified standard excavation includes excavation to sub-grade elevations indicated including excavation of earth, rock (at depth shown on DRAWINGS), bricks, wood, cinders, and other debris.

B. Differing Site Conditions

1. Should the CONTRACTOR, during the course of construction, encounter subsurface or latent physical conditions differing materially from the subsurface information provided, or unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in this CONTRACT, he shall immediately notify the ENGINEER in writing of the conditions encountered.

2. Upon receipt of such notice, the ENGINEER shall promptly investigate the conditions described by the CONTRACTOR and shall advise the CONTRACTOR in writing of the decision and/or disposition of the conditions encountered.

C. Unanticipated Material

1. No classification of excavation will be made when unanticipated material is encountered in WORK:

a. Excavation includes excavation of pavements and other obstructions visible on ground surface; underground

structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as unauthorized excavation.

D. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimensions without specific direction of ENGINEER. Unauthorized excavation, as well as remedial WORK directed by ENGINEER, shall be at CONTRACTOR'S expense.

1. Under footings or foundation bases fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to the ENGINEER.
2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the ENGINEER.

E. Additional Excavation

1. When excavation has reached required sub-grade elevations, notify the ENGINEER who will make an inspection of conditions.
 - a. If unsuitable bearing materials are encountered at required sub-grade elevations, carry excavations deeper and replace excavated material as directed by the ENGINEER.
 - b. Removal of unsuitable material and its replacement as directed will be paid on basis of CONTRACT conditions relative to changes in WORK using Unit Price Modification prices.

F. Stability of Excavations

1. Slope sides of excavations to comply with Federal, State and local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
2. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

G. Shoring and Bracing

Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross-braces, in good serviceable condition.

1. Establish requirements for trench shoring and bracing to comply with Federal, State and local codes and authorities having jurisdiction.
2. Maintain shoring and bracing in excavations regardless of time period excavation progresses.

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3. 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. Cut off tops as required and leave permanently in place.

H. Dewatering

1. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding PROJECT site and surrounding area.
 - a. Do not allow water to accumulate in excavation. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of sub-grades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 - b. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavation to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
2. Prevent impoundment of water behind embankment during construction and prior to acceptance of OWNER.
3. See this Division, Section 02140 for additional requirements.

I. Material Storage

1. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
 - a. Dispose of excess soil material and waste materials as herein specified.

J. Excavation for Structures

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other WORK.

K. Excavation for Pavements

1. Cut surface under pavements to comply with cross-sections, elevations, and grades as shown on DRAWINGS.

L. Trench Excavation

1. The CONTRACTOR shall include in his lump sum BID all trenching and backfill necessary for installation of all pipelines as planned and specified. Trenching shall include clearing and grubbing of all trash, weeds, briars, trees and stumps encountered in the trenching. The CONTRACTOR shall dispose of such material at no extra cost to the OWNER. Shrubs shall be removed, maintained and replanted in the same or adjacent location as the ENGINEER may direct. Trenching also includes such items as pipe and small creek crossings; cutting, moving or repairing damage to fences, posts, gates, and other surface structures regardless of whether shown on the DRAWINGS.
2. All existing facilities shall be protected from danger or damage while pipelines are being constructed and backfilled, and from damage due to settlement of the backfill.
3. In the event any existing structure is damaged, repair and restoration shall be made at once and backfill shall not be replaced until this is done. Restoration and repair shall be such that the damaged structure is equal to or better than its original condition and can serve its purpose as completely as before. All such restoration and repair shall be done without extra cost to the OWNER.
4. Trenches must be dug to lines and grades shown on the DRAWINGS. Hand trenching will be required in areas where machine trenching would result in undue damage to existing structures and facilities.
5. Excavation shall be open trenches.
6. Sheeting and shoring of trenches shall be provided at the expense of the CONTRACTOR where necessary to protect life, property and the new or existing structures from damage or to maintain maximum permissible trench widths at top of pipe. All necessary materials, including, but not limited to, sheeting, sheet piling, trench jacks, braces, shores and stringers, shall be used to hold trench walls. Sheeting and shoring may be withdrawn as the trenches are being backfilled, after backfill has been tamped over top of the pipe at least 18 inches. If removal before backfill is completed to surface endangers adjacent structures, such as buildings, pipelines, street paving, and sidewalks, then the sheeting and shoring shall be left in place until such danger has passed, and then pulled if practical. Voids caused by sheeting withdrawal shall be backfilled and tamped. If not withdrawn, sheeting shall be cut off at least 18 inches below final surface grade, so there is no obstruction at the ground level.
7. Where sub-grade of trench has insufficient stability to support the pipeline and hold it to its original grade, the ENGINEER may order stabilization by various means. Exclusive of dewatering normally

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- required for construction, and instability caused by neglect of the CONTRACTOR, the necessary stabilization shall be paid for at unit price set up in the CONTRACT. In the event no particular BID price is applicable, then the payment for stabilization will be negotiated.
8. The location of the pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before or after construction on any line is started that would indicate desirable changes in location. The OWNER reserves the right to make reasonable changes in line and structure locations without extra cost, except as may be determined by extra units of materials and construction actually involved. The OWNER is under no obligation to locate pipelines, so they may be excavated by machine.
 9. Tunneling may be used as an alternate to open-cut trenching, at no extra cost to the OWNER. The annular space between plates and excavation shall be either permanently placed pea gravel or sand, pumped grout (3 parts sand and 1 part Portland cement by volume) or other suitably installed material approved by the ENGINEER. Backfilling shall be kept close to the heading and completed after each day's WORK. Where grout is used for backfill, injection holes with threaded plugs shall be provided in liner plates at various levels and in sufficient number to effectively grout the void around the tunnel. A minimum of 3 grout holes shall be provided in each 8 feet of tunnel length. Grout shall be injected in the lower holes first, proceeding upward as the void is filled. Plugs shall be installed after each hole is filled and grout stops shall be provided behind plates as necessary to ensure complete filling of the void. In tunneling under buildings, the CONTRACTOR will be responsible for all damage resulting from his operations and methods of excavation and backfilling. Boring may also be used as an alternate to tunneling or open-cut trenching, at no extra cost to the OWNER.
 10. Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.
 - a. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.
 - b. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of crushed stone or gravel prior to installation of pipe.
 - c. For pipes or conduit 3 inches or less in nominal size and for flat-bottomed, multiple-duct conduit units, excavate to sub-base depth indicated or, if not indicated, then to 2 inches below bottom of WORK to be supported.
 - d. For pipes or conduit 6 inches or larger in nominal size, tanks, and other mechanical/electrical WORK indicated to

receive sub-base, excavate to sub-base depth indicated or, if not otherwise indicated, to 6 inches below bottom of WORK to be supported.

- e. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage) so top of piping is no less than 2 feet 6 inches below finish grade.
- f. Grade bottoms of trenches as indicated on DRAWINGS, notching under pipe bells to provide solid bearing for entire body of pipe.
- g. Concrete is specified in Division 3.
- h. Do not backfill trenches until tests and inspections have been made and backfilling authorized by the ENGINEER. Use care in backfilling to avoid damage or displacement of pipe systems.
- i. For piping or conduit less than 2 feet 6 inches below surface of roadways, provide 4-inch thick concrete base slab support. After installation and testing of piping or conduit, provide minimum 4-inch thick encasement (sides and top) of concrete prior to backfilling or placement of roadway sub-base.

M. Cold Weather Protection

- 1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F (1°C).

3.03 COMPACTION

A. General

- 1. Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.
 - a. Percentage of maximum density requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D698; and not less than the following percentage of relative density, determined in accordance with ASTM D2049, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils). CONTRACTOR is responsible for providing one optimum moisture content - maximum dry density curve in accordance with the above referenced ASTM standards for each soil type encountered.
 - b. Structures, building slabs and steps, pavements: Compact top 12 inches of sub-grade and each 8 inch loose, uncompacted layer of backfill or fill material at 100 percent maximum density for cohesive material or 95 percent relative density for cohesionless material.

- c. Lawn or unpaved areas: Compact to 6 inches of sub-grade and each 8 inch loose, uncompacted layer of backfill or fill material at 90 percent maximum density for cohesive soils and 90 percent relative density for cohesionless soils.
- d. Walkways: Compact top 6 inches of sub-grade and each 8 inch loose, uncompacted layer of backfill or fill material at 95 percent maximum density for cohesive material or 95 percent relative density for cohesionless material.

2. Subgrade and backfill for sewers located in fill areas shall be compacted to not less than 95 percent maximum density.

B. Moisture Control

- 1. Where sub-grade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface or sub-grade, or layer of soil material, to prevent free water from appearing on surface during or subsequent to compaction operations.
- 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
- 3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by deicing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.04 BACKFILL AND FILL

A. General

- 1. Place acceptable soil material in layers to required sub-grade elevations, for each area classification listed below.
 - a. In excavations, use satisfactory excavated or borrow material.
 - b. Under grassed areas, use satisfactory excavated or borrow material.
 - c. Under walks and pavements, use sub-base material, or satisfactory excavated or borrow material, or combination of both.
 - d. Under steps, use sub-base material.
 - e. Under building slabs, use engineered fill material for a minimum depth of 6 inches.
 - f. Sub-base material or satisfactory excavated or borrow material may be used below engineered fill at building slabs.
 - g. Under piping and conduit, use sub-base material where sub-base is indicated under piping or conduit; shape to fit bottom 90° of cylinder.

- B. Backfill excavations as promptly as WORK permits, but not until completion of the following:
1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 2. Inspection, testing, approval, and recording locations of underground utilities.
 3. Removal of concrete formwork.
 4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
 5. Removal of trash and debris.
 6. Permanent or temporary horizontally supported walls.
- C. Ground Surface Preparation
1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface, except as otherwise specified in Section 02200-3.05 for embankments.
 2. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, adjust moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Placement and Compaction
1. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
 - a. Before compaction, add moisture to each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - b. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Backfilling Trenches

1. Backfilling shall be accomplished as soon as practical after pipe has been laid and jointing and alignment approved. Packing of crushed rock between joints shall be the usual procedure as the laying progresses. This is in order to avoid danger of misalignment from slides, flooding or other causes. The ENGINEER shall be given a maximum of 24 hours for inspection before backfilling.
2. The backfill over the pipe shall be in accordance with the standard details shown on the DRAWINGS for bedding and backfilling pipe.
3. In case maximum permissible trench widths (as designated by the pipe manufacturer) are exceeded, the CONTRACTOR shall furnish crushed rock backfill to a minimum of 12 inches over the top of pipe at no extra cost to the OWNER.
4. After the foregoing cover requirements over top of the pipe have been met, rock may be used in the backfill in pieces no larger than 12 inches in any dimension and to an extent not greater than one-half the backfill materials used. If additional earth is required for backfilling, it must be obtained and placed by the CONTRACTOR at no additional cost to the OWNER. Filling with rock and earth shall proceed simultaneously, such that no voids are left in the rock. After cover requirements over top of pipe have been met, backfilling may be employed without tamping, provided caution is used in quantity per dump and uniformity of level of backfilling. Surplus material shall be uniformly ridged over trench and excess rock hauled away, with no rock over 1-1/2 inch diameter in the top 6 inches. Ridged backfill shall be confined to the width of the trench and no higher than needed for replacement of settlement of backfill. All rock over 1-1/2 inch diameter shall be broomed to remove all earth and loose rock, all immediately following backfilling.
5. In the case of street, highway, railroad, sidewalk and driveway crossings; or within any roadway paving; or about manholes, valve and meter boxes; the backfill must be mechanically tamped in not over 6 inch layers, measured loose. Alternate method of compacting backfill shall be used, if refill material is in large hard lumps (crushed rock excepted) which cannot be consolidated without leaving voids.
6. In the case of tunnels, the annular space between plates and excavation shall be either permanently placed pea gravel or sand, pumped grout (3 parts sand and 1 part Portland cement by volume) or other suitably installed material approved by the ENGINEER. Backfilling shall be kept close to the heading and completed after each day's WORK. Where grout is used for backfill, injection holes with threaded plugs shall be provided in liner plates at various levels and in sufficient number to effectively grout the void around the tunnel. A minimum of 3 grout holes shall be provided in each 3 feet of tunnel length. Grout shall be injected in the lower holes first, proceeding upward as the void is filled. Plugs shall be installed after each hole is filled and grout

- stops shall be provided behind plates as necessary to ensure complete filling of the void.
7. Where traffic on streets, driveways, railroads, sidewalks and highways requires temporary surfacing, backfilling shall be terminated 4 inches below original ground level and 4 inches to 6 inches of dense graded aggregate shall be placed on the trench. Backfills shall be maintained easily passable to traffic at original ground level, until acceptance of PROJECT or replacement of paving or sidewalks.
 8. Excavated materials from trenches and tunnels in excess of that required for backfill shall be disposed of on the plant lot, as directed by the ENGINEER.
 9. The CONTRACTOR shall protect all sewer, gas, electric, telephone, water, and drain pipes of conduits from damage while pipelines are being constructed and backfilled, and from danger due to settlement of trench backfill.
 10. No extra payment shall be made for backfilling of any kind, except as specified herein before. Backfilling shall be included as a part of the Unit Price BID. No extra payment will be made to the CONTRACTOR for supplying outside materials for backfill.
 11. On completion of the PROJECT, all backfills shall be dressed; holes filled; and surplus material hauled away. All permanent walks, street paving, roadway, etc., shall be restored and seeding and sodding performed as required.

3.05 EMBANKMENTS

A. Borrow Excavation

Should insufficient quantities of suitable soil fill material for construction of the embankment be located within the designated areas, where shown on the PLANS, the CONTRACTOR shall obtain suitable soil material conforming to the requirements of the "Materials" SPECIFICATIONS at no additional cost to the OWNER.

Excavation areas shall be excavated and finally dressed in a manner such that no steep or unstable side slopes or other hazardous or unsightly conditions exist.

To the extent that they are needed, all suitable materials shall be used in the construction of permanent earth fill or rock fill. The suitability of materials for specific purposes will be determined by the ENGINEER. The CONTRACTOR shall not waste or otherwise dispose of suitable excavated materials.

B. Foundation Preparation

Foundations for earth fill shall be stripped of all topsoil to remove vegetation and other deleterious materials or shall be excavated as specified.

Except as otherwise specified for foundation benches, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earth fill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earth fill as specified for subsequent layers of earth fill.

When the original ground surface is sloping at rate of 15 percent or greater, perpendicular to the embankment axis, embankment foundation benches shall be constructed as shown on the CONTRACT DRAWINGS. Preparation of the foundation shall proceed as described in the previous paragraph.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the earth fill can be compacted against them to effect a good bond between the fill and the abutments.

C. Fill Placement

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the ENGINEER. Fill shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.

Fill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed twelve inches (12"). Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed six inches (6").

Adjacent to pipe or structures, fill shall be placed in a manner which will prevent damage to the pipes or structures and will allow the pipes or structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structures.

Earth fill for embankments shall also be placed so as to meet the following additional requirements:

1. The distribution of materials, throughout the zone shall be essentially uniform, and the fill shall be free from voids, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.
2. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.

3. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of not less than 2 percent shall be maintained to insure effective drainage. If the DRAWINGS or SPECIFICATIONS require or the ENGINEER directs that fill be placed at a higher level in one part of an embankment than another, the top surface of each part shall be maintained as specified above.
4. Embankments shall be constructed in continuous layers except where openings to facilitate construction or to allow the passage of stream flow during construction are specifically authorized.
5. Embankments built at different levels as described under (3) or (4) above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all loose material, and shall be scarified, moistened and recompacted when the new fill is placed against it as needed to insure a good bond with the new fill and to obtain the specified moisture content and density in the junction of the in place and new fill.
6. Embankment materials shall be placed in the zones (impervious core and random earth and rock) shown on the CONTRACT DRAWINGS. Prior to fill placement in the cutoff trench, the bottom of the cut off trench shall be inspected by the ENGINEER. All fractures or joints shall be clean and filled with mortar or concrete unless otherwise directed by the ENGINEER.
7. Fill placement shall then proceed in accordance with CONTRACT PLANS AND SPECIFICATIONS and in a manner such that no steep or unstable slopes or other hazardous or unsightly conditions exist. Fill material used shall conform to requirements of the "Materials" SPECIFICATIONS previously mentioned.
8. Rocks placed in the random earth and rock zones shall be kept at least 2 feet below the embankment surface. The rock shall not be dumped into final position, but shall be distributed by blading or dozing in a manner that will ensure proper placement in the embankment so that voids, pockets and bridging will be eliminated.

D. Compaction

Each layer of fill shall be compacted as necessary to make density of the fill matrix not less than the minimum density specified. The fill matrix is defined as the portion of the fill material finer than the maximum particle size used in the compaction test method specified. Embankment fill shall be compacted to minimum field densities equal to or greater than 95 percent of maximum dry density as determined by the Standard Proctor Maximum Dry Density test method ASTM D-698. Moisture content may vary optimum, -2 percent to +1 percent as also determined by ASTM D-698.

CONTRACTOR shall provide one moisture content vs. dry density relationship curve as determined by standard test method ASTM D-698 to help determine optimum moisture content and maximum dry density for each soil type encountered during construction prior to placement in the embankment.

Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators. Heavy equipment shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

The passage of heavy equipment will not be allowed: (a) over cast-in place conduits prior to 14 days after placement of the concrete; (b) over cradled pre-cast conduits prior to 7 days after placement of the concrete cradle; or (c) over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half of the clear span width of the structure or pipe or 2 feet, whichever is greater.

E. Testing

During the course of the WORK, the CONTRACTOR will perform such tests as are required to identify the materials, to determine compaction characteristics, to determine moisture content, and to determine density of fill in place. These tests performed by the CONTRACTOR will be used to verify that the fills conform to the requirements of the SPECIFICATIONS. Such tests are intended to provide the CONTRACTOR with the information required by him for the proper execution of the WORK.

Submittals shall be per Section 02200, paragraph 1.04 A.

F. Removal and Replacement of Defective Fill

Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the SPECIFICATIONS shall be reworked to meet the requirements or removed and replaced by acceptable fill. The replacement fill, the foundation, and the surfaces upon which the fill is placed shall conform to all requirements of the SPECIFICATIONS for foundation preparation, approval, placement, moisture control and compaction.

3.06 GRADING

A. General

1. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface

within specified tolerances, compact with uniform levels or slopes between such points and existing grades.

B. Grading Outside Building Lines

1. All materials used for backfill around structures shall be of a quality acceptable to the ENGINEER and shall be free from large or frozen lumps, wood and other extraneous material. All spaces excavated and not occupied by footings, foundations, walls or other permanent WORK shall be refilled with earth up to the surface of the surrounding ground, unless otherwise specified, with sufficient allowance for settlement. In making the fills and terraces around the structures, the fill shall be placed in layers not exceeding 12 inches in depth and shall be kept smooth as the WORK progresses. Each layer of the fill shall be rolled with an approved type roller and/or be compacted. When it is not practicable to compact sections of the fill immediately adjacent to buildings or structures by rolling, then such sections shall be thoroughly compacted by means of mechanical tamping or hand tamping as may be required by the conditions encountered. All fills shall be placed so as to load structures symmetrically.
2. As set out herein before, rough grading shall be held below finished grade and then the topsoil which has been stockpiled shall be evenly spread over the surface. The grading shall be brought to the levels shown on the DRAWINGS or to the elevations established by the ENGINEER. Final dressing shall be accomplished by hand WORK or machine WORK, or a combination of these methods as may be necessary to produce a uniform and smooth finish to all parts of the re-grade. The surface shall be free from clods greater than 2 inches in diameter. Excavated rock (6 inches maximum size) may be placed in the fills, but it shall be thoroughly covered. Rock placed in fills shall not be closer than 12 inches from finished grade.
3. Grade areas adjacent to building lines to drain away from structures and to prevent ponding.
 - a. Finish surfaces free from irregular surface changes, and as follows:
 - 1) Lawn or unpaved areas: Finish areas to receive topsoil to within not more than 0.10 ft. above or below required sub-grade elevations.
 - 2) Walks: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10 ft. above or below required sub-grade elevation.
 - 3) Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 0.04 ft. above or below required sub-grade elevation.

C. Grading Surface of Fill Under Building Slabs

1. Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 0.04 ft. when tested with a 10ft. straightedge.

D. Compaction

1. After grading, compact sub-grade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.07 PAVEMENT SUB-BASE COURSE

A. General

1. Sub-base course consists of placing sub-base material, in layers of specified thickness, over sub-grade surface to support a pavement base course.

B. Grade Control

1. During construction, maintain lines and grades including crown and cross-slope of sub-base course.

C. Shoulders

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

D. Placing

1. Place sub-base course material on prepared sub-grade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting sub-base material during placement operations.
2. When a compacted sub-base course is shown to be 6 inches thick or less, place material in a single layer. When it is shown to be more than 6 inches thick, place material in equal layers, such that no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.08 BUILDING SLAB ENGINEERED FILL COURSE

A. General

1. Engineered fill course consists of placement of fill material, in layers of indicated thickness, over sub-grade surface to support concrete building slabs.

B. Placing

1. Place fill material on prepared sub-grade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.
2. When a compacted course is shown to be 6 inches or less, place material in a single layer. When it is shown to be more than 6 inches thick, place material in equal layers, such that no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.09 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction

1. Allow testing service to inspect and report to the ENGINEER on findings and approve sub-grades and fill layers before further construction WORK is performed.
 - a. Perform field density tests in accordance with ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2992 (nuclear density method), as applicable.
 - b. Footing sub-grade: 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 sub-grade may be based on a visual comparison of each sub-grade with related tested strata, when acceptable to ENGINEER.
 - c. Paved areas and building slab sub-grade: Make at least one field density test of sub-grade for every 2,000 square feet of paved area or building slab, but in no case less than three tests. In each compacted fill layer, make one field density test for every 2,000 square feet of overlying building slab or paved area, but in no case less than three tests.
 - d. Foundation wall backfill: Take at least two field density tests, at locations and elevations as directed.

- B. If in the opinion of the ENGINEER, based on testing service reports and inspection, sub-grade or fills which have been placed are below specified density, CONTRACTOR shall provide additional compaction and testing at no additional expense to the OWNER.

3.10 MAINTENANCE

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- A. Protection of Graded Areas
 - 1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas
 - 1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- C. Settling
 - 1. Where settling is measurable or observable at excavated areas during general PROJECT warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent WORK, and eliminate evidence of restoration to greatest extent possible.

3.11 BASIS FOR PAYMENT

Payment for excavation shall be made on a unit price or a lump sum basis where a separate bid item is provided. Otherwise payment for all excavation, trenching and backfilling required for other work, such as structures, pipelines, etc., shall be made on a unit price or lump sum basis bid for that work.

END OF SECTION

SECTION 02255

CRUSHED STONE AND DENSE GRADED AGGREGATE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install crushed stone for miscellaneous uses as shown on the Drawings, as called for in the Specifications, or as may be directed in writing by the ENGINEER.
- B. Sizes, types, and quality of crushed stone are specified in this Section, but its use for replacement of unsuitable material, pavement base, and similar uses is specified in detail elsewhere in the Specifications. The ENGINEER may order the use of crushed stone for purposes other than those specified in other sections, if, in his opinion, such use is advisable.

PART 2 PRODUCTS

2.01 MATERIALS

- A. When referred to in these Specifications, crushed stone shall be Number 57 graded in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, 2000 Edition.
- B. When referred to in these Specifications, dense graded aggregate (DGA) shall be crushed stone classified by the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, 2000 Edition, and conforming to the following requirements:

Sieve Size	Percent Passing
1 Inch	100
3/4 Inch	70 - 100
3/8 Inch	50 - 80
#4	30 - 65
#30	10 - 40
#200	4 - 13

PART 3 EXECUTION

3.01 INSTALLATION

- A. Crushed stone shall be placed in uniform layers not greater than 6 inches deep and shaped by power equipment to required lines, grades, cross sections, and depths. No minimum compacted density, method of compaction, or compaction equipment is required since a nominal amount of compaction effort with vibration can establish the desired inter-granular locking of the aggregate under controlled placement depth. Acceptable compaction can be achieved with pneumatic-tired and tracked vibratory equipment and vibratory rollers.
- B. All compaction operations shall be performed to the satisfaction of the ENGINEER.
- C. Crushed stone shall be placed in those areas as shown on the Drawings and as may be directed by the ENGINEER.

3.02 BASIS FOR PAYMENT

Payment for crushed stone or DGA shall be made on a unit price or a lump sum basis where a separate bid item is provided. Otherwise payment for crushed stone or DGA required for other work show on the PLANS shall be made on a unit price or lump sum basis bid for that work.

END OF SECTION

SECTION 02270

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials and equipment required for erecting, maintaining and removing temporary erosion and sedimentation controls as shown on the Drawings and as specified herein.
- B. Temporary erosion controls include, but are not limited to grassing, mulching, seeding, watering, and reseeding on all disturbed surfaces including waste area surfaces and stockpile and borrow area surfaces; scheduling work to minimize erosion and providing interceptor ditches at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits.
- C. Temporary sedimentation controls include, but are not limited to, silt dams, silt fences, traps, barriers, staked straw-bale diversions and appurtenances at the foot of sloped surfaces, which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits.
- D. CONTRACTOR is responsible for providing and maintaining effective temporary erosion and sediment control measures during construction or until final controls become effective.
- E. The erosion and sedimentation controls where shown on the Drawings and/or specified herein are intended to provide the required environmental protection. However, should additional controls be directed by the ENGINEER, CONTRACTOR shall furnish, install and maintain additional mulching and straw-bale diversions to control erosion and sedimentation to the satisfaction of the ENGINEER at no additional cost to OWNER.
- F. Construction methods that will minimize siltation and erosion shall be employed. The CONTRACTOR shall take steps to minimize unnecessary excavation and disturbing or uprooting trees and vegetation. The CONTRACTOR is prohibited from dumping soil or debris, or pumping silt-laden water into a stream. Cleanup, grading, seeding and planting or restoration of all work areas shall begin immediately. Exposed areas shall not remain unprotected for more than seven days. (From 10-States' Standards)

1.02 RELATED WORK NOT INCLUDED

- A. Site clearing and grubbing is included in this Division, Section 02110.
- B. Dewatering is included in this Division, Section 02140

- C. Landscape work is included in this Division, Section 02900.
- D. Final erosion protection measures are included in this Division, Section 02200.

PART 2 PRODUCTS

- A. Erosion control blanket where called for in this Section, on the Drawings, or as determined by the ENGINEER, shall be AMSCO Curlex Blanket, North American Green SC150, Propex Landlok CS2 or equal.
- B. Rip-rap lining where called for in this Section, on the Drawings or as determined by the ENGINEER shall be Class III or Class II lining as shown on the Drawings and as specified in Section 703 of the 2000 edition of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction."

For Class III, no less than 80 percent, by volume, of individual stones shall range in size from 1/4 to 1-1/2 cubic feet. Stones of smaller sizes are permissible for use in filling voids in the upper surface and dressing to the proper slope. In addition to the above referenced specifications, individual stone dimensions are limited to 4 inches (minimum) and 24 inches (maximum).

For Class II lining, no more than 20 percent of the finished product shall pass through square openings 5 inches by 5 inches.

- C. Filter fabric for use with rip-rap where called for in this Section, on the Drawings, or as determined by the ENGINEER, shall be Mirafi 700X, AMOCO 1199 or equal.
- D. Silt fence fabric where called for in this Section, on the Drawings or as determined by the ENGINEER shall be Mirati 100X, STABILINKA 140 or equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Erosion control practices shall be adequate to prevent erosion of all disturbed and/or all regraded areas.
- B. Earthwork procedures shall be as specified in this Division, Section 02200.
- C. Silt fences shall be located and staked in all disturbed locations and/or all regraded where erosion may occur.

3.02 TEMPORARY SEEDING

- A. This item shall consist of seeding a temporary cover of grass, or grass and small grain, on areas disturbed on the construction site, which will not be redistributed within a 60 day period. The determination of the area to be temporarily seeded and the time of seeding shall be made by the ENGINEER.
- B. The seed mixtures to be used for temporary cover will be governed by the time of year the seeding is accomplished. The mixture of seeding shall be as follows:
 - 1. Time of Seeding - February 15 to June 1

Rye 1-1/2 bushels and rye grass 25 pounds per acre; or tall fescue 30 pounds and rye grass 20 pounds per acre.
 - 2. Time of Seeding - June 2 to August 15

Tall fescue 30 pounds and rye-grass 20 pounds per acre; or, spring oats 2 bushels and rye grass 30 pounds per acre.
 - 3. Time of Seeding - August 16 to February 14

Rye 2 bushels and rye grass 20 pounds per acre; or, tall fescue 30 pounds and rye- grass 20 pounds per acre.
 - 4. Lime will not be required for temporary seeding.
 - 5. Fertilizer at the rate of 400 pounds per acre of 10-10-10 fertilizer, or equivalent, broadcast uniformly on the area to be seeded.
 - 6. All seed shall be broadcast evenly over the area to be seeded and culti-packed or otherwise pressed into the soil. Seed and fertilizer may be mixed together and applied after the seed has been prepared.
 - 7. Mulch for temporary seeding will not be required except on those areas, in the ENGINEER'S opinion, which are too steep to hold the seed without protective cover.

3.03 RIP-RAP LINING

- A. Rip-rap lining shall be constructed to the lines and grades and at the location designated on the Drawings.

The filter fabric shall be placed at the locations shown on the Drawings. The surface to receive the fabric shall be prepared to a relatively smooth condition free of obstructions, debris or sharp objects that may puncture the fabric. Construction equipment will not be permitted to operate directly on the fabric.

The fabric shall be placed with long dimension parallel to the channel or embankment centerline and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. If more than one strip is necessary, the strips shall overlap a minimum of 3 feet. Transverse laps shall be placed so the upstream strip laps over the downstream strip.

Fastener pins shall be installed through both strips of overlapped fabric at no less than 5 foot intervals along a line through the midpoint of the lap, and at any other locations as necessary to prevent any slippage of the fabric.

Fabric shall be covered with the rip-rap lining within 14 calendar days after placement of the fabric. Fabric not covered within this time shall be removed and replaced at the CONTRACTOR'S expense if the ENGINEER determines that damage or deterioration is evident.

The fabric shall be protected from damage due to the placement of the channel lining by limiting the height of drop of the material at no greater than 3 feet or by placing a cushioning layer of sand on top of the fabric before dumping the material, at the CONTRACTOR'S option. The CONTRACTOR shall demonstrate that the placement technique will prevent damage to the fabric.

Placement of channel lining shall begin at the toe of the channel and proceed upstream. The lining shall be placed to conform to the template shown on the Drawings. The lining need not be compacted but shall be placed upgrade in a manner to ensure that the larger rock fragments are uniformly distributed and the smaller rock fragments serve to fill the spaces between the larger rock fragments in such a manner as will result in a well keyed, densely placed, uniform layer of lining of the specified thickness. Hand placing will be required only to the extent necessary to secure the results specified above.

3.04 MAINTENANCE OF CONTROLS AND PERFORMANCE

- A. Erosion and sedimentation controls shall be inspected weekly and after significant rainstorms. Replace silt fencing which is damaged filter stone which is dislodged, erosion control blanket which is damaged, and make other necessary repairs.
- B. Should any of the temporary erosion and sediment control measures employed by the CONTRACTOR fail to produce results consistent with normal and acceptable standards of the industry. The CONTRACTOR shall immediately take whatever steps are necessary to correct the deficiency at his own expense.
- C. Remove all temporary erosion and sedimentation controls as final landscaping and grading is performed.

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END OF SECTION

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SECTION 02326

STEEL CASING PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Steel casing pipe shall be furnished and installed as shown on the DRAWINGS and specified herein.

1.02 RELATED WORK

- A. Erosion and sedimentation control is included in this Division, Section 02270.
- B. Piping is included in this Division, Section 02700.
- C. Landscaping is included in this Division, Section 02900.

PART 2 PRODUCTS

2.01 STEEL CASING PIPE

- A. Steel casing or jack pipe shall be plain end steel pipe with a minimum yield strength of 35,000 psi and tensile strength of 60,000 psi per API-5L Grade B material. The steel pipe supplied shall be manufactured by the seamless, electric-weld, submerged arc weld or gas metal-arc weld process as specified in API-5L. Certifications of 35,000 psi minimum yield strength shall be furnished by the CONTRACTOR.
- B. The inside diameter shall be at least 2 inches greater than the largest outside diameter of the carrier pipe, joint or couplings for carrier pipe less than 6" in diameter and at least 4" greater for carrier pipe 6" and over in diameter unless otherwise noted on the plan sheets. In all cases, the casing pipe shall be great enough to allow the carrier pipe to be removed subsequently without disturbing the casing pipe or roadbed.
- C. Casing pipe shall have minimum wall thickness as shown in the following table:

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Nominal Diameter (Inch)	Nominal Thickness (Inch)	Nominal Diameter (Inch)	Nominal Thickness (Inch)
Under 10	0.188	24	0.438
10 - 12	0.250	26	0.438
14 - 16	0.281	28 - 30	0.500

PART 3 EXECUTION

3.01 TUNNELING, BORING OR JACKING

- A. Boring or jacking as specified herein shall be located as shown on DRAWINGS. All other casing pipe installations shall be open cut trench.
- B. Tunneling under paving, railroads, buildings and underground structures is included as an alternate to boring or repaving required by open cut trenching at no extra cost to the OWNER. Bore and casing pipe is also included as an alternate to tunneling. Backfilling of tunnels shall be mechanically tamped in not more than 3-inch layers and with material rendered suitable for tamping before being placed in tunnel unless otherwise shown on the DRAWINGS. No payment will be made for tunnels less than 3 feet long.
- C. In tunneling under buildings, the CONTRACTOR will held responsible for all damage by his operations and methods of excavation and backfilling.
- D. Should the CONTRACTOR elect and receive permission to tunnel and bore, other than locations designated on the DRAWINGS or required by the ENGINEER to be tunneled or bored, the entire compensation therefore shall be the same as the unit prices bid for installation in open trench, including paving replacement, but not including bore or unit prices.
- E. At locations where tunneling or boring or jacking is called for on the DRAWINGS, in addition to the unit prices for permanent tunnel, tunnel liner, temporary tunnel, boring or jacking and/or casing pipe, payment will be made for furnishing and laying carrier pipe inside the tunnel or casing pipe. No payment will be made for separate trench and backfill unit price items where permanent tunnel, tunnel liner, temporary tunnel, boring or jacking and/or casing pipe unit prices is paid.
- F. Boring or jacking under highways, railroads, sidewalks, pipelines, etc., shall be done at the locations shown on the DRAWINGS. It shall be performed by mechanical means and accurate vertical and horizontal alignment must be maintained. When shown on the DRAWINGS, casing pipe shall be used and shall be installed inside bored holes concurrently with boring, or jacking.

3.02 STEEL CASING PIPE INSTALLATION

- A. Steel casing pipe shall be of the size and wall thickness as shown on the DRAWINGS or specifications.
- B. When casing pipe is jacked, concurrent with boring, all joints shall be solidly welded. The weld shall be such that the joint shall be of such strength to withstand the forces exerted from the boring and jacking operation as well as the vertical loading imposed on the pipe after installation. The weld shall also be such that it provides a smooth, non-obstructing joint in the interior of the pipe, which will allow easy installation of the carrier pipe without hanging or abrasion to the carrier pipe upon installation.
- C. When casing pipe is installed in open trench or permanent tunnel, it shall be bedded and backfilled as specified in Division 2. When casing pipe is installed in temporary tunnel, it shall be laid accurately to alignment of proposed pipeline and at an elevation below proposed pipeline necessary to support it at the planned elevation. Bedding and backfill for casing pipe in temporary tunnel shall be as specified in Division 2.
- D. Casing pipe in open trench, permanent tunnel and temporary tunnel shall be joined by welding such that it will not be moved out of alignment or grade and will prevent backfill material from entering joint. Where casing pipes are shown on the DRAWINGS to be equipped with vent pipes, vents shall be installed as shown on the DRAWINGS with cost of the same included in the price bid for the casing pipe unless otherwise specified.

3.03 CARRIER PIPE IN CASING PIPE INSTALLATION

A. Pipeline Spacers

Carrier pipes shall be centered inside casing pipe throughout the length of the casing pipe. Centering shall be accomplished by the installation of polyethylene pipeline spacers attached to the casing pipe in such a manner as to prevent the dislodgment of the spacers as the carrier pipe is pulled or pushed through the casing pipe. Spacers shall be of such dimensions to provide (1) full supportive load capacity of the carrier pipe and contents; (2) of such thickness to allow installation and/or removal of the pipe; and (3) to allow no greater than 1/2 inch movement of the carrier pipe within the casing pipe after the carrier pipe is installed. Installation shall be in accordance with manufacturer's recommendations.

- B. Upon completion of installation of the carrier pipe, the annular space at the ends of the cover pipe shall be sealed to prevent the entrance of groundwater, silt, etc., into the casing pipe. The seal shall be a manufactured product specially made for this purpose. The seal shall be the best seal type constructed of synthetic rubber with stainless steel banding straps. Seals may be of the "pull-on" or "wrap around" type as

manufactured by Advance Products and Systems, Inc., The Metraflex
Company or equal.

3.04 BASIS FOR PAYMENT

Steel Casing Pipe shall be paid for at the unit price bid or lump sum bid and shall include all work incidental to making a complete installation such as excavation, carrier pipe, bedding, backfill, painting, testing, disinfection, cleanup, seeding, etc.

END OF SECTION

SECTION 02500

BITUMINOUS PAVEMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Extent of bituminous pavement paving, as applicable, is shown on the Drawings, including roads, driveways, and parking areas.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Unless noted, all specification designations refer to the Kentucky Transportation Cabinet Department of Highways Standard Specification for Road and Bridge Construction, latest edition. Appropriate portions of the referenced sections of the Specifications shall apply, but all work shall be included in lump sum bid items described herein unless otherwise specified or shown on the Drawings.
- B. Preparation of sub-base is specified in this Division, Section 02200.
- C. Crushed stone and dense graded aggregate are specified in this Division, Section 02255.

1.03 QUALITY ASSURANCE

- A. Performance: Bituminous seal coat that fails as the result of not meeting the requirements of these Specifications shall be corrected as directed by the ENGINEER at the CONTRACTOR'S expense.
- B. The design plant mix shall be submitted to the ENGINEER for review and acceptance. The submittal shall include the last date the mixture was approved by the Kentucky Transportation Cabinet Department of Highways for use on a state road project; and the location where the mixture was recently used, and the name and address of the paving contractor.

PART 2 PRODUCTS

2.01 BITUMINOUS CONCRETE SURFACE MATERIAL

- A. Aggregates shall meet the applicable requirements of Sections 804 and 805.
- B. Bituminous materials shall meet the applicable requirements of Section 806.
- C. Bituminous materials for tack coat shall be one of the following:

SS-1, SS-1h, CSS-1, CSS-1h, AE-60, RS-1, CRS-1, RC-70 or RC-250.

02500-1

- D. Steel, wood, or other suitable material shall be of size and strength necessary to resist movement during bituminous placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

2.02 BITUMINOUS SEAL COAT MATERIAL

- A. Coarse aggregate shall be Kentucky Transportation Cabinet Department of Highways Standard No. 8, graded 3/8 inch to No. 8, meeting applicable requirements of Section 805.
- B. Bituminous materials shall meet applicable requirements of Section 806.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

- A. The road shall be swept with an approved mechanical sweeper and with wire hand brooms, when necessary. Special care shall be taken to clean the edges of the surface so that full width of the roadway to be treated shall be uniformly clean. Where any mud or earth exists, it shall be removed sufficiently in advance of application of bituminous material to allow the surface to become thoroughly dry.

3.02 BITUMINOUS CONCRETE PAVING

- A. Composition of Mixtures: Surface pavement mixture, meeting requirements of Sections 401.02 through 401.05 shall be used as determined by local plant mix availability. The mixture shall have been approved recently by the Kentucky Transportation Cabinet Department of Highways, used recently on a state project, and conform to the requirements below when tested in accordance with ASTM D 1559-latest revision:

Stability, minimum pounds		750
Flow, 0.01 inch		Min, 8, Max.
Percent air voids	16	Min. 3, Max. 5
Minimum voids in mineral aggregate, percent: 3/4 inch		14
	1 inch	13
Voids filled, percent		Min. 75, Max.
	85	

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- B. Construction Methods: Construction requirements shall conform to applicable requirements of Sections 401, 402, and 407.
- C. A tack coat shall be required to bond new paving to the surface of concrete or brick pavements and bases or existing bituminous surfaces. It shall be applied at the rate of 0.8 pound (0.1 gal.) per square yard at the following range of application temperatures:

SS-1, SS-1h, CSS-1, CSS-1h, AE-60	70-160°F
RS-1, CRS-1	70-
	140°F
RC-70	
	120°F
RC-250	
	165°F

* These temperatures should be used unless higher temperatures are required for satisfactory coverage. Caution must be exercised to prevent fire or explosion.

- D. When SS-1, SS-1h, CSS-1, CSS-1h, or AE-60 is furnished for tack material, it shall be diluted with an equal quantity of water conforming to Section 803, shall be thoroughly mixed prior to application, and shall be applied a sufficient time in advance of the paver to ensure that all water has evaporated before the bituminous concrete mixture is placed. The application rate shall be 0.8 pound (0.1 gal.) per square yard of the diluted SS-1, SS-1h, CSS-1, CSS-1h, or AE-60.
- E. Where bituminous paving is placed against vertical surfaces such curbs, gutters, manhole frames, valve boxes, etc., the vertical face shall be tack coated to seal the surface. Where these surfaces are inaccessible to pressure distributor, the tack coat may be brushed or broomed into place. The tack coat shall not be allowed to spill over onto any horizontal surface outside the area to be paved.
- F. Unless otherwise indicated on the Drawings or in these Specifications, the compacted thickness of the bituminous concrete paving shall be a minimum of 2 inches and the minimum ambient temperature for placing shall be 40°F. Mixing and laying temperatures shall be as follows:

Aggregates	Min. 240°F - Max. 325°F
Asphalt Cement	Min. 225°F - Max. 325°F
Mixture at Plant (measured in truck)	Min. 240°F - Max. 325°F
Mixture when Placed (measured in truck when discharging)	275° + 20°F **

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** The 275°F + 20°F mixture placing temperature is based on 275°F being about the ideal temperature for obtaining optimum compaction under average conditions. However, when the distance between the asphalt plant and the job is such that specified placing temperatures are covered, insulated hauling equipment as described below are used, the minimum placing temperature shall be 225°F.

- G. Trucks for hauling bituminous mixtures shall have tight, clean, and smooth metal beds that have been sprayed with a minimum amount of soap emulsion, paraffin oil, or other approved material that is not detrimental to the mixture to prevent the mixture from adhering to the beds. All trucks shall be equipped with covers of sufficient size to completely cover the loaded material and all covers shall be securely fastened in place before the truck leaves the plant. Truck beds shall be insulated, when necessary, to maintain the specified temperature to the point of delivery. Any truck causing excessive segregation of material by its spring suspension or other contributing factors shall be discharged from the work until such conditions are corrected.
- H. The CONTRACTOR shall have an accurate thermometer on the job at all times for verifying all temperature requirements and for taking temperature measurements whenever requested by the ENGINEER or OWNER. The CONTRACTOR shall closely control temperature and compaction requirements to achieve quality bituminous paving and related work.
- I. Bituminous paving that fails as the result of not meeting the requirements of these Specifications shall be removed and replaced as directed by the ENGINEER at the CONTRACTOR's expense.

3.03 BASIS FOR PAYMENT

Payment for Bituminous Pavement shall be made on a unit price or a lump sum basis where a separate bid item is provided.

END OF SECTION

SECTION 02700

SEWAGE AND DRAINAGE PIPING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals necessary to install and test pipe and fittings as shown on the DRAWINGS and required by the SPECIFICATIONS.
- B. Piping shall be located substantially as shown. The ENGINEER reserves the right to make such modifications in locations as may be found desirable to avoid interference between pipes or for other reasons. Pipe fitting notation is for the CONTRACTOR'S convenience and does not relieve him from laying and jointing different or additional items where required without additional compensation.
- C. Wherever the word pipe or piping is used it shall mean pipe and fittings unless otherwise noted.

1.02 RELATED WORK

- A. Trenching, backfilling and compacting are included in this Division, Section 02200.
- B. Concrete is included in Division 3, Section 03300.
- C. General Piping

1.03 DESCRIPTION OF SYSTEM

- A. Piping shall be installed substantially as shown on the DRAWINGS so as to form a complete smooth flow path and workable system.
- B. The piping and materials specified here in are intended to be standard types of pipe for use in transporting the fluids as indicated on the DRAWINGS. The pipe and fittings shall be designed, constructed, and installed in accordance with the best practices and methods and the manufacturer's recommendations.

1.04 QUALIFICATIONS

- A. All pipe and fittings under this section shall be furnished by manufacturers who are fully experienced, qualified, and regularly engaged in the manufacture of the materials to be furnished.

1.05 SUBMITTALS

- A. The CONTRACTOR shall submit to the ENGINEER for review in accordance with Division 1, Section 01300, complete sets of SHOP DRAWINGS showing layout and details of materials, joints and methods of construction and installation of the pipe, specials and fittings required.
- B. Before fabrication and/or shipping of the pipe is begun, the CONTRACTOR shall submit for approval a schedule of pipe lengths for the entire job. All pipe furnished under the CONTRACT shall be fabricated in full accordance with the approved DRAWINGS.
- C. Submit to the ENGINEER within 30 days after execution of the CONTRACT a list of materials to be furnished, the names of the SUPPLIERS and the approximate date of delivery of materials to the site.

1.06 INSPECTION

- A. The manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the ENGINEER a notarized affidavit stating all pipe meets the requirements of applicable ASTM SPECIFICATIONS, these SPECIFICATIONS, and the joint design with respect to square ends and out-of-round joint surfaces.

PART 2 PRODUCTS

2.01 DUCTILE IRON PIPE (FORCE MAIN AND GRAVITY SEWER APPLICATIONS)

- A. General
 - 1. Ductile iron pipe shall be centrifugally cast of ductile iron conforming to ASTM Specification A-746-82, or latest revision. Unless noted otherwise on the DRAWINGS, all ductile iron pipe shall have a wall thickness not less than 0.33 inch (Class 52).
 - 2. The manufacturing tolerances included in the nominal thickness shall not be less than specified by ANSI/AWWA C150/A21.50-latest revision.
 - 3. Pipe may be furnished in 18' or 20' nominal laying lengths; and the weight of any single pipe shall not be less than the tabulated weight by more than 5 percent for pipe 12 inches or smaller in diameter, not by more than 4 percent for pipe larger than 12 inches in diameter.
 - 4. The hydrostatic and acceptance tests for the physical characteristics of the pipe shall be as specified in ANSI/AWWA C151/A21.51-latest revision.

5. Any pipe not meeting the ANSI/AWWA SPECIFICATIONS quoted above shall be rejected in accordance with the procedure outlined in the particular specification.
6. The ENGINEER shall be provided with 3 copies of a certification by the manufacturer that the pipe supplied for this CONTRACT has been tested in accordance with the referenced SPECIFICATIONS and is in compliance therewith.
7. The net weight, class or nominal thickness and sampling period shall be marked on each pipe. The pipe shall also be marked to show that it is ductile iron.
8. Unless otherwise noted, joints for ductile iron pipe will be "push-on" type consisting of a rubber gasket installed in a recess in the bell.
9. Ductile iron pipe must be used within 200 feet of underground petroleum storage tanks and shall have gaskets designed for this purpose such as Nitrile Butadiene (NBR), approved equal or better.

B. Lining and Coating Ductile Iron Pipe

1. All ductile iron pipe and fittings shall have manufacturers outside coal tar or asphaltic base coating. The inside lining shall be one of the following protective coatings:
 - a. Calcium Aluminate Cement Mortar with Sealcoat (ANSI/AWWA C104/A21.4);
 - b. Coal Tar Epoxy (20 to 40 mil, nominal);
 - c. Amine Cured Novalac Epoxy (40 mil, nominal);
 - d. Polyethylene (40 mil, nominal)
 - e. Polyurethane (40 mil, nominal).

C. Fittings for Ductile Iron Pipe - 3" and Larger

Fittings shall be the same as specified in Section 02610, Paragraph 2.02 C of these SPECIFICATIONS.

D. Ductile Iron Pipe and Fittings - Smaller than 3"

Fittings shall be the same as specified in Section 02610, Paragraph 2.02 D of these SPECIFICATIONS.

E. Flanged Cast Iron Pipe and Flanged Coupling Adapters for Flexible Couplings

Fittings shall be the same as specified in Section 02610, Paragraph 2.02 E of these SPECIFICATIONS.

- F. Mechanical Joint Restraints shall be the same as specified in Section 02610, Paragraph 2.02 F of these SPECIFICATIONS.

2.02 POLYVINYLCHLORIDE (PVC) PIPE AND FITTINGS (GRAVITY SEWER APPLICATIONS)

- A. PVC pipe used for gravity sewer applications shall meet all requirements of ASTM specification D3034-latest revision. Pipe and fittings shall meet the extra strength minimum of SDR-35 of that specification.
- B. All pipe and fittings shall be inspected at the factory and on the job site. Testing of PVC pipe and fittings shall be accomplished in conformance with the latest revision of ASTM D3034, ASTM D2444, ASTM D2412 and ASTM D2152. The manufacturer shall submit 5 copies of certification of test for each lot of material represented by shipment to the job site.
- C. The pipe shall be homogeneous throughout and free from cracks, holes foreign inclusions or other defects. The pipe shall be as uniform in color as commercially practical. PVC pipe shall have a ring painted around spigot ends in such a manner as to allow field checking of setting depth of pipe in the socket.
- D. Pipe must be delivered to job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or stored as close to the final point of placement as is practical. Pipe shall not be stored outside where subject to sunlight.
- E. Jointing of PVC pipe shall be by a natural rubber ring inserted into the belled end of the pipe or double hub joints. Solvent weld joints are not acceptable.
- F. The PVC pipe manufacturer shall provide special fittings, acceptable to the ENGINEER to make water-tight connections to manholes.

2.03 POLYVINYLCHLORIDE (PVC) PIPE AND FITTINGS (FORCE MAIN APPLICATIONS)

- A. General
 - 1. PVC pipe used for force main applications shall meet all the requirements of ASTM specification D2241-latest revision. The PVC cell classification shall be 1245B as defined under ASTM D1784.

2. Elastomeric gaskets shall comply with the requirements specified in ASTM F477.
3. Joints shall comply with the requirements specified in ASTM D3139.
4. PVC pipe shall be as manufactured by IPEX, J-M Manufacturing, North American Pipe or approved equal.
5. The lubricant used for joint assembly shall be a water soluble lubricating and shall not be detrimental to the gasket or the pipe.
6. The manufacturer shall, upon written request by the purchaser, furnish an affidavit that all basic materials used in pipe production meet the requirements of this recommended standard.
7. Pipe shall be homogeneous throughout. It shall be free from voids, cracks, inclusions and other defects. It shall be uniform as commercially practical in color, density, and other physical properties. Pipe surfaces shall be free from nicks and scratches. Joining surfaces of spigots and joints shall be free from gouges and imperfections that could cause leakage.
8. Pipe shall be nominal sizes and dimension ratio as shown on the DRAWINGS or specified elsewhere. Pipe outside diameters shall be consistent with iron pipe sizes (IPS), to assure the pipe can be directly connected to ductile iron fittings without adapters or complicated procedures.
9. Pipe shall be a standard green color representative of sewer pipe.

B. Testing and Certification

1. The manufacturer shall be subject to random inspection and evaluation by an independent third party in order to assure the purchaser of full compliance with this specification. The third party shall report all findings to the purchaser upon request. The third party selection shall be subject to the approval of the OWNER and shall be provided at no additional cost to the OWNER.
2. The third party inspector shall have free access to those parts of the manufacturer's plant involved in WORK performed to meet requirements of this recommended standard. The manufacturer shall afford the third party inspector reasonable facilities needed to determine if the pipe meets the requirements of this recommended standard.
3. Certification: Upon request by the OWNER, the manufacturer shall furnish a certificate of conformance to specified standards. Upon request by the OWNER, the manufacturer shall furnish

production standard dimensions and tolerances of the joint and gasket.

4. Test Preparation

- a. Testing shall be performed at 73.4°F + 36°F (23°C + 2°C) unless otherwise specified. Care shall be exercised to condition test specimens to the proper temperature before testing. In cases of disagreement, specimens shall be conditioned in accordance with Procedure A of ASTM D618.
- b. Selection of pipe specimens for testing, if not specified in this recommended standard, shall be as agreed upon by the purchaser and manufacturer.

5. Test Methods

- a. All measurements shall be made in accordance with ASTM D2122.
- b. Flatten three (3) specimens of pipe, 2 inches long, between parallel plates in a suitable press until the distance between the plates is 5% of the original outside diameter of the pipe, or the walls touch, whichever occurs first. The rate of flattening shall be uniform and such that the compression is completed within two (2) to five (5) minutes. Remove the applied load and examine the specimen for evidence of splitting, cracking or breaking.
- c. The extrusion quality test shall be performed in accordance with ASTM D2152. This procedure determines the extrusion quality as indicated by reaction to immersion in anhydrous acetone. The test distinguishes between fused and unfused PVC. After completion of test procedure, remove the specimen and examine for evidence of flaking or disintegration.
- d. The design of the gasket joint provided on the PVC pipes shall comply with ASTM D3139.
- e. Impact testing shall be performed in accordance with ASTM D2444.
- f. The manufacturer shall hydrostatically proof-test all pipe, including the joint, that is marked with the designation number of piece of pipe, whether ANSI/AWWA C905-latest revision at 73.4°F + 3.6°F (23°C +2°). Each piece of pipe, whether standard or random length shall be proof-tested at twice the pressure rating of the pipe. The test shall be run for a minimum dwell of 5 seconds.

- g. Impact Resistance Requirements
 - 1. TUP Weight shall be 20 lb. or 30 lb.
 - 2. TUP shall have a 1/2" radius nose piece.
 - 3. Sample lengths shall be 12" O.A.L.
 - 4. Ten samples shall be tested and all shall pass. Any failures shall result in rejection.
 - 5. All samples shall pass a minimum impact of 220 ft. lbs.
- 6. Test Frequency
 - a. The dimensions of pipe and joints shall be measured at the beginning of each extrusion run and hourly thereafter.
 - b. The flattening test shall be performed at the beginning of each extrusion run and once every twenty-four hours thereafter.
 - c. The extrusion quality test shall be performed at the beginning of each extrusion run of each specific material on size, and every two hours thereafter. The test shall also be run immediately following any change from established running conditions that could affect extrusion quality.
 - d. The joint integrity test shall be performed by the manufacturer to evaluate gasket joint design whenever the design of the joint or the gasket is changed.
 - e. The impact test shall be performed every two hours during the extrusion run.
 - f. The hydrostatic proof test shall be performed every twenty-four hours during the extrusion run.
- C. Quality Control Records.
 - 1. The manufacturer shall maintain for a period of not less than two years a record of all quality control tests and shall, if requested, submit the pertinent record to the purchaser.
- D. Markings
 - 1. Pipe and couplings shall bear identification markings that will remain legible during the normal handling, storage, and installation. Markings shall be applied in a manner that will not

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weaken or damage the pipe or coupling. Marking shall be applied at the intervals of not more than five (5) feet on the pipe.

2. Marking on the pipe and coupling shall include the following:
 - a. Nominal size and OD base (e.g. 24CI)
 - b. PVC
 - c. Dimension ratio and pressure rating (e.g. DR25 PR165)
 - d. UNI-B-11
 - e. Manufacturer's name or Trademark
 - f. Manufacturer's production code to include day, month, year, shift, plant and extruder of manufacture.
 - g. Certification seals pertaining to entire documents or specific sections, if desired or requested.
3. Special Marking: If plant inspection is made by a third party inspector, a special marking of no more than three (3) letters, as specified by the OWNER may be added to markings on the pipe and coupling.
4. Double Assembly Lines: Pipe shall be supplied with twin assembly lines on the spigot to guard against over-assembly.

2.04 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS (FORCE MAIN APPLICATIONS)

A. General

1. HDPE pipe and fittings used for force main applications shall meet all the requirements of ASTM specification D1248-latest revision and meet the requirements of Type III, Class C, Category 5, Grade P34.
2. Elastomeric gaskets shall comply with the requirements specified in ASTM F477. Use gasket molded into a circular form or extruded to the proper section and then spliced into circular form. The basic polymer shall be natural rubber, synthetic elastomer, or a blend of both.
3. Joints shall comply with the requirements specified in ASTM D3139.
4. HDPE pipe shall be as manufactured by Drisco, J-M Manufacturing or approved equal.

5. The lubricant used for joint assembly shall be a water soluble lubricating and shall not be detrimental to the gasket or the pipe.
6. The manufacturer shall, upon written request by the purchaser, furnish an affidavit that all basic materials used in pipe production meet the requirements of this recommended standard.
7. Pipe shall be homogeneous throughout. It shall be free from voids, cracks, inclusions and other defects. It shall be uniform as commercially practical in color, density, and other physical properties. Pipe surfaces shall be free from nicks and scratches. Joining surfaces of spigots and joints shall be free from gouges and imperfections that could cause leakage.
8. Pipe shall be nominal sizes and dimension ratio as shown on the DRAWINGS or specified elsewhere. Pipe outside diameters shall be consistent with iron pipe sizes (IPS), to assure the pipe can be directly connected to ductile iron fittings without adapters or complicated procedures.
9. Pipe shall be a standard green color representative of sewer pipe.

B. Testing and Certification

1. The manufacturer shall be subject to random inspection and evaluation by an independent third party in order to assure the purchaser of full compliance with this specification. The third party shall report all findings to the purchaser upon request. The third party selection shall be subject to the approval of the OWNER and shall be provided at no additional cost to the OWNER.
2. The third party inspector shall have free access to those parts of the manufacturer's plant involved in WORK performed to meet requirements of this recommended standard. The manufacturer shall afford the third party inspector reasonable facilities needed to determine if the pipe meets the requirements of this recommended standard.
3. Certification: Upon request by the OWNER, the manufacturer shall furnish a certificate of conformance to specified standards. Upon request by the OWNER, the manufacturer shall furnish production standard dimensions and tolerances of the joint and gasket.
4. Test Preparation
 - a. Testing shall be performed at $73.4^{\circ}\text{F} + 3.6^{\circ}\text{F}$ ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and 50% relative humidity $\pm 5\%$ for not less than 40 hours prior to test unless otherwise specified. Care shall be exercised to condition test specimens to the proper temperature before testing.

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- b. Selection of pipe specimens for testing, if not specified in this recommended standard, shall be as agreed upon by the purchaser and manufacturer.

5. Test Methods

- a. All measurements shall be made in accordance with ASTM D2122.
- b. Flattening. Flatten three (3) specimens of pipe, prepared in accordance with Paragraph 2.04 (B) (4a), in a suitable press until the internal diameter has been reduced to 40% of the original inside diameter of the pipe. The rate of loading shall be uniform and at 2 inches per minute. The test specimens, when examined under normal light and with the unaided eye, shall show no evidence of splitting, cracking, breaking, or separation of the pipe walls or bracing profiles.
- c. Joint Tightness. Test for joint tightness in accordance with ASTM D 3212, except replace the shear load transfer bars and supports with 6 inch wide support blocks that can be either flat or contoured to conform to the pipe's outer contour.
- d. The design of the gasket joint provided on the HDPE pipes shall comply with ASTM D3139.
- e. Impact testing shall be performed in accordance with ASTM D2444.
- f. The manufacturer shall hydrostatically proof-test all pipe, including the joint, that is marked with the designation number of piece of pipe, whether ANSI/AWWA C905-latest revision at 73.4°F + 3.6°F (23°C +2°). Each piece of pipe, whether standard or random length shall be proof-tested at twice the pressure rating of the pipe. The test shall be run for a minimum dwell of 5 seconds.
- g. Impact Resistance Requirements
 - 1. TUP Weight shall be 20 lb. or 30 lb.
 - 2. TUP shall have a 1/2" radius nose piece.
 - 3. Sample lengths shall be 12" O.A.L.
 - 4. Ten samples shall be tested and all shall pass. Any failures shall result in rejection.

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5. All samples shall pass a minimum impact of 220 ft. lbs.

6. Test Frequency

- a. The dimensions of pipe and joints shall be measured at the beginning of each extrusion run and hourly thereafter.
- b. The flattening test shall be performed at the beginning of each extrusion run and once every twenty-four hours thereafter.
- c. The extrusion quality test shall be performed at the beginning of each extrusion run of each specific material on size, and every two hours thereafter. The test shall also be run immediately following any change from established running conditions that could affect extrusion quality.
- d. The joint integrity test shall be performed by the manufacturer to evaluate gasket joint design whenever the design of the joint or the gasket is changed.
- e. The impact test shall be performed every two hours during the extrusion run.
- f. The hydrostatic proof test shall be performed every twenty-four hours during the extrusion run.

C. Quality Control Records.

1. The manufacturer shall maintain for a period of not less than two years a record of all quality control tests and shall, if requested, submit the pertinent record to the purchaser.

D. Markings

1. Pipe and couplings shall bear identification markings that will remain legible during the normal handling, storage, and installation. Markings shall be applied in a manner that will not weaken or damage the pipe or coupling. Marking shall be applied at the intervals of not more than five (5) feet on the pipe.
2. Marking on the pipe and coupling shall include the following:
 - a. Nominal size and OD base (e.g. 24CI)
 - b. PVC
 - c. Dimension ratio and pressure rating (e.g. DR25 PR165)

- d. UNI-B-11
 - e. Manufacturer's name or Trademark
 - f. Manufacturer's production code to include day, month, year, shift, plant and extruder of manufacture.
 - g. Certification seals pertaining to entire documents or specific sections, if desired or requested.
3. Special Marking: If plant inspection is made by a third party inspector, a special marking of no more than three (3) letters, as specified by the OWNER may be added to markings on the pipe and coupling.
 4. Double Assembly Lines: Pipe shall be supplied with twin assembly lines on the spigot to guard against over-assembly.

2.05 DETECTABLE UNDERGROUND UTILITY WARNING TAPES

- A. Detectable underground utility warning tapes which can be located from the surface by a pipe detector shall be installed directly above non-metallic (PVC, polyethylene, concrete) pipe.
- B. The tape shall consist of a minimum thickness 0.35 mils solid aluminum foil encased in a protective inert plastic jacket that is impervious to all known alkalis, acids, chemical reagents and solvents found in the soil.
- C. The minimum overall thickness of the tape shall be 5.5 mils and the width shall not be less than 2" with a minimum unit weight of 2-1/2 pounds/1" x 1000'. The tape shall be color coded and imprinted with the message as follows:

Type of Utility	Color Code	Legends
Water	Safety Precaution Blue	Caution Buried Water Line Below
Sewer	Safety Green	Caution Buried Sewer Line Below

- D. Detectable underground tape shall be "Detect Tape" as manufactured by Allen Systems, Presco or approved equal.
- E. Installation of detectable tapes shall be per manufacturer's recommendations and shall be as close to the grade as is practical for optimum protection and detectability. Allow a minimum of 18" between the tape and the line.

- F. Payment for detectable tapes shall be included in the linear foot price BID of the piping BID item(s).
- G. Immediately below the tape, the Contractor shall install one unspliced No. 12 A.W.G. conductor. Each end of the conductor shall terminate at an accessible location such as an air release manhole or pump station valve box. A separate valve box shall be installed for accessing the terminal end of a conductor where a force main discharges to a manhole.
- H. Payment for detectable tapes shall be included in the linear foot price BID of the piping BID item(s).

2.06 DETECTABLE TRACER WIRE

- A. A 12-gauge, solid-wire conductor, tracer wire shall be placed directly on top of all force mains and shall be attached to the pipe at 5 ft intervals maximum. Tracer wire segments shall be 800 feet maximum and shall terminate at each air release valve manhole, or a structure the same as a clean-out box. Contractor shall leave three feet of coiled slack at each termination point.

2.07 FLEXIBLE FIBER REINFORCED PIPELINE MARKER

- A. A flexible fiber reinforced flat composite pipeline marker shall be installed above the force main approximately every 500 feet at a location designated by the ENGINEER.
- B. The marker shall be manufactured of a fiber reinforced composite material. The reinforcement material shall be comprised of both lineal strands and horizontal mesh mats. The marker post must be flat in shape with rails on both sides. Marker shall be at least 3 3/4" wide. A 2 7/8" wide decal must fit on each side of the marker. The back side of the post shall have a rounded rib down the center and two small ribs on the sides to act as guides for the decals. Decals will be placed on both sides to ensure that a warning message can be seen from both directions.
- C. The marker shall be capable of withstanding a minimum of 10 vehicle impacts at 55 M.P.H. with a car bumper.
- D. The marker shall be coated with a coloring which matches the color of the post. The coating shall totally stop ultraviolet light from reaching the resin portion of the post. The coating shall not fade, peel, or blister after a minimum of 2,000 hours in a QUV Weatherometer.
- E. The marker post shall remain flexible from -40° F to +140° F.
- F. Decals shall be fade resistant and remain legible after a minimum of 2,000 hours in a QUV Weatherometer. Decal graphics shall include the international Do0Dig symbol. Decals shall be placed on both sides of the post.

- G. Marker shall be Rhino 3-Rail, PRO-MARK PM-301 or equal, with Rhino Force Main Sewer Warning decal GD-5314C, PRO-MARK Poly Sign or approved equal.

PART 3 EXECUTION

3.01 LAYING NON-PRESSURE PIPE - GENERAL

A. General

1. All pipe may be tested for uniform diameter, straightness and defects before laying. Rejected pipe shall be removed from the PROJECT.
2. All pipe after being inspected and accepted shall be laid to the lines and grades shown on the DRAWINGS. The CONTRACTOR shall furnish all labor and materials for staking out lines and grades. All gravity pipelines shall be laid to constant grades between invert elevations shown on the DRAWINGS. Grades shown on DRAWINGS are invert of pipe, unless specifically noted otherwise. The pipe lengths shall be fitted together and matched to form a smooth and uniform invert.
3. Sub-grade, undercut, bedding and backfilling under, around and over the pipe shall all be in accordance with the details shown on the DRAWINGS. No pipe shall be laid until the sub-grade is properly in place.
4. Unnecessary walking upon the completed pipelines shall be avoided until trench has been backfilled to over the top of the pipe.
5. The interior of the pipe shall be cleaned of all dirt, jointing materials and superfluous materials of every description. When laying of pipe is stopped, the end of the pipe shall be securely plugged or capped. Care should be taken to prevent flotation of the pipe in the event the trench should floor. The CONTRACTOR will be responsible for relaying and/or relocating pipe if the pipe is laid before trenching has progressed far enough to eliminate the possibility of grade conflicts or realignment on account of existing structures, pipelines, or conduits.
6. In trench conditions where pipe is in danger of sinking below grade or floated out of grade or line, or where backfill materials are such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe shall be weighted or secured permanently in place.
7. Pipes shall be laid free from all structures other than those planned. Openings in and joints to contact walls shall be constructed as shown on the DRAWINGS.

8. Non-pressure pipes entering structures underground and unsupported by original earth for a distance of more than 3', shall be supported by Class "B" concrete, where depth of such support does not exceed 3'. All pipes entering buildings or basins, below original ground, which are higher than 3' depth above sub-grade, span more than 3' depth above sub-grade, span more than 3' between wall and original earth, and with more than 24" of cover or under a roadway, shall be supported by concrete beams with piers at 6' intervals between structural wall and edge of excavation for the structure, in order to prevent breakage from settlement of backfill about the structure. Concrete and reinforcing steel for these supports shall be in the lump sum portion of the CONTRACT; and no extra payment will be allowed. Pipe entering structures shall have flexible joint within 18" of exterior of structure or from point of leaving concrete support.
9. No backfilling except for securing pipe in place, shall be done until the ENGINEER has inspected the joints, alignment, and grade in the section laid. Such inspection, however, does not relieve the CONTRACTOR of liability in case of defective joints. Joints that show leakage will not be accepted. If after backfilling and inspection, any joints are found that are allowing groundwater to enter the sewer, such joints shall be sealed by the CONTRACTOR.
10. Flexible thermoplastic sewer pipe installation shall conform to ASTM D-2321, latest revision.
11. Ductile iron pipe installation shall conform to AWWA C-600-82, or latest revision.

B. Pipe Bedding

1. Pipe bedding for gravity sewers shall be as shown on the DRAWINGS. Crushed stone used for bedding shall be size shown, and shall comply with State Highway Department Standards.

3.02

TESTING SANITARY SEWERS PIPE

Note: Before entering any confined space, follow all local, state and federal safety precautions.

- A. A wetted interior pipe surface is desirable and will produce more consistent test results. Where practical, clean the line with cleaning balls, manufactured by Cherne Industries Incorporated, Mechanical Research and Design, Inc. or approved equal, prior to testing, to wet the pipe surface and eliminate debris.

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- B. All new pipe shall be low-pressure air tested to insure the integrity of the pipe and joints.
- C. Air testing shall be performed by the CONTRACTOR using equipment manufactured by Cherne Industries Incorporated, Mechanical Research and Design, Inc. or approved equal. Equipment used shall meet the following minimum requirements:
1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
 2. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
 3. All air used shall pass through a single control panel.
 4. Three (3) individual hoses shall be used for the following connections:
 - a. From control panel to pneumatic plugs for inflation.
 - b. From control panel to sealed line for introducing the low pressure air.
 - c. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.
- D. Air testing procedures shall follow guidelines outlined in ASTM SPECIFICATIONS C828, C924 and Uni-Bell B6, (see ASTM C828, C924 and Uni-Bell B6). All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to the manufacturer's recommended inflation pressure. The sealed pipe shall be pressurized to 5 PSIG. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole to manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to manufacturer's recommended inflation pressure. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 PSIG. At least two minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 PSIG minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "Acceptable" if the allocated line pressure decreases less than one PSI in the time shown for the given diameters in the following table:

Nominal Pipe Size Inches	Time Minutes per 100 Feet
4.....	0.3
6.....	0.7
8.....	1.2
10.....	1.5
12.....	1.8
15.....	2.1
18.....	2.4
21.....	3.0
24.....	3.6

In areas where ground water is known to exist, the height in feet shall be divided by 2.35 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 PSIG.)

If the installation fails to meet this requirement, the CONTRACTOR shall, at his own expense, determine the source of leakage. He shall perform a leak location test and then repair or replace all defective materials and/or workmanship.

E. Joints

Individual joint air tests shall be performed on pipe over 24" in diameter according to the following instructions: (see ASTM C1103-89)

1. Determine test pressure. Test pressure for large diameter pipe should be 3.5 PSIG (.24 bar). In addition, .43 PSIG (0.3 bar) is added to the 3.5 PSIG (.24 bar) for every foot of water head above the top of the pipeline, to a maximum pressure of 15 PSIG (1.03 bar). (i.e. 10 ft. of water head above a 60" diameter pipe would require a test pressure of $10 \times .43 = (4.3 \text{ PSIG}) + 3.5 \text{ PSIG} = 7.8 \text{ PSIG}$ required test pressure.)
2. Position the Joint Tester so the end elements (inflatable pneumatic rings) are located on both sides of the joint to be tested. Inflate the end elements to 50 PSIG 93.4 bar).
3. Pressurize center cavity with air or water to test pressure calculated in Step 1 above. Allow pressure to stabilize (approx. 10-15 seconds) and turn off pressure source.
4. If the pressure in the cavity holds or drops less than 1 PSIG (.68 bar) in 5 seconds, the pipe joint shall be found to be acceptable. If the pressure drops over 1 PSIG the joint is defective and should be repaired.
5. When the joint test is completed all pressure must be exhausted from center cavity to 0 PSIG and then from the end elements to 0

PSIG. The Joint Tester can then be transported and positioned on the next joint to be tested.

The equipment used must be manufactured by Cherne Industries Incorporated, Mechanical Research and Design, Inc. or approved equal.

F. Deflection Test

Mandrel test (deflection test) shall be performed by the CONTRACTOR in order to verify the roundness and proper installation of the pipeline.

1. Mandrels shall be approved by the ENGINEER with proving rings prior to use and shall meet the following requirements:

a. Mandrel Sizing: The outside diameter of the mandrel shall be fabricated to the following SPECIFICATION:

Base Pipeline Diameter – (Percent of deflection limit times base pipeline diameter) = Mandrel diameter. In accordance with ANSI/ASTM D-3034 and F-679.

b. Mandrel Construction: The mandrel shall be of open design to prevent debris build-up from occurring between the channels of adjacent fins which in-turn causes erratic test results. The fin sets shall number at least (9) and be removable from the mandrel core by unscrewing the wing-nut and loosening the end caps which secure the fins in position. The contact area of the fins shall be equal to the nominal inside diameter of the pipe. Gauges of various diameters shall be assembled by substituting fin sets of appropriate dimension.

Equipment used must be manufactured by Cherne Industries Incorporated, Mechanical Research and Design, Inc. or approved equal.

2. Deflection Test

The deflection test shall consist of testing pipe for proper installation by the method outlined: (Set ASTM D3034)

After the pipeline has been installed and backfill materials have been compacted to their required standard densities (called out in ASTM D 2321 or other applicable standard), the mandrel shall be pulled by hand through the pipeline with a suitable rope or cable that is connected to an eyebolt at one end of the gauge. A similar rope or cable shall be attached to the eyebolt at the opposite end of the mandrel and tension shall be applied to it. This will insure that the mandrel maintains its correct position during testing and also to remove the mandrel if it should be lodged in an excessively

deflected pipeline. Winching or other means of forcing the mandrel through the pipeline are unacceptable. Pipeline deflection testing performed within thirty (30) days of installation shall have a deflection not exceeding 5% of the base inside pipe diameter as established by ASTM Standards D3034 and F679 listed in the following table:

Deflection Gauge Dimensions: SDR 35

Nominal Size	Average I.D.	Base I.D.	5% Deflection Gauge
6"	5.893	5.742	5.46
8"	7.891	7.665	7.28
10"	9.864	9.563	9.08
12"	11.737	11.361	10.79
15"	14.374	13.898	13.20
18"	17.564	16.976	16.13
21"	20.707	20.004	19.00
24"	23.296	22.480	21.36
27"	26.258	25.327	24.06

Pipeline deflection testing performed thirty days (30) beyond the date of installation shall have a deflection not exceeding 7.5% of the nominal inside diameter or as established otherwise by the applicable governing body.

3. A permanent record of all testing with locations where excessive pipeline deflections occur shall be kept by the CONTRACTOR and forwarded to the ENGINEER after completion of testing on each line.
4. The CONTRACTOR shall immediately replace all sections of pipe which deflect more than 5% (or 7 1/2%).
5. All materials and labor required for testing and replacement of pipelines shall be furnished by the CONTRACTOR and the cost thereof included in the prices BID for furnishing and laying sewers.

3.03 PRESSURE PIPE INSTALLATION - GENERAL

A. General

1. Pipe shall be handled with such care as necessary to prevent damage during installation. The interior of the pipe shall be kept clean and the pipe shall be installed to the lines and grades shown on the DRAWINGS. Whenever pipe laying is stopped, the end of the pipe shall be securely plugged or capped.
2. Fittings shall be firmly blocked as described in Section 02610, Paragraph 3.02 A of these SPECIFICATIONS.

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3. Pipes shall be free of all structures other than those planned. Openings and joints to concrete walls shall be constructed as shown on the DRAWINGS.

B. Pressure Pipe Laying

1. Pressure pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the manufacturer. A copy of such instructions shall be available at all times at the site of the WORK.
2. All pipes must be forced and held together, or "homed" at the joints, before sealing or bolting. Pipe must be aligned as each joint is placed, so as to obtain straight lines and grades. Curves and changes in grades shall be laid in such a manner that maximum allowable joint deflection is not exceeded. If the manufacturer's specification prohibits deflection at a joint, all curvature must be provided though deflection of the pipe within the tolerances permitted by the manufacturer.
3. Trench excavation for pipe laying must be of sufficient width to allow the proper jointing and alignment of the pipe. Trenches in earth or rock shall be dug deep enough to insure 30" minimum cover over top of the pipe, unless otherwise indicated on the DRAWINGS.
4. Trench line stations shall be set ahead of the trenching at least each 100 feet of pipeline. Trenches shall be dug true to alignment of stakes. Alignment of trenches or pipes in trench must not be changed to pass around obstacles such as poles, fences and other evident obstructions without the approval of the ENGINEER. Lines will be laid out to avoid obstacles as far as possible, consistent with maintenance of alignment necessary to finding the pipeline in the future and avoiding obstruction of future utilities an structures.
6. Cut pieces of pressure pipe 18" or more length may be used in fitting to the specials and valves and fitting changes in grade and alignment. Cut ends shall be even enough to make first class joints.
7. Pipe shall maintain a consistent positive or negative slope between air release and/or vacuum valves, and shall not create highpoints in the force main other than at air release and/or vacuum valve locations as shown on the DRAWINGS.

C. Testing Pressure Pipe – Hydrostatic Testing

1. Test procedures shall meet the requirements of ANSI/AWWA C600.

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2. The piping shall be complete, and thrust blocks shall have been in place for not less than 10 days prior to being tested.
3. Test closed-end pressure piping as follows:
 - a. Expel all air from the piping prior to the application of test pressure. Tap the piping at high points, if necessary, to release all air from the piping. Plug taps after the test is successfully completed. Plugs shall be watertight.
 - b. Test piping at a static pressure of 150 pounds per square inch over a period of not less than eight consecutive hours. The test will be considered successful when the pressure drop over the test period is 5 pounds per square inch or less. If the pressure drop exceeds 5 pounds per square inch, repair the leaks and repeat the test. Repair leaks and repeat the test until the pressure drop over the test period is 5 pounds per square inch or less.
4. Test open-end pressure piping and ductile iron sewer piping as follows:
 - a. The ends of piping being tested shall have test plugs or caps adapted with a tap of adequate diameter to fill and pressurize the system with water.
 - b. When a section is terminated at a manhole with a plain end (spigot), the pipe must extend into the manhole of sufficient length to accommodate a restraining cap. The benchwall shall be formed in the manhole after the test section has been approved.
 - c. Water shall be introduced into the section to be tested at the lower end. The upper end shall have an orifice at the top of the plug or cap to expel air when filling the system with water. All air shall be expelled from the pipe.
 - d. The test plugs or caps shall be capable of withstanding an internal pressure of 175 psi.
 - e. Gravity flow systems shall be tested in conformance with Section 13 of ANSI/AWWA C600, at 50 pounds per square inch over a period of not less than one hour. The system will not be acceptable until all leaks have been repaired.
 - f. Pumped flow systems shall be subjected to an internal pressure equal to 50% more than the maximum operating pressure, but in no case less than 50 psig or greater than 120 psig.

- g. Hydrostatic tests may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed in such a way as to prevent blowouts. Inasmuch as a force of 2,500 pounds is exerted on an 8-inch plug by an internal pipe pressure of 50 psi, it should be realized that sudden expulsion of a poorly installed plug or cap can be dangerous. As a safety precaution, no one shall be allowed in the manholes when the pipe is pressurized.

3.04 VALVE LEAKAGE TESTING

Test valves for leakage at the same time that the connecting pipelines are tested. See pressure testing requirements. Protect or isolate any parts of valves, operators, or control and instrumentation systems whose pressure rating is less than the pressure test. Valves shall show zero leakage. Repair or replace valves showing leaks and retest.

3.05 VALVE FIELD TESTING

- A. Operate manual valves through 10 full cycles of opening and closing. Valves shall operate from full open to full close without sticking or binding. If valves stick or bind, repair or replace the valve and repeat the tests.
- B. Gear operators shall operate valves from full open to full close through 10 cycles without binding or sticking. The pull required to operate handwheel or chainwheel-operated valves shall not exceed 80 pounds. The torque required to operate valves having 2-inch AWWA nuts shall not exceed 150 ft-lbs. If operators stick or bind or if pulling forces and torques exceed the values stated previously, repair or replace the operators and repeat the tests. Operators shall be fully lubricated in accordance with the manufacturer's recommendations prior to operating.

3.06 FINAL CLEAN-UP

Before completion of the CONTRACT, all backfill shall be reshaped, holes filled and surplus material hauled away, and all permanent walks, street, driveway and highway paving, and sod, replaced and reseeding performed.

The CONTRACTOR shall be responsible for clean-up, grading, seeding, sodding or otherwise restoring all areas that he disturbs, even if these areas are within the WORK limits of other CONTRACTORS on this PROJECT.

The WORK shall not be accepted until the right-of-way of roads and all private property has been cleared of all rubbish and loose stone, and also all equipment, excess material and temporary structures. All property which has been damaged in the course of the WORK shall be restored in a manner fully acceptable to the property owner.

3.07 BASIS FOR PAYMENT

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A. Piping shall be paid for at the unit price bid and shall include all work incidental to making a complete installation such as, excavation, bedding, backfill, testing, cleanup, seeding, etc.

END OF SECTION

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SECTION 02733

MANHOLES

PART 1 GENERAL

1.01 SCOPE OF WORK

The WORK to be performed includes the furnishing of all labor, materials, equipment and services necessary for the construction of all manholes, including reinforced concrete rings, bases, barrels, steps, frames and covers, invert construction, stubs and all other appurtenances.

PART 2 PRODUCTS

2.01 MANHOLES

Precast concrete manholes shall consist of precast reinforced concrete sections, a conical or flat slab top section and a base section conforming with the typical manhole details as shown on the DRAWINGS.

Precast manhole sections shall be manufactured, tested and marked in accordance with the latest provisions of ASTM SPECIFICATION C 478.

Manholes shall be constructed of specified materials to the sizes, shapes and dimensions and at the location shown on the DRAWINGS or as otherwise directed by the ENGINEER. The height or depth of the manhole will vary with the location, but unless shown otherwise on the DRAWINGS, shall be such that the top of the manhole frame will be at finish grade in pavement and 2 inches above ground surface elsewhere and the invert will be at the designated elevations. Wall thickness of precast concrete manholes shall be as shown on the DRAWINGS.

Manholes shall be constructed of precast reinforced concrete manhole rings, unless specified otherwise. Form and dimensions shall be as shown on DRAWINGS. Precast bases for manholes shall be bedded on at least 12 inches of # 9 crushed stone as shown on DRAWINGS.

The minimum compressive strength of the concrete for all sections shall be 4,000 psi.

Corrosion resistant additive such as Xypex ADMIX C-1000 (dye), Bentocrete C16 or approved equal concrete waterproofing admix shall be added to the concrete during the batching operation to provide corrosion resistance. 3% of the required weight of Portland Cement shall be added. The amount of cement shall remain the same and not be reduced. A colorant shall be added to verify the additive was added to the concrete. Colorant shall be added at the additive manufacturing facility, not at the concrete batch plant. Additive must be added to the concrete at the time of batching. It is recommended that the additive powder be added first to

the rock and sand and blended thoroughly for 2-3 minutes before adding cement and water. The total concrete mass should be blended using standard practices to insure homogeneous mixture.

The admixture manufacturer shall furnish a qualified concrete technician employed by the manufacturer, to assist in the proper field batching and use of the specified admixtures if requested by the Engineer. The technician shall visit the site at the beginning of concrete operations and as requested during construction. In addition, the manufacturer shall furnish the ready mix plant with accurate and dependable equipment for the proper dispensing of admixture.

The maximum allowable absorption of the concrete mix design aggregate shall not exceed 8 percent of the dry weight.

The ends of each reinforced concrete manhole riser section and the bottom end of the manhole top section shall be so formed that when the manhole risers and the top are assembled, they will make a continuous and uniform manhole.

Joints of manhole sections shall be of the tongue and groove type with performed plastic gasket meeting the requirements of Federal SPECIFICATION SS-S-00210, "Sealing Compound, Performed Plastic for Pipe Joints" Type 1, Rope Form. The sealing compound shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler and shall contain no solvents, irritating fumes, or obnoxious odors. The compound shall not depend on oxidizing, evaporating, or chemical action for its adhesive or cohesive strength. It shall be supplied in extruded rope-form of suitable cross-section and of such sizes as to seal the joint space when the manhole sections are set. The sealing compound shall be protected by a suitable removable two-piece wrapper.

Each section of the precast manhole shall have not more than two (2) holes for the purpose of handling and setting. These holes shall be tapered and shall be plugged with rubber stoppers or mortar after installation.

2.02 Specialty Coatings

Pump station wetwells shall have the following coating system

- A. The entire interior of the wetwell shall be coated with a severe-immersion rated coating per Section 09960(2.7C) of these specifications.

2.03 Manhole Castings

Manhole rims, toe pockets and covers shall be cast iron conforming to the minimum requirements of Federal SPECIFICATION WW-1-652 or to the latest ASTM SPECIFICATION A-48, for Class 30 gray iron castings. All castings shall be made accurately to the required dimensions, fully interchangeable, sound, smooth, clean and free from blisters and/or other defects. Defective castings which have been plugged or otherwise treated shall not be used. All castings shall be thoroughly cleaned and painted or coated with bituminous paint. Each casting shall have its actual weight in pounds stenciled or painted on it in white

paint.

Manhole frames and covers shall be of the size and weights shown on the DRAWINGS and as manufactured by the J.R. Hoe & Sons, Neenah Foundry Co. No R1772-C, Clow No. F-3245-1 or equal. Sanitary sewer manhole covers shall have the words "Sanitary Sewer" cast on the top in letters 2 inches high.

Where frames and covers are shown on the drawings to be cast into the manhole top slab they shall have 24-inch clear openings and be designed for for H-20 loading. Manhole covers for the air and vacuum release valve manholes shall have the words "Sanitary Sewer" cast on the top in letters 2 inches high.

Watertight manhole covers shall be equal to J.R. Hoe & Sons, Neenah Foundry Co., or equal. The size and weights shall be as shown on the DRAWINGS. Payment shall be as a cost difference between regular and watertight frames and covers.

Manhole steps shall be reinforced with three-eighths inch (3/8") rebar and shall have a polypropylene plastic coating identical to the dimensions of cast iron manhole steps. They shall be produced specifically for use as manhole steps. Spacing of steps shall be built into the walls of all manholes.

Manhole steps shall be installed in each section of the manhole in accordance with the details on the DRAWINGS.

2.04 Line Connectors

All manholes shall have rubber and/or neoprene line connectors for the installation of the line such as Kor-N-Seal, Lock Joint, A-Lok or approved equal.

2.06 Drop Manholes

Internal drop structures shall be installed in all manhole structures where called for on the drawings, and on all influent lines into pump stations.

- A. The structure shall consist of a RELINER drop bowl manufactured by Duran Inc., GU International or approved equal, a drop pipe and a turn-out at the base of the drop. All force main discharges shall include a force line hood.
- B. The appropriately sized drop pipe of SDR 35 PVC, or as noted on the drawing, shall be securely attached to the manhole wall using stainless steel RELINER adjustable clamping brackets and stainless steel fasteners.
- C. The connection of drop bowl to drop pipe shall be by flexible external pipe coupler.
- D. The turn-out at the base end of the drop pipe shall be accomplished with a cast-in RELINER drop end flume system or an appropriately angled PVC pipe elbow.

- E. The clamping pipe supports shall consist of 304 stainless steel with 18-8 stainless nuts and bolts.

PART 3 EXECUTION

3.01 INSTALLATION

Manhole inverts shall be constructed of 1:2 grout in accordance with details on the DRAWINGS and inverts shall have the same cross-section as the invert of the sewer to which they connect. The manhole invert shall be carefully formed to the required size and grade by gradual and even changes in sections. Changes in direction of flow through the sewer shall be made to a true curve with as large as radius as the size of the manhole will permit. Only inverts with a smooth trowel finish will be acceptable.

The cast iron frame for the manhole cover shall be set at the required elevation and properly anchored to the masonry. Where manholes are constructed in paved areas, the top surface of the frame and cover shall be tilted to conform to the exact slope, crown and grade of the existing adjacent pavement.

Masonry WORK shall be allowed to set for a period of not less than 24 hours. Outside forms, if any, then shall be removed and the manhole backfilled and compacted in the manner provided in these SPECIFICATIONS. All loose or waste material shall be removed from the interior of the manhole. The manhole cover then shall be placed and the surface in the vicinity of the WORK cleaned off and left in a neat and orderly condition.

After backfilling has been completed, the excavated area, if located in a street, alley or sidewalk, shall be provided with a temporary surface.

A bench shall be provided in each side of any manhole channel when the pipe diameter(s) are less than the manhole diameter. The bench should be sloped no less than ½ inch per foot (4%). No lateral sewer, service connection, or drop manhole pipe shall discharge onto the surface of the bench. (From *Recommended Standards for Wastewater Facilities*, often known as the "10-States Standards").

3.02 TESTING

- A. Vacuum tests shall be conducted on newly constructed manholes. Preliminary manhole testing shall take place following construction after all connections are made, and before backfilling. Test results derived from this test will allow time for necessary repairs to be completed before further construction proceeds and hinders such repairs. Final tests must be performed after the manhole has been backfilled.
- B. Equipment:
 - 1. Manhole vacuum tester assembly and vacuum pumps shall be manufactured by Cherne Industries Incorporated, Mechanical

Research and Design, Inc. or approved equal.

2. Pneumatic plugs shall be manufactured by Cherne Industries Incorporated, Mechanical Research and Design, Inc. or approved equal. These plugs shall have a sealing length equal to or greater than the diameter of the connecting pipe to the be sealed.

C. Procedures:

1. Plug all manhole entrances and exits other than the manhole top access using suitably sized pneumatic or mechanical pipeline plugs and follow all manufacturer's recommendations and warnings for proper and safe installation of such plugs. Plugs should be inserted a minimum of 6" beyond manhole wall. Make sure such plugs are properly rated for the pressures required for the test. The standard test of 10" Hg (mercury) is equivalent to approximately 5 PSIG (.3 bar) backpressure. Unless such plugs are mechanically restrained, it is recommended that the plugs are used with a minimum two times (2x) safety factor or a minimum of 10 PSIG (0.7 bar) backpressure usage rating.

CAUTION: BRACE INVERTS IF LINES ENTERING THE MANHOLE HAVE NOT BEEN BACKFILLED TO PREVENT PIPE FROM BEING DISLODGED AND PULLED INTO THE MANHOLE.

2. Install the vacuum tester head assemble at the top access of manhole. Adjust the cross brace to insure that the inflatable sealing element inflates and seals against the straight top section of the manhole or the ring assembly, if possible. (If using a "plate" style manhole tester, position the plate on the manhole ring assembly.)
3. Attach the vacuum pump assembly to the proper connection on the test head assemble. Make sure the vacuum inlet/outlet valve is in the closed position.
4. Following safety precautions and manufacturer's instructions, inflate sealing element to the recommend maximum inflation pressure.

CAUTION: DO NOT OVER INFLATE!

5. Start the vacuum pump and allow pre-set RPM to stabilize.
6. Open the inlet/outlet ball valve and evacuate the manhole to 10" Hg (approximately negative 5 PSIG, 0.3 bar).

CAUTION: DO NOT PRESSURIZE MANHOLE! THIS MAY RESULT IN MANHOLE DAMAGE AND/OR RESULT IN MANHOLE TEST HEAD DISLODGING FROM MANHOLE

INLET!

7. Close vacuum inlet/outlet ball valve and monitor vacuum for specified test period (see Minimum Test Times for Various Manhole Diameters table on the following page). If vacuum does not drop in excess of 1" Hg, manhole is considered acceptable and the manhole passes the test. If manhole fails the test, complete necessary repairs and repeat test procedure until satisfactory results are obtained.

Minimum Test Times for Various Manhole Diameters									
Depth, Feet	Diameter, Inches								
	30	33	36	42	48	54	60	66	72
	Time, Seconds								
0 to 8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

(The valves listed above are taken from ASTM SPECIFICATION C1244-93 "Standard Test Method for Concrete Manholes by the Negative Air Pressure (Vacuum) Test.")

- D. Repeat the above test procedure after backfilling manhole for final acceptance test.

All plugs and equipment used must be manufactured by Cherne Industries Incorporated or approved equal.

3.05 BASIS FOR PAYMENT

- A. Manholes shall be paid for at the unit price bid and shall include all work incidental to making a complete installation such as excavation, bedding, backfill, testing, cleanup, seeding, etc.

END OF SECTION

SECTION 02900

LANDSCAPING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

- A. Landscape development work in this phase is generally limited to seeding and sodding.

1.02 RELATED WORK

- A. Sub-grade elevations, excavation, filling, and grading required to establish elevations shown on Drawings are not specified in this Section. Refer to this Division, Section 02200.
- B. Erosion and sediment control are included in this Division, Section 02270.

1.03 SCOPE OF WORK

- A. Sod shall be placed on all slopes steeper than 3:1 except for dam embankment slopes. All other surfaces including dam embankment slopes shall be fertilized and seeded as specified hereinafter, except for those surfaces to be paved or rip-rapped.
- B. Fertilizing and seeding shall be performed on all disturbed areas within the limits of work of this contract which are not specified to be sodded and are not occupied by structures, road, concrete slab walls, etc. or within the impoundment area.

PART 2 PRODUCTS

2.01 QUALITY OF SOD

- A. Sod shall be well-rooted Kentucky Blue Grass sod or other approved pasture sod, completely free from noxious weeds, and reasonably free from objectionable grasses, weeds and stones or other foreign materials. The source of the sod shall be available for inspection and approval by the ENGINEER prior to stripping.
- B. Sections of sod stripped may vary in length not to exceed 8 feet but shall be of uniform width of not less than 10 inches nor more than 18 inches, and shall be cut to a depth of not less than 1 inch and not more than 2 inches. The above widths and lengths are required to ensure proper handling without undue tearing and breaking. Sod from light sand or heavy clay will not be accepted. When cut in strips, the sod shall be rolled with the grass folded inside. The sod shall be cut by means of an approved mechanical sod cutter. During dry weather, the sod shall be

watered before stripping to ensure its vitality and to prevent the loss of soil from the roots. Sod shall be rejected if permitted to decay or dry out to the extent that, in the judgment of the ENGINEER, its survival is doubtful.

2.02 PLACING SOD

- A. The sod bed shall be shaped to a smooth even surface and shall be graded such that the sod, when in place, shall be flush with any adjacent turfed area, pavement or other structures, except when otherwise directed by the ENGINEER. Prior to placing of the sod, fertilizer (10-20-10 - Ratio - 25 lbs. per one thousand square feet), Agricultural Limestone (Ratio - 75 lbs. per one thousand square feet), shall be applied, harrowed, raked or otherwise incorporated into the soil. After application of above, the sod bed, if dry, shall be moistened to the loosened depth.
- B. No sod shall be placed when the temperature is below 32°F. No frozen sod shall be placed, nor shall any sod be placed on frozen soil. Sod shall not be placed during extremely dry weather unless authorized, in writing, by the ENGINEER and provided that immediately after placing, the wood is covered with a 1 inch thickness of straw mulch.
- C. The sod shall be carefully placed by hand so that each section closely joins the adjacent sections without overlapping. All open spaces or gaps shall be plugged with sod cut to the same size and shape.
- D. The sod, after it is placed, shall be wetted thoroughly and tamped or rolled to incorporate the roots with the sod bed and to ensure tight joints between strips.
- E. All sodded areas shall be kept thoroughly moist for 2 weeks after sodding.

2.03 FERTILIZING AND SEEDING

- A. This work consists of furnishing all labor, equipment and materials and in performing all operations in connection with the fertilizing and seeding of all the finished graded areas not specified to be sodded or occupied by structures, roads, concrete slabs, sidewalks, walls, etc., and including grassed areas destroyed or damaged by the CONTRACTOR.
- B. The areas to be seeded shall be thoroughly tilled to a depth of at least 4" by deicing, harrowing, or other approved methods until the condition of the soil is acceptable to the ENGINEER. After harrowing or deicing, the seed bed shall be dragged and/or hand raked to finished grade.
- C. Fertilizer shall be 25 lbs. of 10-20-10 or equivalent per 1,000 square feet. The incorporation of the fertilizer and the agricultural lime (Ratio - 75 lbs. per one thousand square feet) may be a part of the tillage operation and shall be applied not less than 24 hours nor more than 48 hours before the seed is to be sown.

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D. The seed mixture to be sown for dry land areas shall be in the following proportions:

Common Name	Proportion By Weight	% of Purity	% of Germination
Kentucky Bluegrass	40	90	85
Chewings Fescue	25	90	85
Italian Rye Grass	20	90	85
Red Top	10	90	85
White Clover	5	95	90

The seed mixture for stream bank and wet soil areas shall be in the following proportions and applied at the noted rates:

Scientific Name	Common Name	Pure Live Seed (PLS) Ounces/Acre
<i>Andropogon gerardii</i>	Big bluestem grass	66
<i>Calamagrostis canadensis</i>	Blue joint grass	4
<i>Elymus canadensis</i>	Canada wild rye	16
<i>Panicum virgatum</i>	Switch grass	2
<i>Sorghastrum nutans</i>	Indian grass	2
Scientific Name	Common Name	Pure Live Seed (PLS) Ounces/Acre
<i>Spartina pectinata</i>	Prairie cord grass	6
<i>Agrostis alba</i>	Redtop	8
<i>Avena sativa</i>	Seed oats	360
<i>Lolium multiflorum</i>	Annual rye	100
<i>Phleum pratense</i>	Timothy	20
<i>Aster ericoides</i>	Heath aster	2
<i>Aster novae-angliae</i>	New England aster	1.25
<i>Baptisia leucantha</i>	White wild indigo	1.5
<i>Cassia fasciculata</i>	Partridge pea	3.5
<i>Coreopsis tripteris</i>	Tall coreopsis	1.25
<i>Desmodium illinoense</i>	Illinois tick trefoil	1
<i>Eryngium yuccifolium</i>	Rattlesnake master	3
<i>Gentiana andrewsii</i>	Bottle gentian	1
<i>Helenium autumnale</i>	Sneezeweed	1.25
<i>Helianthus grosseserratus</i>	Sawtooth sunflower	2

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<i>Lespedeza capitata</i>	Round-headed bush clover	3
<i>Liatris spicata</i>	Marsh blazing star	4
<i>Monarda fistulosa</i>	Prairie bergamot	0.75
<i>Parthenium integrifolium</i>	Wild quinine	2.5
<i>Physostegia virginiana</i>	False dragon; Obedient plant	1
<i>Pycnanthemum virginianum</i>	Common mountain mint	0.5
<i>Ratibida pinnata</i>	Yellow coneflower	3.5
<i>Rudbeckia hirta</i>	Black-eyed susan	1.5
<i>Rudbeckia laciniata</i>	Wild golden glow	2
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed susan	1.25
<i>Silphium integrifolium</i>	Rosin weed	2
<i>Silphium laciniatum</i>	Compass plant	3
<i>Silphium perfoliatum</i>	Cup plant	3
<i>Silphium terebinthinaceum</i>	Prairie dock	2
<i>Solidago juncea</i>	Early goldenrod	2
<i>Solidago rigida</i>	Stiff goldenrod	2
<i>Solidago rugosa</i>	Rough goldenrod	2.5
<i>Tradescantia ohioensis</i>	Common spiderwort	1.25
<i>Vernonia altissima taeniotricha</i>	Hairy tall ironweed	3
<i>Veronicastrum virginicum</i>	Culver's root	1
<i>Zizia aurea</i>	Golden alexanders	0.5

- E. All seed shall be fresh and clean and shall be delivered mixed, in unopened packages, bearing a guaranteed analysis of the seed and mixture.
- F. Seed shall be broadcast either by hand or approved sowing equipment at the rate of ninety (90) pounds per acre (two pounds per 1,000 square feet), uniformly distributed over the area. Broadcasting seed during high winds will not be permitted. The seed shall be drilled or raked into a depth of approximately 1/2 inch and the seeded area shall be lightly raked to cover the seed and rolled. Drill seeding shall be done with approved equipment with drills not more than 3 inches apart. All ridges shall be smoothed out, and all furrows and wheel tracks, shall be removed.
- G. Seed may be sown during the following periods:
 - February 1 to April 15
 - August 15 to October 15
- H. Seed may not be sown at any other time except with the written approval of the ENGINEER.
- I. After the seed has been sown, the areas so seeded shall be mulched with clean straw at the rate of one (1) bale per 2,000 feet (approximately 1

inch loose depth). Mulch on slopes shall be held in place with binder twine staked down at approximately 18 inch centers or by other equally acceptable means.

- J. Areas seeded shall be protected until a uniform stand develops, when it will be accepted and the CONTRACTOR relieved of further responsibility for maintenance. Displaced mulch shall be replaced or any damage to the seeded area shall be repaired promptly, both in a manner to cause minimum disturbance to the existing stand of grass. If necessary to obtain a uniform stand, the CONTRACTOR shall re-fertilize, re-seed and re-mulch as needed. Scattered bare spots up to one (1) square yard in size will be allowed up to a maximum of 10 percent of any area.

PART 3 EXECUTION

3.01 SEQUENCE OF WORK

- A. All finish grading in a general area shall be complete before sodding or fertilizing and seeding begins.

3.02 BASIS FOR PAYMENT

A. Payment for sod or fertilizing and seeding shall be made on a unit price or a lump sum basis where a separate bid item is provided. Otherwise payment for all landscaping required for other work, such as structures, pipelines, etc., shall be made on a unit price or lump sum basis bid for that work.

END OF SECTION

SECTION 03740

MODIFICATIONS TO EXISTING CONCRETE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to cut, repair or otherwise modify parts of existing concrete structures or appurtenances as shown on the Drawings and as specified herein as necessary to complete the work under this Contract.
- B. Work under this Section shall also include bonding new concrete to existing concrete.

1.02 RELATED WORK

- A. Demolition is included in Division 2, Section 02050.
- B. Excavation and Backfill are included in Division 2.
- C. Concrete, Concrete Reinforcement and Accessories are included in this Division.

1.03 GENERAL

- A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the ENGINEER.
- B. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers, shoring and bracing and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work, protect personnel, and to prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown or specified, saw cutting shall be required in cutting existing concrete. Where saw cutting is not possible, line drilling will be permitted.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Bonding Compound
 - 1. General
 - a. The bonding compound shall be a 2-component, solvent-free, moisture insensitive epoxy resin material suitable for

use as a bonding adhesive to bond fresh, plastic concrete to clean, sound hardened concrete and for grouting bolts and the bonding of mating materials.

2. Material

- a. The epoxy material shall conform to the following requirements:
 - 1) Component A - Component A shall be a modified epoxy resin of the epichlorohydrin-bisphenol-A type containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
 - 2) Component B - Component B shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin-bisphenol-A type containing suitable viscosity control agents, pigments, and accelerators.
 - 3) The ratio of Component B:A shall be 1:1 by volume.
 - 4) The material shall not contain asbestos.
- b. Properties of the Mixed Material*
 - 1) Pot Life -- 25 to 35 minutes.
 - 2) Tack-free Time to Touch (20 mil thickness) -- 3 to 5 hours.
 - 3) Initial Viscosity (Brookfield Viscometer Spindle #3; Speed 100) -- 1900-3700 cps.
 - 4) Color -- Gray.
- c. Properties of the Cured Material*
 - 1) Compressive Properties (ASTM D-695) at 28 days
Compressive Strength - 8,500 psi minimum;
Modulus of Elasticity 375,000 psi minimum.
 - 2) Tensile Properties (ASTM D-638) at 14 days.

Tensile Strength - 4,000 psi minimum; Elongation at Break -- 1.5-2.25%; Modulus of Elasticity -- 275,000 psi minimum.
 - 3) Flexural Properties (ASTM D-790) at 14 days.

Flexural Strength (Modulus of Rupture) -- 6,300 psi minimum.

- 4) Shear Strength (ASTM D-732) at 14 days.
Shear Strength -- 5,000 psi minimum.
- 5) Water Absorption (ASTM D-570; Section 6.5) at 14 days.
Water Absorption - 1% maximum
- 6) Bond Strength (ASTM C-882) Hardened to Plastic
Bond Strength (14 days moist cure) -- 1500 psi minimum.
- 7) Effective Shrinkage (ASTM C-883)
Effective Shrinkage - Passes Test

*All test data is based on material and curing conditions of 73 + 2 deg. F., 50 +5% relative humidity.

3. Approval Requirements

- a. The CONTRACTOR shall furnish notarized certification that the material proposed for use meets all the above requirements.
- b. Bonding agent shall be Sika Corporation Sikastix 370, Sikadur Hi-Mod, Unitex Pro-Poxy 204, or approved equal.

B. Repair Mortar

1. General

- a. Repair mortar shall be a 2-component, polymer-modified, cementitious, fast-setting, trowel grade, structural repair mortar suitable for use on horizontal, vertical and overhead surfaces on grade above, and below grade on concrete and mortar.

2. Material

- a. The polymer modified cementitious system shall consist of a factory pre-proportioned, 2-component system whose components conform to the following requirements:
 - 1) Component A shall be a liquid polymer emulsion of an acrylic copolymer and shall have the following properties:

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pH	4.5 - 6.5
Minimum film forming temperature	Approx. 68 deg. F.
Tear Strength	Approx. 990-1420
Elongation at Break	500 - 900%
Particle Size Range	Less than 0.1 micron

- 2) Component B shall be a blend of selected portland cements, specially graded aggregates, organic accelerator, and admixtures for controlling setting time, water reducers for workability and a corrosion inhibitor.
- 3) The component ratio A:B shall be 1:7.2 by weight. The system shall not contain chlorides, nitrates, added gypsum, added lime, or high alumina cements. The system shall be non-combustible, either before or after cure.

b. Typical Properties of Mixed Components

- 1) Application Time (Working Time) - 15 minutes after combining components.
- 2) Finishing Time -- 20 to 60 minutes after combining components.
- 3) Color - Concrete Gray.

c. Typical Properties of Cured Material.

- 1) Abrasion Resistance -- 6 times that of controlled concrete.
- 2) Bond Strength (pull off method) - 100% concrete substrate failure.
- 3) Modulus of Elasticity -- 4,500,000 psi.
- 4) Surface Scaling (deicing salt solution freeze/thaw) -
- No deterioration after 120 cycles.
- 5) Compressive Strength (2 hours 50% RH) -- 150 psi minimum.
- 6) Compressive Strength (28 days 50% RH) -- 5,550 psi minimum.
- 7) Flexural Strength (28 days 50% RH) -- 1,300 psi minimum.

- 8) This system shall conform with ECA/USPHS Standards for surface contact with potable water.
- 9) This system shall not produce a vapor barrier.
- 10) This system shall be thoroughly compatible with concrete.
- 11) Stone may be added.
- 12) System may be finished with power trowel.

d. Approval Requirements

- 1) The CONTRACTOR shall furnish notarized certification that the material proposed for use meets all the above requirements.
- 2) Repair mortar shall be Sika Corporation SikaTop 122, BASF Sonopatch 300 or equal.

C. Crack Sealant

1. General

- a. Crack sealant shall be a 2-component, solvent-free, moisture insensitive epoxy resin material suitable for crack grouting by injection or gravity feed, bolt grouting; as a binder for mortar, concrete or grout in thermally stable environments; and, as a concrete sealer.

2. Material

- a. The epoxy material shall conform to the following requirements:
 - 1) Component A - Component A shall be a modified epoxy resin of the epichlorohydrin-bisphenol-A type containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
 - 2) Component B - Component B shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin-bisphenol-A type containing suitable viscosity control agents, pigments, and accelerators.
 - 3) The ratio of Component B:A shall be 1:2 by volume.
 - 4) The material shall not contain asbestos.

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- b. Properties of the Mixed Material*
 - 1) Pot Life -- 20 to 30 minutes.
 - 2) Tack-free Time to Touch (3-5 mil thickness) -- 2 to 4 hours.
 - 3) Initial Viscosity (Brookfield Viscometer Spindle #2, Speed 100) -- 300 to 450 cps.
 - 4) Color -- Amber.

- c. Properties of the Cured Material*
 - 1) Compressive Properties (ASTM D-695) at 28 days
Compressive Strength - 10,500 psi minimum;
Modulus of Elasticity 300,000 psi minimum.
 - 2) Tensile Properties (ASTM D-638) at 14 days.

Tensile Strength - 5,500 psi minimum.

Elongation at Break -- 2-5%; Modulus of Elasticity -
- 60,000 psi minimum.
 - 3) Flexural Properties (ASTM D-790) at 14 days.

Flexural Strength (Modulus of Rupture) -- 12,500
psi minimum.

Tangent Modulus of Elasticity in Bending -- 325,000
psi minimum.
 - 4) Shear Strength (ASTM D-732) at 14 days.

Shear Strength -- 4,500 psi minimum.
 - 5) Water Absorption (ASTM D-570) at 7 days.

Water Absorption - 1.5% maximum
 - 6) Bond Strength (ASTM C-882)

Bond Strength (2 days dry + 12 days moist) --
2,000 psi minimum.
 - 7) Effective Shrinkage (ASTM C-883)
Effective Shrinkage - Passes Test
 - 8) When tested following the procedure prescribed by
the Environmental Control Administration of the

U.S. Public Health Service, the cured material shall be in conformity with the Federal Regulation requiring water extractables of less than 0.5 mg/in.2 of exposed surface for potable water containers.

* All test data is based on material and curing conditions of 73 + 2 deg. F., 50 +5% relative humidity.

3. Approval Requirements

- a. The CONTRACTOR shall furnish notarized certification that the material proposed for use meets all the above requirements.
- b. Crack sealant shall be Sika Corporation Sikastix 350, Sikadur Hi-Mod LV, Unitex ProPoxy 200 or approved equal.

D. Epoxy Paste Adhesive

1. General

- a. Epoxy paste adhesive shall be a 2-component, solvent-free, moisture insensitive epoxy resin material suitable for bolt grouting; as an adhesive for mating surfaces where the glue line is 1/8-inch or less; and to bond fresh, plastic concrete to clean, sound, hardened concrete.
- b. The material shall be classified as Type I, Grade 3, Class B and C and a Type II, Grade 3, Class B and C adhesive in conformity to ASTM C-881.

2. Material

a. The epoxy material shall conform to the following requirements:

- 1) Component A - Component A shall be a modified epoxy resin of the epichlorohydrin-bisphenol-A type containing suitable viscosity control agents and pigments. It shall not contain butyl glycidyl ether.
- 2) Component B - Component B shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin-bisphenol-A type containing suitable viscosity control agents, pigments, and accelerators.
- 3) The ratio of Component B:A shall be 1:2 by volume.

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- 4) The material shall not contain asbestos.
- b. Properties of the Mixed Material*
- 1) Pot Life -- 25 to 45 minutes.
 - 2) Tack-free Time to Touch -- 2 to 3 hours.
 - 3) Consistency (2 inch thick) -- Non-sag
 - 4) Color -- Gray.
- c. Properties of the Cured Material*
- 1) Compressive Properties (ASTM D-695) at 28 days.
Compressive Strength - 10,000 psi minimum.
Modulus of Elasticity - 700,000 psi minimum.
 - 2) Tensile Properties (ASTM D-638) at 14 days.
Tensile Strength - 3,000 psi minimum.
Elongation at Break, % - 0.3 minimum.
Modulus of Elasticity - 630,000 psi minimum.
 - 3) Flexural Properties (ASTM D-790) at 14 days.
Flexural Strength (Modulus of Rupture) - 3,700 psi minimum.
Tangent Modulus of Elasticity in Bending - 850,000 psi minimum.
 - 4) Shear Strength (ASTM D-732) at 14 days.
Shear Strength - 2,800 psi minimum.
 - 5) Water Absorption (ASTM D-570, Section 6.5) at 7 days.
Water Absorption, % - 1.0 maximum
 - 6) When tested following the procedure prescribed by the Environmental Control Administration of the U.S. Public Health Services, the cured material shall be in conformity with the Federal Regulation requiring water extractables of less than 18 mg/in.² of exposed surface for potable water containers.

* All test data is based on material and curing conditions of 73 + 2 deg. F.; 50 +5% relative humidity.

3. Approval Requirements

- a. The CONTRACTOR shall furnish notarized certification that the material proposed for use meets all the above requirements.
- b. Epoxy paste adhesive shall be Sika Corporation Sikastix 390, Sikadur 31 Hi-Mod Gel, Unitex Pro-Poxy 300, or approved equal.

E. Non-shrink Grout

1. Non-shrink grout for setting reinforcing bars in existing concrete shall be ready-to-use formulation, which when mixed with specific amounts of water, will provide a pourable cementitious mixture.

PART 3 EXECUTION

3.01 GENERAL

- A. Concrete removal, repairs and fabrication shall be as shown on the Project Drawings and/or specified herein.
- B. In all locations where new concrete is to be deposited against existing concrete, bonding compound shall be applied to the surfaces of the existing concrete prior to placement of new concrete.
- C. In all cases where the joint between new concrete and existing concrete will be exposed in the finished work, except as otherwise shown or specified, the limit of concrete removal shall be defined by a 1-1/2 inch deep saw cut on each exposed surface of the existing concrete.
- D. When the finished surface is not specified to be coated, the color of new concrete in the exposed surfaces shall match the color of the existing adjoining concrete as closely as possible.
- E. Where indicated or specified, existing concrete shall be removed to the depth indicated or required to expose sound concrete. The surface exposed shall be roughened by chipping, sandblasting, scarifying, or other appropriate means before applying bonding compounds, or repair material as specified.
- F. The ENGINEER may, from time to time, direct the CONTRACTOR to make repairs to existing concrete. These repairs shall be made as specified herein or by such other methods as may be appropriate.

- G. Reinforcing in existing concrete which is exposed as a result of removal of deteriorating concrete shall be wire brushed to remove all loose material and products of corrosion before proceeding with the repair.
- H. All commercial products specified in this Section shall be stored, mixed, and applied in strict accordance with the manufacturer's recommendations.
- I. In all cases where concrete is repaired in the vicinity of an expansion joint or isolation joint the repairs shall be made so as to preserve the isolation between components on either side of the joint.

3.02 SURFACE REPAIR AND PATCHING

- A. Remove fractured, loose, deteriorated and unsound concrete by saw cutting, bush hammering, chipping or other appropriate means. Restore area to original limits or as shown using repair mortar.

3.03 EXPANSION JOINT REPAIR

- A. Where indicated, existing pre-molded joint filler shall be removed and replaced with pre-molded joint filler as specified in this Division, Section 03300. Special joint sealant shall be installed as indicated in accordance with manufacturer's instructions.

3.04 CRACK REPAIR

- A. Cracks on vertical and horizontal surfaces shall be repaired by pressure injecting crack sealant through polyethylene valves sealed to surface with epoxy paste adhesive; where appropriate as determined by the ENGINEER, gravity feeding crack sealant into cracks on horizontal surfaces may be used.

END OF SECTION

SECTION 05540

CASTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, and equipment required to install castings as shown on the Drawings and specified herein. Included in this section are manhole covers, steps, valve boxes, and hatch covers.

1.02 RELATED WORK NOT INCLUDED

- A. Concrete work is included in Division 3.
- B. Surface preparation and furnishing of castings is included in Division 9, Section 09900.

1.03 SUBMITTALS

The CONTRACTOR shall submit to the ENGINEER, in accordance with Division 1, Section 01300, copies of construction details of castings proposed for use.

PART 2 MATERIALS

2.01 GENERAL

- A. All castings shall be gray iron, conforming to the requirements of the ASTM Standards, Designation A48 - latest revision, Class 35B.

2.02 MANHOLE CASTINGS

- A. Frames and Covers
 - 1. Sanitary sewer manhole castings shall consist of cast iron frames and 22-3/4 inch diameter covers, having a combined weight of not less than 350 pounds for out of traffic locations and 460 pounds for traffic locations. The frame shall be at least 7 inches high overall. Manhole covers must set neatly in the frame, with contact surfaces machined smooth for even bearing. The top of the cover shall be flush with the frame edge. The top of the cover shall sufficient corrugations to prevent slipperiness and be marked in large letters "SANITARY SEWER." Covers shall have one pick hole only, about 1-1/2 inches wide and 3/4 inch deep with 3/8 inch square undercut at rear and 3/4 inch square undercut on sides. Covers on sanitary sewer manholes must not be perforated and shall be as manufactured by J.R. Hoe & Sons, Inc. Neenah Foundry or approved equal.

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2. Storm sewer manhole castings shall consist of cast iron frames and 22-3/4 inch diameter grate type covers, having a combined weight of not less than 460 pounds. The frames shall be at least 7 inches high overall. Manhole covers must set neatly in the frame with contact surfaces machined smooth for even bearing. The top of the cover shall be flush with the frame edge. The castings shall be Neenah Foundry Company with type "D" grate, U.S. Foundry Eagle Manufacturing Group or approved equal.

B. Steps

1. Cast iron or polypropylene plastic encapsulated steel manhole steps shall be patterns shown on the detail Drawings, and have corrugated treads. In case of need for non-protruding steps, shop drawings of special inset cast iron steps shall be reviewed by and be acceptable to the ENGINEER.
2. If a step constructed of another material is going to be considered, shop drawings will need to be submitted far enough in advance to allow consideration.
3. It is intended that the cast iron step be Neenah Foundry Company's R-1980-E, American Step Company or approved equal, and the polypropylene plastic encapsulated steel step be M.A. Industries PS-1, America Step Company or approved equal.

2.03 VALVE BOXES

A. Slip Type for Iron Body Gate Valves

1. Valve boxes for 2 inch through 10 inch valves shall be the 2 piece slip type, without screw, of sufficient length to allow for 36 inches of cover over the top of the pipe, Tyler 6855 series, model #562-A, Opelika Foundry or approved equal. The inner section shall have a minimum inside diameter of 5-1/4 inches with a hood type base that will cover the packing gland on a 2 inch through 10 inch valve (minimum of 8 inches inside diameter). The base of the top section shall be flanged at least 1-1/4 inches. The caps shall be circular with a corrugated surface and have pick holes in the periphery and be marked "Water", "Gas", "Sewer", or "Air" according to use. For 12 inch through 16 inch valves, the valve boxes shall be Opelika Foundry Company No. 4907 for cast iron, Russell Pipe and Foundry Company or approved equal.
2. Valve boxes for valves in the horizontal position shall be Opelika Foundry Company No. 4907 for cast iron, Russell Pipe and Foundry Company or approved equal, with a base that is sized to allow covering of the bevel gear case and centering of the operating nut in the valve box.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The installation of castings is generally covered under specifications for pipe work and manholes. Castings shall be leveled, plumbed, secured, and installed in accordance with the Drawings.

END OF SECTION

SECTION 11310

SUBMERSIBLE THREE-PHASE PUMP STATIONS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

The CONTRACTOR shall furnish all labor, materials, equipment and services for manufacturing, assembling, delivering, installing, testing and placing in service the sewage pumping station including pumps, motors, controls, basins and appurtenances as noted on the drawings.

1.02 DEFINITIONS

When the term "pumping unit" is used, it shall be deemed to mean a pump or pumps, complete with, but not limited to, drive motor, accessories, appurtenances and all associated equipment.

1.03 CONTRACT DRAWINGS

The contract drawings are intended to show a general arrangement of pumping equipment, controls, connected piping and valves. The pump manufacturer shall furnish each pumping unit complete with motor and all components necessary for the intended function of the unit.

1.04 RELATED WORK

- A. Special and general requirements for WORK are included in Divisions 0 and 1.
- B. Piping is specified in Division 2 and 15.
- C. Valves are included in Division 15.
- D. Electrical is specified in Division 16.

1.05 SUBMITTALS

- A. SHOP DRAWINGS shall be submitted in accordance with Division 1, Section 01300.
- B. SHOP DRAWINGS shall include detail installation drawings and dimensions as well as performance data.
- C. The CONTRACTOR shall provide operation and maintenance manuals in accordance with Division 1, Section 01300.

1.06 FIELD TESTING

A. After start-up of the pumps, a representative of the manufacturer shall perform FIELD testing to verify the pump head, capacity and efficiencies are in compliance with the performance curve.

B. The CONTRACTOR shall furnish test equipment as necessary, including but not limited to direct-reading RMS wattmeter with potential and current transformers, calibrated test gages, calibrated flow measuring device, and a sufficient supply of water.

C. Each pump shall be operated at three points on the pump curve, one point being the specified design operating point the TDH, flow rate and efficiency shall be determined for each point, and compared with the performance curve.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the complete requirement of these SPECIFICATIONS, manufacturers offering products which may be incorporated into the WORK include but are not limited to the following:

1. F. E. Myers
2. Goulds Pumps, Inc.
3. ITT Flygt, Corp.
4. Or approved equal

B. If pumps are proposed other than those specified herein, all pump stations relative to this specification shall contain pumps of a common manufacturer.

2.02 EQUIPMENT

A. General

All pumps and motor assemblies shall be FM listed for Class 1, Group D Explosion – Proof Service. Pumping units shall be designed and built for the specified operation without overheating, without excessive vibration or strain and requiring only generally acceptable maintenance.

The pumps shall be non-clogging sewage pumps with recessed type impeller capable of operating in a partially or entirely submerged condition. The design shall be such that pumping units will be automatically

connected to the discharge piping when lowered into place on the discharge connection. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts or other fastenings to be removed for this purpose and no need for personnel to enter the pump well. Each pump shall be fitted with a stainless steel chain of adequate strength and length to permit raising the pump for inspection and removal.

All major parts, such as stator casing, oil casing, sliding bracket and volute shall be of gray iron. All surfaces coming into contact with sewage shall be protected by a coating resistant to sewage. All exposed nuts and bolts shall be of stainless steel. All openings in the pump impeller and volute case shall be large enough to pass a three (3) inch diameter sphere. The discharge flange shall be as four inch standard.

B. Motors

Pump motor shall be of the sealed submersible type rated as listed on the pump schedule, at 60 Hertz. Motors shall be three phase, 230V.

Three phase motors shall be NEMA B type. Stator winding shall be of the open type with Class F insulation good for 155°C (311°F) maximum operating temperature. Winding housing shall be filled with a clean high dielectric oil that lubricates bearings and seals and transfers heat from windings and rotor to outer shell. Air-filled motors which do not have the superior heat dissipating capabilities of oil-filled motors shall not be considered equal.

Motor shall have two heavy duty ball bearings to support pump shaft and take radial and thrust loads and a sleeve guide bushing directly above the lower seal to take radial load and act as flame path for seal chamber. Ball bearings shall be designed for 50,000 hours B-10 life. Stator shall be heat shrunk into motor housing. A heat sensor thermostat shall be attached to and imbedded in the winding and be connected in series with the motor starter contactor coil to stop motor if temperature of winding is more than 120°C (248°F). Thermostat shall reset automatically when motor cools to safe operating temperature. Three heat sensors shall be used on 3 phase motors. The common pump motor shaft shall be of 416 stainless steel.

C. Seals

The motors shall be protected by two mechanical seals mounted in tandem with a seal chamber between the seals. Seal chamber shall be oil filled to lubricate seal face and to transmit heat from shaft to outer shell.

Upper seal face shall be tungsten carbide and lapped to a flatness of one light band. Lower seal shall be tungsten carbide. Upper seal face shall be carbon and ceramic and lapped to a flatness of one light band. Lower seal faces shall be tungsten carbide.

A double electrode shall be mounted in the seal chamber to detect any water entering the chamber through the lower seal. Water in the chamber

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shall cause a red light to turn on at the control panel. This signal shall not stop the motor but shall act, as a warning only, indicating service is required.

D. Impeller

The impeller shall be cast ductile iron and of the recessed type. Pump-out vanes shall be used on the back shroud. Impeller shall be dynamically balanced by grinding on shroud faces. No holes are to be drilled for balancing. Impeller shall be driven by stainless steel key and impeller held in position with lock screw and washer. Impeller and motor shall have top lift-out of case so that the assembly can be removed without disturbing any piping.

E. Pump Case

The volute case shall be cast iron and have a flanged center line discharge. Discharge flange shall be 4" standard with bolt holes straddling center line. A bronze wear ring shall be pressed into the case for guiding impeller neck and to prevent corrosion freeze up. Wear ring is to be held from rotating by locking with stainless steel set screw.

F. Pump and Motor Castings

All castings shall be of high tensile cast iron and shall be treated with phosphate and chromate rinse. All fasteners shall be stainless steel.

G. Bearing End Cap

Upper motor bearing cap shall be a separate casting for ease of mounting and replacement. All fasteners shall be stainless steel.

H. Power Cables

Power cord and control cord shall be double sealed. The power and control conductor shall be single strand sealed with epoxy potting compound and then clamped in place with rubber seal busing to seal outer jacket against leakage and to provide for strain pull. Cords shall withstand a pull of 300 pounds to meet UL requirements. Minimum cable length shall be as required by equipment and controls location shown on the DRAWINGS.

Insulations of power and control cord shall be type SOOW. Both control and power cords shall have a green carrier ground conductor that attaches to motor frame.

I. Lift Out Rail

1. COMPONENTS – The lift-out rail system shall be of non-sparking design and shall be listed for explosion-proof service. Each lift-out system consist of a discharge and rail support elbow that bolts to bottom of wet well, a brass seal flange that mounts to

pump, top rail support guides, and brass guide/support brackets that mount to pump. All exposed nuts, bolts, and fasteners shall be 300 series stainless steel.

2. ELBOW - Discharge elbow shall be integrally cast into the base assembly.

3. GUIDE RAILS - Two rail pipes shall be used to guide the pump from the surface to the discharge base connection. The guide rails shall be schedule 40 stainless steel pipe, of a diameter recommended by the manufacturer. The weight of the pump shall bear solely on the discharge base and not on the guide rails. Rail systems which require the pump to be supported by legs which might interfere with the flow of solids into the pump suction will not be considered equal. The guide rails shall be firmly attached to the access hatch frame. Systems deeper than 12 feet shall use an intermediate guide for each 12 feet of wet well depth.

J. Lifting Chain

An adequate length of stainless steel lifting chain, of adequate strength as recommended by the manufacturer, shall be supplied for removing each pump. The chain shall be of sufficient length and shall include an adequate number of lifting rings for easy removal. Length shall be 3' greater than overall wet well depth. A stainless steel fabricated hook shall be provided for each chain. These hooks shall be secured to the hatch frame with stainless steel bolts and nuts before the hatch is cast into concrete.

K. Discharge Piping and Bolts

Piping within the station shall be flanged joint cement lined ductile iron with proper bolts and gaskets. All concrete anchor bolts used for any part of this station installation shall be stainless steel. All flange bolts shall be stainless steel.

L. Top Rail Support Plates

One (1) each aluminum top rail support plate shall be provided for each installed pump. This plate shall be fabricated of aluminum plate and shall contain expandable rubber bushings to accept the stainless steel guide rails. These rubber bushings when completely tightened shall provide for a tight, vibration free guide rail installation. Notched openings in the rail support plates shall provide for horizontal adjustment. All fasteners shall be stainless steel.

M. Gravity Sewers

All gravity sewers entering the wet well shall be as shown on the PLANS. All gravity sewers shall extend 3" within the inside of the wet well. Non-shrink grout shall be used to seal all pipe penetrations within the wet well.

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N. Discharge Piping

All piping shall be installed plumb and without strains or binds. Piping shall be properly supported. Any fabricated pipe supports used shall be stainless steel or aluminum.

O. Pipe Fittings - Flanged

All flanged pipe fittings shall be ductile iron, cement lined AWWA type. Flange bolts shall be stainless steel. All flange bolts shall be assembled using "Never Seeze".

P. Pipe Fittings - Mechanical Joint

All mechanical joint pipe fitting shall be ductile iron cement lined with restrained joint connections. All mechanical joint fittings shall be properly blocked as required.

Q. Guide Rails

All guide rails shall be type 304, schedule 40 stainless steel.

R. Access Hatch - Wet Well

There shall be furnished and installed one (1) aluminum access hatch for pump station. Hatch shall be sized to allow removal of all pumping equipment. The hatch shall be of non-skid design and designed to handle a weight of 300 pounds per square foot. A positive hold open bar shall be provided to secure the hatch in the open position. Stainless steel bolts for mounting each rail support plate shall be furnished so that each set of guide rails can mount directly to the access hatch.

All hinges and hinge bolts shall be stainless steel. All hinge bolt nuts shall be tack welded to prevent removal of bolts. All fasteners used on the hatches shall be non corrosive.

All areas of hatch frames that will be in contact with concrete shall be coated with bitumastic paint.

All single door wet well hatches shall be equal to Halliday Products or U. S. FOUNDRY type A.P.S. All double door wet well hatches shall be equal to Halliday Products or U. S. FOUNDRY type A.P.S.

All wet well hatches shall be furnished with factory installed stainless steel bolts for securing the guide rail support plates, float mounting bracket, chain hooks and cable strain reliefs. Holes for these bolts shall be drilled and tapped at the factory. Bolts as required shall be threaded into the hatch frame from the concrete side and secured with stainless steel nuts.

All bolts shall be installed to prevent interference when closing the hatch. An adequate offset of the hatch stiffeners shall be made so that FIELD

installation of the guide rail top support plates will not interfere with closing of the hatch.

Each wetwell shall be supplied with a protective grating panel as manufactured by Halliday Products, US Foundry and Manufacturing or equal. Grating panel shall be 1 inch (25 kg.) aluminum "I" bar grating with Safety Orange powder-coated finish. Grating shall be hinged, and shall be supplied with a positive latch to maintain unit in an upright position. Grating shall have a 6-in. (152mm) viewing area on each lateral unhinged side for visual observation and limited maintenance. Grating support ledges on 300 lbs. psf (1464 kg. per sq. meter) loaded access covers shall incorporate nut rail with a minimum of four (4) stainless steel spring nuts. A padlock hasp for owner-supplied padlock shall be provided.

S. Pump Basins - Wet Well

Where required, pump station basin extensions and/or lids shall be precast reinforced concrete pipe in conformance with ASTM C478 (LR) constructed as shown on the DRAWINGS. The interior and exterior of the basin, and interior piping shall be protective coated per Division 9 of these specifications.

T. Duplex Control Panel

A Nema 4X steel control panel shall be furnished with each pumping unit to be installed, as shown on the plans. NEMA 4X control panel enclosures may be 5052-H32 aluminum, 304/304L stainless steel, or 316/316L stainless steel.

All electrical components shall be mounted in a NEMA 4X enclosure. The enclosure shall have a hasp for padlocking (padlock not included).

A separate hinged deadfront inner door shall be provided in the enclosure. All control switches, lights, and overload resets shall be mounted through the inner door. The pump circuit breaker and control circuit breaker shall be mounted with operating handles through the inner door, and shall have locking tabs that prevent the inner door from being opened with the breakers in the "ON" position.

Both the inner door and the back panel shall be a minimum of 14 Ga. steel, and shall be painted on both sides with a white enamel finish.

The panel shall include a pump circuit breaker, control circuit breaker, alarm circuit fuse, control circuit fuse, I.E.C. rated motor starter with 3-pole ambient compensated bimetal overload relay, pump hand-off-auto switch (momentary in the hand position), alarm test switch, pump run lights, seal leak lights, alternator relay (solid state), override relay, control transformer with primary fusing, terminal blocks, ground lugs, audible alarm, elapsed time meters, and all necessary wiring and brackets. The panel shall also be equipped with an external 120 V, 15 A weatherproof GFI receptacle, mounted on the side of the panel.

The control panel shall be fitted with a red lexan (polycarbonate) alarm light. The light shall be approximately 3" high by 3 1/2" diameter. The globe shall be mounted on top of the enclosure with a neoprene gasket. The lens cannot be removed from the exterior of the enclosure. The lens may be removed by entering the interior of the enclosure and removing four (4) #8 screws. The bulb shall be 40 watt minimum high intensity-medium base type. The bulb shall be easily replaced by removing a thumb screw from the support bracket on the interior of the panel.

The alarm shall have a bright glow and flash during high water conditions. The alarm light will go out when the water level drops.

All internal wiring shall be neat and color coded. Each wire shall be a different color or stripe (except for ground), and all incoming wires shall terminate into a box clap type terminal block. All control wires shall be 14 Ga. Type TEW rated for 105° C.

A schematic diagram (showing wire color) shall be permanently fastened to the inside of the enclosure. An Installation and Service Manual shall also be included with each control panel.

The control panel shall be U.L. listed as an assembly.

A pedestal mounted junction box shall be provided as shown on the plans. The materials of construction shall be the same as for the control panel.

U. Control Panel Mounting

The control panel shall be mounted as shown on the plans, on an aluminum or stainless steel unistrut frame of sufficient strength to accommodate the weight of the panel. All necessary hardware to mount the frame and control panel shall be stainless steel.

V. Elapsed Time Meter

An E.T.M. shall be provided for each pump to record the actual running time of the motor. The E.T.M. shall be energized by an auxiliary contact from the motor starter or contactor and be wired in parallel with the pump run light. The E.T.M. shall have a maximum reading of 99,999.99 hours. The E.T.M. shall be non-resettable.

W. Intrinsically Safe Relays

Intrinsically safe relays shall be provided for the float switches in the wet well. The float switches shall be incapable of releasing sufficient electrical or thermal energy under normal conditions to cause ignition of a specific hazardous atmospheric mixture suitable for use in Division I locations. The intrinsically safe relay shall read circuits up to 3,000 Ohms resistance. The power transmitted through the float switch shall be held to a maximum of 12 VDC and 3 MA. Standard simplex panels shall use two relays (pump

off-on, high water), standard duplex panels shall use three relays (pump off-on, override, high water).

X. Motor Heat Sensor and Seal Leak Circuitry for Explosion Proof Pumps

The control panel shall contain motor heat sensor and seal leak circuitry required for explosion proof pumps. The seal leak circuitry shall contain a test switch and light that will allow the integrity of the circuit to be tested. The motor heat sensor circuitry shall require a manual reset for either a tripped heat sensor or a tripped thermal overload contact. Either of which shall also signal an indicating light.

Y. Alarm Horn

An audible alarm horn shall be provided to indicate an alarm condition. The horn shall be energized by either the alarm float switch or the alarm test switch and operate in conjunction with the alarm light. The horn shall be weatherproof and be rated for 103 DB at 10 feet.

Z. Alarm Light

The control panel shall be fitted with a red lexan (polycarbonate) alarm light. The light shall be 3" high by 3 1/2" diameter. The lens shall be mounted on top of the enclosure with a neoprene gasket. The lens shall not be able to be removed from the exterior of the enclosure. The lens may be removed by entering the interior of the enclosure and removing four (4) #8 screws. The bulb shall be 40 watt minimum high intensity medium base type. The bulb shall be easily replaced by removing a thumb screw from the support bracket on the interior of the panel. The alarm light shall have a bright glow during high water conditions. The alarm light will go out when the water level drops.

1. Identification Nameplate - Accessories

Each piece of equipment shall be provided with a stainless steel nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacturer, serial number, and principal rating data. A second identical nameplate shall be provided for each submersible pump and affixed to the control panel.

The CONTRACTOR shall furnish with each type, kind or size of pumping unit, two sets of any special suitably marked high-grade tools, gauges and fixtures which may be needed to adjust, operate, maintain or repair the equipment. Such tools and accessories shall be furnished in neat, special steel cases fitted with locks and keys and delivered to the ENGINEER prior to the initial operation of equipment.

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AA. Float Switch

Float switches for sewage pump stations shall be mechanically activated (no mercury) and shall be normally open (N.O) or normally closed (N.C.) as required. Cable shall be flexible 18 gauge, 2 conductor (UL, CSA) SJOW, water-resistant (CPE), and of a length appropriate for the specific application. Float shall be approximately 2.75 inches diameter x 5 inches long, constructed of high impact, corrosion resistant, polypropylene housing for use in sewage and water up to 60°C (140°F), up to 30 feet deep. Electrical rating shall be 5 amps, 125/250 VAC, 50/60 Hz. Floats shall be equipped with external weights. Float shall be SJE Signal Master, Consolidated Electric Company Model LS or Approved Equal.

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2.03 PUMP SCHEDULE

Pump Station	Flow (gpm)	Head (TDH)	Make	Model	Impeller (in)	Speed (rpm)	Power (HP)
Combs Pump Station*	321	145	Myers or ABS or Equivalent	4RCX-M2	6.63	3500	50
				AFP 1035.2 ME250/2	Type 2	2900	34
Cherokee Hills Pump Station*	180	96	Myers or ABS or Equivalent	4RHX-M2	6.13	3500	20
				AFP 1034.8 ME150/2	Type 8	2900	27
Frogtown Pump Station*	185	142	Myers or ABS or Equivalent	4RCX-M2	6.38	3500	40
				AFP 1035.5 ME200/2	Type 8	2900	20
Grinder Pump	43	126	Myers	WG75H	6.25	3500	7.5

*Notes: All motors shall be 230V / 3-phase.
All pumps shall have a 4" discharge diameter.
Myers Pumps are preferred to match existing system.

PART 3 EXECUTION

3.01 PAINTING

A. Painting shall be in accordance with Division 9.

3.02 FIELD SERVICE

A. A qualified manufacturer's representative shall inspect the installation and be present at the initial start-up and pump tests to confirm each pump capacity and efficiency.

3.03 INSTALLATION

A. Work shall be performed in a workmanship manner in accordance with manufactures recommendations.

END OF SECTION

SECTION 11312

GRINDING LIFT STATIONS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

The CONTRACTOR shall furnish all labor, materials, equipment and services for manufacturing, assembling, delivering, installing, testing and placing in service the sewage pumping station including pumps, motors, controls, basins and appurtenances.

1.02 DEFINITIONS

When the term "pumping unit" is used, it shall be deemed to mean a pump or pumps, complete with, but not limited to, drive motor, accessories, appurtenances and all associated equipment.

1.03 CONTRACT DRAWINGS

The contract drawings are intended to show a general arrangement of pumping equipment, controls, connected piping and valves. The pump manufacturer shall furnish each pumping unit complete with motor and all components necessary for the intended function of the unit.

1.04 RELATED WORK

- A. Special and general requirements for WORK are included in Divisions 0 and 1.
- B. Piping is specified in Division 15.
- C. Valves are included in Division 15.
- D. Electrical is specified in Division 16.

1.05 SUBMITTALS

- A. SHOP DRAWINGS shall be submitted in accordance with Division 1, Section 01300.
- B. SHOP DRAWINGS shall include detail installation drawings and dimensions as well as performance data.
- C. SHOP DRAWINGS shall include the specified warranty.
- D. The CONTRACTOR shall provide operation and maintenance manuals in accordance with Division 1, Section 01300.

1.06 OPERATING CONDITIONS

The pump shall have a capacity of 0 GPM at a total head of 145 feet (shutoff condition), 80 GPM at a total head of 105 feet, a maximum flow of 43 GPM at a total head of 125 feet and shall use a 7.5 HP motor operating at 3500 RPM. Motor shall be non-overloading over the entire performance curve.

1.07 FIELD TESTING

- A. After start-up of the pumps, the CONTRACTOR shall perform field testing to verify the pump head, capacity and efficiencies are in compliance with the performance curve.
- B. The CONTRACTOR shall furnish test equipment as necessary, including but not limited to direct-reading RMS wattmeter with potential and current transformers, calibrated test gages, calibrated flow measuring device, and a sufficient supply of water.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the complete requirement of these SPECIFICATIONS, manufacturers offering products which may be incorporated into the WORK include but are not limited to the following:
 - 1. Myers Pumps
 - 2. Liberty Pumps
 - 3. or approved equal
- B. If pumps are proposed other than those specified herein, all grinder pump stations incorporated into this contract shall contain pumps of a common manufacturer.
- C. Pump shall meet the performance of the Myers Pumps WG75H Series two-stage, 7.5 HP, submersible grinder pump or approved equal.

2.02 PUMP

Castings shall be constructed of class 25 cast iron. The motor housing shall be oil filled to dissipate heat. All mating parts shall be machined and sealed with a Buna-N o-rings. All fasteners exposed to the liquid shall be stainless steel. The motor shall be protected on the top side with a sealed cord entry plate with molded pins to conduct electricity, eliminating the ability of water to enter internally through the cord. The motor shall be protected on the lower side with a dual seal arrangement. The first seal shall be a double lip seal molded in FKM fluoroelastomer or Buna N. The second / main seal shall be a unitized hard face silicon carbide seal with stainless steel housings and spring. The upper and

lower bearing shall be capable of handling all radial thrust loads. The lower bearing shall have the additional ability to handle the downward axial thrust produced by the impeller and cutters by design of angular contact roller races. The pump housing shall be of the concentric design thereby equalizing the pressure forces inside the housing which will extend the service life of the seals and bearings. Additionally there shall be no cutwater in the housing volute in order to discourage the entrapment of flowing debris. The pump shall be furnished with a stainless steel handle having a nitrile grip.

The exterior of the casting shall be protected with powder coat paint. All exposed hardware shall be stainless steel.

2.03 GRINDER

The cutter and plate shall consist of 440 stainless steel with a Rockwell C hardness of 55-60. The stationary cutter plate shall have specially designed orifices through it, which enable the slurry to flow through the pump housing at an equalized pressure and velocity. The stationary cutter shall consist of V shapes to maximize cutting action and arc shape exclusion slots to outwardly eject debris from under the rotary cutter. The rotary cutter shall have 4 blades and be designed with a recessed area behind the cutting edge to prevent the accumulation and binding of any material between rotary cutter and the stationary cutter. The cutting system must incorporate close tolerances for optimum performance. Ring or radial cutters, or those that grind on the outside circumference shall not be acceptable.

The grinding assembly shall operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. In order to demonstrate adequate flow velocity and grinding capability, the grinder pump shall be capable of passing a series of stringy type solids (diapers, rags, feminine products, etc.) through the pump without roping or winding the material in or immediately below the pump suction.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects", such as paper, wood, plastic, glass, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4" diameter discharge piping.

2.04 IMPELLER

The impeller shall be an investment cast stainless steel impeller, with pump out vanes on the back shroud to keep debris away from the seal area. It shall be keyed and bolted to the motor shaft.

2.05 BEARINGS AND SHAFT

An upper radial and lower thrust bearing shall be required. The upper bearing shall be a single ball / race type bearing. The lower bearing shall be an angular contact heavy duty ball / race type bearing, designed to handle axial grinder

pump thrust loads. Both bearings shall be permanently lubricated by the oil, which fills the motor housing. The bearing system shall be designed to enable proper cutter alignment from shut off head to maximum load at 145' of TDH. The motor shaft shall be made of 300 or 400 series stainless steel and have a minimum diameter of 6.25".

2.06 ELECTRIC MOTOR

Single phase motors shall be oil filled, capacitor start/capacitor run, 240 volt, class B insulated NEMA B design, rated for continuous duty. At maximum load the winding temperature shall not exceed 135 degrees C un-submerged. Since air filled motors are not capable of dissipating heat they shall not be considered equal. Single phase pump motors shall have an integral thermal overload switch in the windings for protecting the motor. The capacitor circuit shall be mounted internally on single phase pumps. Single phase motors shall have an integral solid state starting circuit-switch for switching the start winding off.

2.07 SEALS

The pump shall have a dual seal arrangement consisting of a lower and upper seal to protect the motor from the pumping liquid. The lower seal shall be a FKM fluoroelastomer OR Buna N molded double lip seal, designed to exclude foreign material away from the main upper seal. The upper seal shall be a unitized silicon carbide hard face seal with stainless steel housings and spring, Crane Type T-6a, Vulcan Seals Type 75b or equal. The motor plate / housing interface shall be sealed, with a Buna-N o-ring.

2.08 POWER CORD

The submersible pump shall be supplied with 25 feet of multiconductor power cord. It shall be cord type SJOOW (1-phase) or SEOOW (3-phase), capable of continued exposure to the pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a water tight compression fitting cord plate assembly, with molded pins to conduct electricity. This will eliminate the ability of water enter internally through the cord, by means of a damaged or wicking cord.

2.09 BASIN

The basin diameter, minimum depth, and other dimensions shall be as shown on the Drawings.

The basin shall be fiberglass reinforced polyester resin with a minimum 3" ballast support flange. The basin shall be furnished with one flexible inlet flange (shipped loose to facilitate field location) to accept a 4.50" OD DWV pipe. Inlet location can vary to accommodate ease of installation. Basin capacities and dimensions shall be as shown on the contract drawings or as specified herein. The basin FRP wall laminate thickness shall vary with the wetwell depth to provide the aggregate strength to meet the tensile and flexural physical property requirements. The basin FRP wall laminate must be designed to withstand wall

collapse or buckling based on a hydrostatic pressure equivalent to a saturated soil weight of 120 pounds per cubic foot. Basin must comply with the pipe stiffness values as specified in ASTM D 3753. The basin laminate must be constructed to withstand or exceed 150% of the assumed loading on any depth. The finished FRP laminate will have a Barcol hardness of at least 90% of the resin manufactures specified hardness for the fully cured resin. The Barcol Hardness shall be the same for both interior and exterior surfaces. Manufacturer must submit documentation including calculation and production certification that basin (s) on the project are in compliance with the above requirements.

If basin manufacturer does not recommend backfill of the basin with native earth then manufacturer's backfill requirements/recommendations shall be clearly stated in the shop drawing submittal. Contractor shall install basin in accordance with manufacturer's recommendations.

All piping inside the basin silhouette shall be at a level in the station that is as shown on the Drawings.

Basin shall be UL Listed to Standard 1951.

Basin top shall be 5/16" thick fiberglass, green in color, with anti-skid surface. It shall have a 3" unscreened mushroom vent.

All discharge piping shall be constructed of schedule 40 PVC. The manufacturer shall guarantee all bulkhead penetrations watertight.

2.10 STATION CONFIGURATION

Basins shall be supplied in a wet well configuration as shown on the Drawings. Wet well must have minimum storage volumes above alarm level according to the following table:

Overall Station Height	Minimum Reserve Storage Above Alarm Level
48"	35.7 gallons
60"	59.2 gallons
72"	82.7 gallons
84"	106.2 gallons
96"	129.7 gallons
108"	153.2 gallons
120"	176.7 gallons

2.11 PUMP REMOVAL SYSTEM

Each basin shall be equipped with a 300 series stainless steel "C" channel rail assemblies, one for each pump, to facilitate removal of the pump from ground level. A 1/2" diameter polypropylene rope shall be supplied for each pump. Pump removal system must not require the loosening of fasteners to facilitate pump removal and shall provide for automatic alignment and re-connection of

discharge piping for the replacement pump. Pump replacement shall be accomplished while the basin is full of sewage without the need to de-water the basin. Pump base shall be cast iron.

2.12 VALVES

A. Check Valve

The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the discharge piping. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Working parts will be made of a 300 series stainless steel and nitrile, nylon reinforced synthetic elastomer to ensure corrosion resistance, and fatigue strength. A non-metallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back pressure. The valve body shall be ASTM Class 30 Cast Iron, Powder Coated.

Each grinder pump station shall also include one separate check valve for installation in the 1 1/2" service lateral between the grinder pump station and the sewer main, preferably next to the curb stop.

B. Anti-Siphon Valve

The basin assembly shall be arranged for quick and easy acceptance of an anti-siphon valve in the field when required.

A riser pipe shall extend from the pump discharge between the check valve and the gate valve to within two feet of the surface of the basin. The riser shall be capped. An anti-siphon valve kit shall be supplied to easily assemble to the riser pipe. The valve assembly shall include all materials required to complete the assembly. The anti-siphon valve shall mount horizontally, shall be made of PVC and will not interfere with pump removal or installation.

2.13 CORE UNIT

The Grinder Pump Station shall have cartridge type easily removable core assemblies containing pump, motor, grinder, controls, check valve, anti-siphon valve, electrical quick disconnect and wiring.

2.14 CONTROLS

A simplex pump control panel shall be provided. Enclosure shall be NEMA 4X with ultraviolet stabilized thermoplastic for outdoor installation. Control panel shall include magnetic motor contactor, HOA switch, green pump run indicator, float switch terminal block, control and alarm fuses, control and alarm power indicators, breaker, pump input power and pump connection terminal block, ground lug, and alarm package. Alarm package shall include NEMA 4X red beacon, horn (83 to 85 db), and exterior test/normal/silence switch (all installed in

such a way as to maintain the NEMA 4X rating of the panel). Visual alarm shall remain as long as the high water condition exists in the basin. Both beacon and horn alarms shall automatically reset when the high water condition subsides.

Level detection for controlling pump and alarm operation shall be accomplished by use of three pilot-duty float switches for off, on, and alarm with cord length suitable for the installation site conditions (minimum 20'). Floats shall be high-impact PVC. Cable shall be 18 gauge, 2 conductor.

Panels shall have a lockable latch.

The control assembly shall be part of the U.L.1951 listing. The level controls shall be removable and serviceable without the need for a confined space entry as defined by OSHA or the need to remove the pump.

2.15 JUNCTION BOX

The junction box shall be constructed of structural plastic for corrosion resistance, stability and mechanical strength. The enclosure shall be of adequate thickness and properly reinforced to provide good mechanical strength. The junction box shall have a fully gasketed cover that is held in place by four (4) captive stainless steel screws that cannot be removed from the cover, with heads totally encapsulated so that no metal parts are exposed. The screw heads shall be of adequate size so that they may easily be installed and removed without the use of special tools. The cover shall be fastened to the main body of the junction box by means of totally corrosion-resistant tether to prevent dropping the cover into the basin during service.

An adequate number of sealing-type cord grips shall be supplied for incoming pump and switch cords. The cord grips shall be made of non-corrosive material, such as PVC or nylon, and shall make an effective seal around the wire jacket. The cord grip shall also seal to the junction box wall with an "O" ring, gasket, or other effective means.

The junction box shall have a PVC solvent weld socket type conduit hub mounted in the bottom of the enclosure. The hub shall be of a corrosion resistant material and shall be of adequate size to accommodate the number of wires required to operate the pump.

The incoming wires shall be sealed by an external EYS type seal-off, (supplied by others), so that condensation from the conduit or groundwater will not enter the enclosure. The interior of the enclosure shall be of adequate size to accommodate the wires and connections required to operate the pump.

The wires running between the control panel and the junction box shall be color-coded and fastened to the pump and switch controls by means of adequately sized and insulated twist lock or crimp connectors.

The junction box shall be designed to NEMA 6 standards for occasional submergence.

2.16 OSHA CONFINED SPACE

All maintenance tasks for the grinder pump station must be possible without entry of the grinder pump station (as per OSHA 1910.146 Permit-required confined spaces). *"Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space."*

2.17 CORROSION PROTECTION

All materials exposed to wastewater shall have inherent corrosion protection: i.e., painted cast iron, fiberglass, stainless steel, PVC.

2.18 SAFETY

The Grinder Pump shall be free from electrical and fire hazards as required. As evidence of compliance with this requirement, the completely assembled and wired Grinder Pump Station in its tank shall be listed by Underwriters Laboratories, Inc., to be safe and appropriate for the intended use.

The grinder pump shall meet accepted standards for plumbing equipment, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the National Sanitation Foundation seal.

2.19 WARRANTY

The manufacturer shall provide a 3-year warranty against all factory defects in materials and workmanship from the date of delivery to the project site. The manufacturer's obligation under this warranty shall be the repair or replacement of any parts found to be defective, provided the part or assembly is returned freight prepaid to the manufacturer or authorized service center. The written warranty shall be provided with the shop drawing submittal. It shall be in the name of Perry County Sanitation District No. 1. It may be necessary for the manufacturer to modify its standard written warranty if the warranty period differs from that stated above.

The Contractor shall provide documentation acceptable to the manufacturer of the date of delivery to the project site that shall be the basis for the warranty period.

PART 3 EXECUTION

3.01 DELIVERY

All Grinder Pump units will be delivered to the job site, 100% completely assembled, including testing, ready for installation

3.02 INSTALLATION

Earth excavation and backfill are specified under Section 02200, EARTHWORK, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing. The CONTRACTOR shall be responsible for handling groundwater to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding. The Grinder Pump Stations shall not be set into the excavation until the installation procedures and excavation have been approved by the ENGINEER.

Remove packing material. Users' instructions MUST be given to the OWNER. Hardware supplied with the unit, if required, will be used at installation. The basin will be supplied with a standard 4" inlet grommet (4.50" OD) for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.

Installation shall be accomplished so that 1" to 4" of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the hole must be large enough to allow for the concrete anchor.

A 6" inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8" or more than 3/4" shall be used as bedding material under each unit. A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer's instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. Each Grinder Pump Station with its precast anti-flotation collar shall have a minimum of three (3) lifting eyes for loading and unloading purposes. The unit shall be leveled, and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.

Backfill of clean native earth, free of rocks, roots, and foreign objects (OR BACKFILL AS REQUIRED OR RECOMMENDED BY THE BASIN MANUFACTURER) shall be thoroughly compacted in lifts not exceeding 12" to a final Proctor Density of not less than 85%. Improper backfilling may result in damaged accessways. The Grinder Pump Station shall be installed at a minimum depth from grade to the top of the 1 1/4" discharge line, to assure maximum frost protection. The finish grade line shall be 1" to 4" below the bottom of the lid, and final grade shall slope away from the Grinder Pump Station.

All restoration will be the responsibility of the CONTRACTOR. Per unit costs for this item shall be included in the CONTRACTOR'S bid price for the individual Grinder Pump Stations. The properties shall be restored to their original condition in all respects, including, but not limited to, curb and sidewalk replacement, landscaping, loaming and seeding, and restoration of the traveled ways, as directed by the ENGINEER.

The electrical enclosure shall be furnished, installed and wired to the Grinder Pump Station by the CONTRACTOR. An alarm device is required on every installation, there shall be NO EXCEPTIONS. It will be the responsibility of the CONTRACTOR to coordinate with the individual property owner(s) to determine the optimum location for the control panel and disconnect.

The CONTRACTOR shall mount the control panel and alarm device in a conspicuous location, as per national and local codes.

3.03 START-UP AND FIELD TESTING

The MANUFACTURER shall provide the services of a qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the OWNER'S personnel in the operation and maintenance of the equipment before the stations are accepted by the OWNER. All equipment and materials necessary to perform testing shall be the responsibility of the OWNER or INSTALLING CONTRACTOR. This will include, as a minimum, a portable generator (if temporary power is required) and water in each basin.

Upon completion of the installation, the authorized factory technicians will perform the following test on each station:

- A. Make certain the discharge shut-off valve is fully open. This valve must not be closed when the pump is operating. In some installations, there may be a valve(s) at the street main that must also be open.
- B. Turn ON the alarm power circuit.
- C. Fill the wet well with water to a depth sufficient to verify the high level alarm is operating. Shut off water.
- D. Turn ON pump power circuit. Initiate pump operation to verify automatic "on/off" controls are operative. Pump should immediately turn ON. Within one (1) minute alarm light will turn OFF. *Within three (3) minutes the pump will turn OFF.*

Upon completion of the start-up and testing, the MANUFACTURER shall submit to the ENGINEER the start-up authorization form describing the results of the tests performed for each Grinder Pump Station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed.

PART 4 OPERATION AND MAINTENANCE

4.01 MANUALS

The MANUFACTURER shall supply four (4) copies of Operation and Maintenance Manuals to the OWNER, and one (1) copy of the same to the ENGINEER.

4.02 SPARE CORES

The provision of spare units is critical to the operation of the collection system. Without spare units it would be necessary to leave individual customers without sewer service and with sewage overflowing in their yard for extended periods of time when equipment fails.

The MANUFACTURER shall supply one spare grinder pump core for each full increment of 50 grinder pump units supplied, complete with all operational controls, level sensors, check valve, anti-siphon valve, pump/motor unit and grinder. Cores shall be properly packaged for shipment and storage.

END OF SECTION

SECTION 15100

VALVES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish all labor, materials, equipment, and incidentals required, and install complete and ready for operation, all valves and appurtenances as show on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Excavation, backfill and grading are included in Division 2
- B. Painting is included in Division 9, Section 09960.
- C. Electrical is included in Division 16.

1.03 SYSTEM DESCRIPTION

- A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of wastewater, sludge, water, air or chemicals, depending on the applications.

1.04 QUALITY ASSURANCE

- A. All of the types of valves and appurtenances shall be products of well established firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. All materials of construction shall be of an acceptable type and shall be designated for the pressure and temperature at which they are to be operated, for the materials they are to handle and for the use for which they are intended. The materials shall meet established technical standards of quality and strength necessary to assure safe installations and conform to applicable standards. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

1.05 REFERENCES

- A. Kentucky Basic Building Code.
- B. Kentucky State Plumbing Law, Regulations and Code

1.06 SUBMITTALS

- A. Copies of all materials required to establish compliance with these Specifications shall be submitted in accordance with the provisions of Division 1, Section 01300. Submittals shall include at least the following:
 - 1. Certified drawings showing all important details of construction and dimensions.
 - 2. Descriptive literature, bulletins, and/or catalogs of the equipment.
 - 3. The total weight of each item.
 - 4. A complete total bill of materials.
 - 5. A list of the manufacturer's recommended spare parts.

1.07 OPERATING INSTRUCTIONS

- A. Operating and maintenance instructions shall be furnished to the ENGINEER as provided in Division 1. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc., that are required to instruct operating and maintenance personnel unfamiliar with such equipment.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. General
 - 1. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
 - 2. All valves and appurtenances shall have the name of the maker, flow directional arrows, and the working pressure for which they are designed cast in raised letters on some appropriate part of the body.
 - 3. All buried valves shall open left (counterclockwise). Insofar as possible, all valves shall open counterclockwise.

2.02 VALVES

- A. Plug Valves

Eccentric plug valves shall be used in shut-off applications for pump stations and where the valves are scheduled for infrequent use.

Eccentric plug valves 3 to 12 inches in diameter shall be rated for 175 psi working pressure. The body and cover shall be cast iron conforming to ASTM A126, Class B. Flange ends shall comply with ANSI B16.1, Class 125 standards. Mechanical joint ends shall comply with AWWA C11/ANSI 21.11. The entire seat surface shall be protected by a welded nickel seat of minimum 1/8" thickness. The plug shall be cast iron ASTM A126, Class B. The portion of the plug in the valve body cavity shall be coated with Buna-N rubber using an injection-mold process. Valve bonnet shall be full sealed and bolted to the body for ease of maintenance. The seal between the body and the bonnet shall be an O-ring. Stem packing shall be Buna-N multiple "V" ring stem packing seals, conforming to AWWA C504 and AWWA C507 standards. The packing seal shall be held in place with an adjustable gland follower. Shaft bearings shall be sintered 316 stainless steel for both the upper and lower trunnions. Bearings shall be permanently lubricated. 3" valves shall be quarter-turn and shall be supplied with a position indicator marked at 10 degree increments. Valves 4" and larger shall be equipped with a worm gear operator. Eccentric plug valves shall be Clow F-5412, F-5413, DeZurik PEF or approved equal.

B. Ball Valves

Ball valves shall be used in shut-off applications for residential grinder pump stations.

Ball valves shall be rated for a minimum of 225 psi working pressure. Valves 2 inch and smaller shall be PVC body construction, with EPDM seals, PTFE ball seats, double stem seals. Valves shall operate at full port when open, be a true union with solvent cement socket ends. The valves shall be manufactured by George Fischer, Hayward or approved equal.

C. Swing Check Valves

Check valves for Polyvinyl Chloride (PVC) pipelines shall be swing type and shall meet the material requirements of ASTM Specification D2241-latest revision. The valves shall be PVC body with full flow design. Valves shall have an angle seat and PVC weighted and shielded flapper that will retain a backpressure up to 125 psi. The valves shall be manufactured by Flo Control Inc., DeZurik or approved equal.

1. When there is no flow through the line, the weighted flapper shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the water-way to allow full flow.
2. Valves shall be so constructed that the body may easily be removed and replaced without removing the valve from the line.

D. Y Check Valves

Check valves for PVC pipelines shall be Y-type. The valves shall be PVC body with Viton seals, rated for 150 psi working water pressure. The disk

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guide shall be a PVC coil. The valves shall be manufactured by George Fischer, Hayward, or approved equal.

1. Valves shall be so constructed that the plunger assembly can be easily accessed for cleaning.
2. Valves shall be so constructed such full flow may be achieved. Minimal back pressure shall be necessary to seat the plunger.

E. Sewage Air/Vacuum Valves

1. Sewage Air/Vacuum Valves shall be furnished and installed at the locations shown on the PLANS. The valves shall be combination air valves for sewage as manufactured by A.R.I Flow Control Accessories sewage, Kfar Charuv, 12932 Israel or approved equal.
2. The valves shall be the size shown on the PLANS and be A.R.I Model D-025 or approved equal.
3. The valves shall be designed to allow entrapped air to escape from the pipeline when pumps are started and close water tight when liquid enters the valves. When the sewage line is filled, the valves shall allow air to reenter when draining, to prevent vacuum or water column separation. The valves shall allow unrestricted venting or re-entry of air through it, during filling or draining of the force main. The complete valve shall withstand 500 psi test pressure.
4. Inlet and outlet blow off valves, and five (5) feet of hose for flushing shall be provided with each valve. Fittings shall be $\frac{3}{4}$ " hose connections.
5. The body and cover of each valve assembly shall be constructed of reinforced nylon. The lower float, stem and hardware shall all be constructed of 316 stainless steel conforming to ASTM A240. The upper float shall be constructed of foamed polypropylene. The seal plug assembly, shall be constructed of reinforced nylon. O-rings shall be constructed of Buna-N rubber.

F. Air Release Valves

1. Air Release Valves shall be furnished and installed at the locations shown on the PLANS. The valves shall be kinetic air valves for sewage as manufactured by A.R.I Flow Control Accessories sewage, Kfar Charuv, 12932 Israel or approved equal.
2. The valves shall be the size shown on the PLANS and be ARI Model K-020 or approved equal.

3. The valves shall be designed to allow entrapped air to escape from the pipeline when pumps are started and close water tight when liquid enters the valves. The complete valve shall withstand 500 psi test pressure.
4. Inlet and outlet blow off valves, and five (5) feet of hose for flushing shall be provided with each valve. Fittings shall be ¾" hose connections.
5. The body and cover of each valve assembly shall be constructed of reinforced nylon. The lower float, stem and hardware shall all be constructed of 316 stainless steel conforming to ASTM A240. The upper float shall be constructed of foamed polypropylene. The stopper shall be constructed of acetyl rubber. O-rings shall be constructed of Buna-N rubber.

G. Mud Valves

1. Mud valves shall be of the iron body, bronze mounted type with non-rising stems, flanged ends, extension stem with t-bar. The frame, yoke and gate shall be sturdily proportioned for strength and rigidity and be of cast iron conforming to ASTM specifications A126, Class B. the stem, stem nuts and seats shall be bronze. The stem shall be machined with accurately cut threads. The valves shall be Troy-Valve A-25600, Trumbull Manufacturing, Inc. or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the ENGINEER before they are installed.
- B. After installation, all valves and appurtenances shall be tested at least one hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the ENGINEER.
- C. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the OWNER.
- D. Buried valves and valve boxes shall be set with the valve stem vertically aligned in the center of the box. Valves shall be set on firm foundation and supported by tamping selected excavated material under the sides of

the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade.

3.02 SHOP PAINTING

- A. Interior surfaces of all valves, the exterior surfaces of buried valves, and miscellaneous piping appurtenances shall be given a shop finish of an asphalt varnish conforming to Federal Specification TT-V51e for Varnish Asphalt.
- B. The exterior surface of various parts of the valves, operators, and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer, such as Inertol Primer No. 621, shall be applied in accordance with the instructions of the paint manufacturer.
- C. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.
- D. Field painting is specified under Division 9, Section 09960.

3.03 INSPECTION AND TESTING

- A. The various pipelines in which the valves and appurtenances are to be installed are specified to be field tested. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the ENGINEER.
- B. Various valves, or appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the ENGINEER.

END OF SECTION

SECTION 16100

GENERAL PROVISIONS

PART 1 GENERAL

- 1.01 The General and Special Conditions and all other CONTRACT DOCUMENTS are applicable to WORK under this section of the SPECIFICATIONS. All the WORK under this section of the SPECIFICATIONS shall be governed by any alternates and unit prices called for in the FORM OF PROPOSAL insofar as they affect this portion of the WORK.
- 1.02 Include furnishing of all labor, materials, equipment and other related items required to complete the WORK called for and indicated on the CONTRACT DRAWINGS and specified for a complete system, including excavation, backfilling and tamping. Classification of excavation and payment for same shall be in accordance with applicable provisions of these SPECIFICATIONS.
- 1.03 Abbreviations of organizations and publications:
- | | | |
|-------|---|---|
| NEC | - | National Electrical Code |
| UL | - | Underwriters Laboratories, Inc. |
| IPCEA | - | Insulated Power Cable Engineers Association |
| ANSI | - | American National Standards Institute |
| OSHA | - | Occupational Safety Health Act |
- 1.04 All materials shall be new and the best of their respective kinds unless otherwise specified and shall be listed by the UL and shall be so labeled. All equipment shall conform to the latest approved standards of the IEEE, NEMA, ANSI and OSHA.

PART 2 COOPERATION

- 2.01 Check with other trades on the scope of their WORK and coordinate on all locations of various items of equipment and outlets before they are finally placed and connected. Any relocation of material or equipment necessitated by failure to coordinate WORK shall be at no cost to the OWNER.
- 2.02 Do not cut the WORK of any other trade without first consulting the ENGINEER'S representative. Repair any WORK damaged employing the services of the trade whose WORK is damaged.

PART 3 SCOPE

- 3.01 The WORK covered by this section of the CONTRACT shall include the furnishing of all labor, materials, tools and equipment necessary to complete the electrical WORK as herein specified, or implied and as shown or implied on the CONTRACT DRAWINGS.
- 3.02 The CONTRACTOR shall note that most of the electrical conduit, boxes and wiring are existing. The CONTRACTOR shall visit the site prior to BID and satisfy

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themselves as to the extent of existing WORK and new WORK required to complete the project as indicated. Submission of a BID will be interpreted that the visit has been done and no extra will be allowed for additional WORK as a result of not doing the inspection of existing conditions.

PART 4 DRAWINGS AND SPECIFICATIONS

- 4.01 The CONTRACT DRAWINGS and SPECIFICATIONS are intended to cover all WORK enumerated under the respective headings. Examine all CONTRACT DRAWINGS and SPECIFICATIONS to determine any references to WORK of an electrical nature and be guided accordingly in prosecuting the electrical WORK. The CONTRACT DRAWINGS are diagrammatic only, as far as final location is concerned. Any item of WORK not clearly included, specified or shown, and any errors or conflict between CONTRACT DRAWINGS, SPECIFICATIONS, codes and field conditions shall be clarified by a written request to the ENGINEER prior to bidding, otherwise all labor and materials required to make good any damage or defect in finished WORK caused by such error, omission or conflict shall be provided at no additional cost to the OWNER.

PART 5 CODE COMPLIANCE, INSPECTION AND CERTIFICATES

- 5.01 The minimum standards for all electrical WORK shall be the 1996 revision of the NEC. Whenever and wherever OSHA and/or federal, state and/or local laws or regulations and/or design require higher standards than the NEC, then these laws and/or regulations and/or design shall be followed.
- 5.02 Furnish electrical inspection by a licensed electrical inspector. Notify the electrical inspector in writing, immediately upon the start of the WORK with a copy of the notice to the ENGINEER. The inspector shall be scheduled for rough as well as finished WORK. Approval from the electrical inspector will not be allowed as reason for deviation from the CONTRACT DRAWINGS and SPECIFICATIONS. All cost incidental to the electrical inspection shall be borne by the CONTRACTOR.

PART 6 CLEANING

- 6.01 At the completion of the WORK required under this contract and just prior to acceptance by the OWNER, thoroughly clean all exposed equipment fittings, fixtures and accessories.

PART 7 CONNECTIONS TO EQUIPMENT BY OTHERS

- 7.01 Provide all conduit, boxes and wire with required connections, including any disconnect switches required by NEC to all electrically powered or controlled equipment furnished and set in place by others. Examine all divisions of the SPECIFICATIONS and all CONTRACT DRAWINGS to determine location and size of all electrically powered or controlled equipment.

PART 8 PHASING

- 8.01.1 Verify the rotation of all three phase motors with the trade furnishing equipment. These motors shall be "bumped" or run uncoupled in the presence of the trade furnishing the equipment to insure proper rotation.

PART 9 SPECIAL NOTE

- 9.01.1 All openings in electrical equipment, enclosures, cabinet outlets and junction boxes shall be by means of standard knockouts or shall be sawed or drilled. The use of a cutting torch is prohibited.

PART 10 PIPE SLEEVES AND FIRE RATING OF OPENINGS

- 10.01 Wherever conduit pass through floor slabs in other than slab on grade construction, steel sleeves shall be provided for each conduit. Sleeves shall project 3/8" above slab and spaces between conduit and sleeves shall be caulked with a material which will provide a fire rating substantially the same as the unpierced floor.
- 10.02 Holes through walls and ceilings, chases, shafts, etc., for the passage of cable or conduit shall be made so as to substantially preserve the integrity of the fire rating of such surfaces or passages in accordance with NEC 300-21.
- 10.03 Where conduit penetrates the roof, such penetration shall be through an opening approved by manufacturer of the roof.

PART 11 EXCAVATION AND BACKFILLING

- 11.01 Perform all excavation and backfilling required for completion of WORK indicated on the CONTRACT DRAWINGS and specified herein. Classification of excavation and prices for excavation shall be in accordance with the applicable division of these SPECIFICATIONS.
- 11.02 Backfill material for conduit or direct bury cable unless otherwise specified and/or noted on the DRAWINGS shall be clean earth, free from rock and debris, thoroughly tamped in six inch (6") layers to the finished grade.
- 11.03 During the progress of the project, the premises shall be kept reasonably clean and free from accumulate rubbish and debris. Proper care shall be exercised to protect all trees, shrubbery, and etc., in the vicinity of the work. All surplus earth shall be disposed of as directed by the ENGINEER.
- 11.04 Compaction of backfill in place shall be 95% of maximum density.

PART 12 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

- 12.01 At completion of the CONTRACT, the OWNER shall be provided with two (2) bound copies of operations and maintenance instructions for the various items of the electrical equipment, including existing motor control center, new panelboards, service equipment, lighting fixtures, etc.

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- 12.02 In addition to manufacturer's approved SHOP DRAWINGS, manual shall include: (a) A listing of equipment (identified in accordance with the DRAWINGS nomenclature, e.g. LF-1, M.D.P. etc.) and distribution or supplier of the equipment. In case of lighting fixtures, the type replacement lamp including recommended voltage and other necessary designation shall be included.
- 12.03 Instructions shall be included for routine checking of circuit breakers and fused switches.

PART 13 LABELING

- 13.01 All lighting and power panels, telephone cabinets, switches in distribution equipment, safety switches for remote equipment and all other items noted for labeling shall be properly identified in accordance with the designations shown on the DRAWINGS or the function they perform. This paragraph applies to both new and existing equipment.
- 13.02 Labels shall be 1/4" high, white letters on laminated phenolic engraving stock suitably cemented to the inside of the recessed panels and on the face of surface mounted panels and other equipment.

PART 14 FISH WIRE

- 14.01 All conduit required under this contract which do not receive conductors, shall be provided with a 14 gauge galvanized steel fish wire or approved nylon wire.

PART 15 "OR EQUAL" CLAUSE

- 15.01 The SPECIFICATIONS covering this WORK are open; wherever a specific manufacturer's item is specified, it is intended as a standard to be met and items which are approved equal or superior will be accepted.

PART 16 WARRANTY

- 16.01 CONTRACTOR shall include in BID price the warranty of all labor and equipment that is a part of this CONTRACT, including existing equipment that is reused, for a period of one year from the date of final completion.

END OF SECTION

SECTION 16135
UNDERGROUND DUCTS AND MANHOLES

PART 1 GENERAL

1.01. SUMMARY

- A. Section Includes:
 - 1. Ducts.
 - 2. Duct banks.
 - 3. Manholes.
 - 4. Handholes.

1.02 DEFINITIONS

- A. Duct: General term for electrical conduit and other raceway, either metallic or nonmetallic, specified for use underground, embedded in earth or concrete.
- B. Duct Bank: Group of 2 or more ducts in continuous run between 2 points.
- C. Underfloor Conduits.
 - 1. Conduits which run underground within perimeter of building walls under building floor. This may consist of 1 conduit or several conduits grouped together.
- D. Duct Bank Conduits
 - 1. Conduits which run under ground outside perimeter of building walls. This may consist of 1 conduit, or several conduits grouped together.
- E. Underground Conduits
 - 1. Underground conduits are both underfloor conduits and duct bank conduits.
- F. Handhole: Below-the-surface enclosure in connection with ducts into which people reach, but do not enter, for purpose of installing, operating, or maintaining equipment or wiring.
- G. Manhole: Below-the-surface enclosure or chamber, large enough for person to enter, connecting with ducts and affording facilities for installing, operating, and maintaining equipment or wiring.

1.03 SUBMITTALS

- A. Submittals are not required if CONTRACTOR supplies materials or equipment of specified or named manufacturers. If CONTRACTOR proposes substitutions to material or equipment of specified or named manufacturers, submittals identified below are required.
 - 1. Product data.
 - 2. Submit in accordance with Section 01340.

1.04 QUALITY ASSURANCE

- A. Items provided under this section shall be listed or labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).
 - 1. Term "NRTL" shall be as defined OSHA Regulation
 - 2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article 100.
- B. Regulatory Requirements:
 - 1. National Electrical Code (NEC): Components and installation shall comply with National Fire Protection Association (NFPA) 70.

1.05 SEQUENCING AND SCHEDULING

- A. Coordination of Work:
 - 1. Coordinate layout and installation of manholes and handholes with final arrangement of ducts as influenced by actual final location of other utilities in field.
 - 2. Coordinate elevations of duct and raceway entrances into manholes and handholes with final profiles of ducts and raceways as determined by coordination with other utilities, underground obstructions and buildings
 - 3. Establish locations and elevations to suit field conditions and assure duct runs drain to manholes, handholes, or as shown on Drawings.

PART 2 PRODUCTS

2.01 DUCTS AND FITTINGS

- A. Comply with Section 16050.

2.02 CAST-IN-PLACE CONCRETE

- A. Comply with Section 03300 for concrete and Section 03200 for reinforcing.
- B. Aggregate For Duct Encasement: 3/8 in. maximum size.
- C. Strength: 3,000 psi minimum 28 day compressive strength.

2.03 DUCT BANK ACCESSORIES

- A. Duct Supports: Rigid PVC spacers selected to provide minimum duct spacings and concrete cover depths indicated, while rigidly supporting ducts during concreting.

2.04 RACEWAY/DUCT SEALING COMPOUND

- A. Compound:
 - 1. Nonhardening, putty-like consistency workable at temperatures as low as 35°F.
 - 2. Compound shall not slump at temperature of 300°F and shall readily adhere to clean surfaces of plastic" ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.

PART 3 EXECUTION

3.01 WIRING METHOD

- A. General: Install ducts for wiring runs indicated. Provide sizes as indicated.
- B. Duct Banks: Rigid nonmetallic conduit, Schedule 40, encased in concrete

3.02 EXCAVATION AND BACKFILL

- A. Conform to Section 02316 except as modified below:
 - 1. Do not use heavy-duty, hydraulic-operated compaction equipment.
 - 2. Excavation: Cut trenches neatly and uniformly, and slope uniformly to required pitch.

3.03 INSTALLATION OF DUCTS

- A. Slope: Pitch ducts to drain towards manholes and handholes and away

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from buildings and equipment unless otherwise shown on Drawings. Minimum slope shall be 4 in. in 100 ft. Where necessary to achieve this between manholes, slope ducts from high point in run to drain in both directions.

- B. Curves and Bends: Use manufactured elbows for stub-ups at equipment and at building entrances; For other curves and bends, except as otherwise indicated, use manufactured long sweep bends with minimum radius of 24 in. in both horizontal and vertical directions.
- C. Make joints in ducts and fittings watertight in accordance with manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
- D. Duct Entrances to Manholes and Handholes: End bells spaced approximately 10 in. center to center for 5 in. ducts and varied proportionately for other duct sizes. Change from regular spacing to end bell spacing shall start 10 ft from end bell and shall be made without reducing duct line slope and without forming trap in line. Grout end bells into manhole walls from both sides to provide watertight entrances. Provide groundable end bushings on metal ducts and connect to system grounding conductor.
- E. Duct Entrances to Buildings: Transformations from underground PVC duct to steel conduit shall be made 10 ft. minimum, outside building wall and shall use fittings manufactured for purpose. Install in accordance with following:
 - 1. Concrete-Encased Ducts: Install reinforcing in duct banks through disturbed earth near buildings and excavations and coordinate duct bank with structural design at wall so duct bank is supported at wall without reducing structural or watertight integrity.
 - 2. Waterproof Entrances: Where ducts enter buildings through waterproofed floor or wall, watertight' entrance-sealing device shall be installed with sealing gland assembly on inside. Anchor device securely into masonry construction with 1 or more integral flanges and membrane waterproofing secured to device in permanently watertight manner.
- F. Concrete-Encased Ducts: Support on plastic separators coordinated with duct size and required duct spacing, -and install in accordance with following:
 - 1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, and secure separators to earth and to ducts to prevent floating during concreting. Do not use tie wires or reinforcing steel in such way as to form conductive or magnetic loops around ducts or duct groups.
 - 2. Reinforcing: Reinforce duct banks. Size and arrange reinforcing

steel as indicated on Drawings.

3. Concreting: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not use power-driven agitating equipment unless specifically designed for duct bank application. Pour each run of envelope between manholes or other terminations in one continuous operation unless approved by ENGINEER, Where more than 1 pour is necessary, terminate each pour in vertical plane and continue ductbank reinforcing minimum of 18 in. beyond termination of pour.
 4. Forms: Walls of trench may be used to form side walls of duct bank. provided soil is self-supporting and concrete envelope can be poured without soil inclusions. Use forms where soil is not self-supporting.
 5. Minimum Clearances: 3 in. between ducts and exterior envelope wall, 3 in. between ducts for like services, and 6 in. between power and ducts for other systems.
 6. Depth: Except as otherwise indicated, top of duct bank shall be 24 in. below finished grade, minimum, in nontraffic areas, and 30 in. below finished grade, minimum, in vehicular traffic areas.
- G. Stub-ups: Duct stub-ups to equipment shall be galvanized rigid steel. For equipment mounted on outdoor concrete pads, steel conduit shall extend minimum of 5 ft away from edge of pad. Install insulated grounding bushings on terminations. Couple steel conduits to ducts with adapters designed for purpose and encased concrete.
- H. Sealing: For ducts to be wired in this Project, provide temporary closure at terminations. For spare ducts, seal bore of ducts at terminations. Use sealing compound and plugs as required to withstand 15 psi minimum hydrostatic pressure.
- I. Pulling Cord: Provide 100 lb test nylon cord in ducts including spares.
- J. Marker Tape: Provide plastic marker, tape over ducts at 12in. below finished grade.

3.04 TESTING

A. Field Quality Control:

1. Grounding: Test manhole grounding provisions to ensure electrical continuity of bonding and grounding connections. Make ground-resistance test at each ground rod and submit report of results. Use an instrument specifically designed for ground-resistance measurements.

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2. Duct Integrity: Rod ducts with mandrell 1/4 in. smaller in diameter than internal diameter of ducts. Where rodding indicates obstructions in ducts, remove obstructions and retest.
3. Water Tightness: Make internal inspection of manholes/handholes three months after completion of construction for indications of water ingress. Where leakage is noted, remove water found and seal leakage sources. Reinspect after 2 months and reseal remaining leakage sources. Repeat process at two month intervals until leakage is corrected.

3.05 CLEANING AND RESTORATION

- A. Clean Ducts: Clean full length of ducts with round bristle brush with dia 1/2 in. greater than internal diameter of duct.

3.06 RESTORATION

- A. Restore surface features at areas disturbed by excavation and reestablish original grades except as otherwise indicated.
- B. Where sod has been removed, replace it as soon as possible after backfilling is completed.
- C. Restore all areas disturbed by trenching, storing of dirt, cable laying, and other work to their original condition.
- D. Include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, or mulching.
- E. Restore disturbed paving as indicated.

END OF SECTION

2.03 PUMP SCHEDULE

Pump Station	Flow (gpm)	Head (TDH)	Make	Model	Impeller (in)	Speed (rpm)	Power (HP)
Combs Pump Station*	321	145	Myers or ABS or Equivalent	4RCX-M2	6.63	3500	50
				AFP 1035.2 ME250/2	Type 2	2900	34
Cherokee Hills Pump Station*	180	96	Myers or ABS or Equivalent	4RHX-M2	6.13	3500	20
				AFP 1034.8 ME150/2	Type 8	2900	27
Frogtown Pump Station*	185	142	Myers or ABS or Equivalent	4RCX-M2	6.38	3500	40
				AFP 1035.5 ME200/2	Type 8	2900	20
Grinder Pump	43	126	Myers	WG75H	6.25	3500	7.5

*Notes: All motors shall be 230V / 3-phase.
All pumps shall have a 4" discharge diameter.
Myers Pumps are preferred to match existing system.

PART 3 EXECUTION

3.01 PAINTING

A. Painting shall be in accordance with Division 9.

3.02 FIELD SERVICE

A. A qualified manufacturer's representative shall inspect the installation and be present at the initial start-up and pump tests to confirm each pump capacity and efficiency.

3.03 INSTALLATION

A. Work shall be performed in a workmanship manner in accordance with manufactures recommendations.

END OF SECTION

SECTION 11312

GRINDING LIFT STATIONS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

The CONTRACTOR shall furnish all labor, materials, equipment and services for manufacturing, assembling, delivering, installing, testing and placing in service the sewage pumping station including pumps, motors, controls, basins and appurtenances.

1.02 DEFINITIONS

When the term "pumping unit" is used, it shall be deemed to mean a pump or pumps, complete with, but not limited to, drive motor, accessories, appurtenances and all associated equipment.

1.03 CONTRACT DRAWINGS

The contract drawings are intended to show a general arrangement of pumping equipment, controls, connected piping and valves. The pump manufacturer shall furnish each pumping unit complete with motor and all components necessary for the intended function of the unit.

1.04 RELATED WORK

- A. Special and general requirements for WORK are included in Divisions 0 and 1.
- B. Piping is specified in Division 15.
- C. Valves are included in Division 15.
- D. Electrical is specified in Division 16.

1.05 SUBMITTALS

- A. SHOP DRAWINGS shall be submitted in accordance with Division 1, Section 01300.
- B. SHOP DRAWINGS shall include detail installation drawings and dimensions as well as performance data.
- C. SHOP DRAWINGS shall include the specified warranty.
- D. The CONTRACTOR shall provide operation and maintenance manuals in accordance with Division 1, Section 01300.

1.06 OPERATING CONDITIONS

The pump shall have a capacity of 0 GPM at a total head of 145 feet (shutoff condition), 80 GPM at a total head of 105 feet, a maximum flow of 43 GPM at a total head of 125 feet and shall use a 7.5 HP motor operating at 3500 RPM. Motor shall be non-overloading over the entire performance curve.

1.07 FIELD TESTING

- A. After start-up of the pumps, the CONTRACTOR shall perform field testing to verify the pump head, capacity and efficiencies are in compliance with the performance curve.
- B. The CONTRACTOR shall furnish test equipment as necessary, including but not limited to direct-reading RMS wattmeter with potential and current transformers, calibrated test gages, calibrated flow measuring device, and a sufficient supply of water.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the complete requirement of these SPECIFICATIONS, manufacturers offering products which may be incorporated into the WORK include but are not limited to the following:
 - 1. Myers Pumps
 - 2. Liberty Pumps
 - 3. or approved equal
- B. If pumps are proposed other than those specified herein, all grinder pump stations incorporated into this contract shall contain pumps of a common manufacturer.
- C. Pump shall meet the performance of the Myers Pumps WG75H Series two-stage, 7.5 HP, submersible grinder pump or approved equal.

2.02 PUMP

Castings shall be constructed of class 25 cast iron. The motor housing shall be oil filled to dissipate heat. All mating parts shall be machined and sealed with a Buna-N o-rings. All fasteners exposed to the liquid shall be stainless steel. The motor shall be protected on the top side with a sealed cord entry plate with molded pins to conduct electricity, eliminating the ability of water to enter internally through the cord. The motor shall be protected on the lower side with a dual seal arrangement. The first seal shall be a double lip seal molded in FKM fluoroelastomer or Buna N. The second / main seal shall be a unitized hard face silicon carbide seal with stainless steel housings and spring. The upper and

lower bearing shall be capable of handling all radial thrust loads. The lower bearing shall have the additional ability to handle the downward axial thrust produced by the impeller and cutters by design of angular contact roller races. The pump housing shall be of the concentric design thereby equalizing the pressure forces inside the housing which will extend the service life of the seals and bearings. Additionally there shall be no cutwater in the housing volute in order to discourage the entrapment of flowing debris. The pump shall be furnished with a stainless steel handle having a nitrile grip.

The exterior of the casting shall be protected with powder coat paint. All exposed hardware shall be stainless steel.

2.03 GRINDER

The cutter and plate shall consist of 440 stainless steel with a Rockwell C hardness of 55-60. The stationary cutter plate shall have specially designed orifices through it, which enable the slurry to flow through the pump housing at an equalized pressure and velocity. The stationary cutter shall consist of V shapes to maximize cutting action and arc shape exclusion slots to outwardly eject debris from under the rotary cutter. The rotary cutter shall have 4 blades and be designed with a recessed area behind the cutting edge to prevent the accumulation and binding of any material between rotary cutter and the stationary cutter. The cutting system must incorporate close tolerances for optimum performance. Ring or radial cutters, or those that grind on the outside circumference shall not be acceptable.

The grinding assembly shall operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. In order to demonstrate adequate flow velocity and grinding capability, the grinder pump shall be capable of passing a series of stringy type solids (diapers, rags, feminine products, etc.) through the pump without roping or winding the material in or immediately below the pump suction.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects", such as paper, wood, plastic, glass, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4" diameter discharge piping.

2.04 IMPELLER

The impeller shall be an investment cast stainless steel impeller, with pump out vanes on the back shroud to keep debris away from the seal area. It shall be keyed and bolted to the motor shaft.

2.05 BEARINGS AND SHAFT

An upper radial and lower thrust bearing shall be required. The upper bearing shall be a single ball / race type bearing. The lower bearing shall be an angular contact heavy duty ball / race type bearing, designed to handle axial grinder

pump thrust loads. Both bearings shall be permanently lubricated by the oil, which fills the motor housing. The bearing system shall be designed to enable proper cutter alignment from shut off head to maximum load at 145' of TDH. The motor shaft shall be made of 300 or 400 series stainless steel and have a minimum diameter of 6.25".

2.06 ELECTRIC MOTOR

Single phase motors shall be oil filled, capacitor start/capacitor run, 240 volt, class B insulated NEMA B design, rated for continuous duty. At maximum load the winding temperature shall not exceed 135 degrees C un-submerged. Since air filled motors are not capable of dissipating heat they shall not be considered equal. Single phase pump motors shall have an integral thermal overload switch in the windings for protecting the motor. The capacitor circuit shall be mounted internally on single phase pumps. Single phase motors shall have an integral solid state starting circuit-switch for switching the start winding off.

2.07 SEALS

The pump shall have a dual seal arrangement consisting of a lower and upper seal to protect the motor from the pumping liquid. The lower seal shall be a FKM fluoroelastomer OR Buna N molded double lip seal, designed to exclude foreign material away from the main upper seal. The upper seal shall be a unitized silicon carbide hard face seal with stainless steel housings and spring equal to Crane Type T-6a. The motor plate / housing interface shall be sealed, with a Buna-N o-ring.

2.08 POWER CORD

The submersible pump shall be supplied with 25 feet of multiconductor power cord. It shall be cord type SJOOW (1-phase) or SEOOW (3-phase), capable of continued exposure to the pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a water tight compression fitting cord plate assembly, with molded pins to conduct electricity. This will eliminate the ability of water enter internally through the cord, by means of a damaged or wicking cord.

2.09 BASIN

The basin diameter, minimum depth, and other dimensions shall be as shown on the Drawings.

The basin shall be fiberglass reinforced polyester resin with a minimum 3" ballast support flange. The basin shall be furnished with one flexible inlet flange (shipped loose to facilitate field location) to accept a 4.50" OD DWV pipe. Inlet location can vary to accommodate ease of installation. Basin capacities and dimensions shall be as shown on the contract drawings or as specified herein. The basin FRP wall laminate thickness shall vary with the wetwell depth to provide the aggregate strength to meet the tensile and flexural physical property requirements. The basin FRP wall laminate must be designed to withstand wall

collapse or buckling based on a hydrostatic pressure equivalent to a saturated soil weight of 120 pounds per cubic foot. Basin must comply with the pipe stiffness values as specified in ASTM D 3753. The basin laminate must be constructed to withstand or exceed 150% of the assumed loading on any depth. The finished FRP laminate will have a Barcol hardness of at least 90% of the resin manufactures specified hardness for the fully cured resin. The Barcol Hardness shall be the same for both interior and exterior surfaces. Manufacturer must submit documentation including calculation and production certification that basin (s) on the project are in compliance with the above requirements.

If basin manufacturer does not recommend backfill of the basin with native earth then manufacturer's backfill requirements/recommendations shall be clearly stated in the shop drawing submittal. Contractor shall install basin in accordance with manufacturer's recommendations.

All piping inside the basin silhouette shall be at a level in the station that is as shown on the Drawings.

Basin shall be UL Listed to Standard 1951.

Basin top shall be 5/16" thick fiberglass, green in color, with anti-skid surface. It shall have a 3" unscreened mushroom vent.

All discharge piping shall be constructed of schedule 40 PVC. The manufacturer shall guarantee all bulkhead penetrations watertight.

2.10 STATION CONFIGURATION

Basins shall be supplied in a wet well configuration as shown on the Drawings. Wet well must have minimum storage volumes above alarm level according to the following table:

Overall Station Height	Minimum Reserve Storage Above Alarm Level
48"	35.7 gallons
60"	59.2 gallons
72"	82.7 gallons
84"	106.2 gallons
96"	129.7 gallons
108"	153.2 gallons
120"	176.7 gallons

2.11 PUMP REMOVAL SYSTEM

Each basin shall be equipped with a 300 series stainless steel "C" channel rail assemblies, one for each pump, to facilitate removal of the pump from ground level. A 1/2" diameter polypropylene rope shall be supplied for each pump. Pump removal system must not require the loosening of fasteners to facilitate pump removal and shall provide for automatic alignment and re-connection of

discharge piping for the replacement pump. Pump replacement shall be accomplished while the basin is full of sewage without the need to de-water the basin. Pump base shall be cast iron.

2.12 VALVES

A. Check Valve

The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the discharge piping. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Working parts will be made of a 300 series stainless steel and nitrile, nylon reinforced synthetic elastomer to ensure corrosion resistance, and fatigue strength. A non-metallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back pressure. The valve body shall be ASTM Class 30 Cast Iron, Powder Coated.

Each grinder pump station shall also include one separate check valve for installation in the 1 1/2" service lateral between the grinder pump station and the sewer main, preferably next to the curb stop.

B. Anti-Siphon Valve

The basin assembly shall be arranged for quick and easy acceptance of an anti-siphon valve in the field when required.

A riser pipe shall extend from the pump discharge between the check valve and the gate valve to within two feet of the surface of the basin. The riser shall be capped. An anti-siphon valve kit shall be supplied to easily assemble to the riser pipe. The valve assembly shall include all materials required to complete the assembly. The anti-siphon valve shall mount horizontally, shall be made of PVC and will not interfere with pump removal or installation.

2.13 CORE UNIT

The Grinder Pump Station shall have cartridge type easily removable core assemblies containing pump, motor, grinder, controls, check valve, anti-siphon valve, electrical quick disconnect and wiring.

2.14 CONTROLS

A simplex pump control panel shall be provided. Enclosure shall be NEMA 4X with ultraviolet stabilized thermoplastic for outdoor installation. Control panel shall include magnetic motor contactor, HOA switch, green pump run indicator, float switch terminal block, control and alarm fuses, control and alarm power indicators, breaker, pump input power and pump connection terminal block, ground lug, and alarm package. Alarm package shall include NEMA 4X red beacon, horn (83 to 85 db), and exterior test/normal/silence switch (all installed in

such a way as to maintain the NEMA 4X rating of the panel). Visual alarm shall remain as long as the high water condition exists in the basin. Both beacon and horn alarms shall automatically reset when the high water condition subsides.

Level detection for controlling pump and alarm operation shall be accomplished by use of three pilot-duty float switches for off, on, and alarm with cord length suitable for the installation site conditions (minimum 20'). Floats shall be high-impact PVC. Cable shall be 18 gauge, 2 conductor.

Panels shall have a lockable latch.

The control assembly shall be part of the U.L.1951 listing. The level controls shall be removable and serviceable without the need for a confined space entry as defined by OSHA or the need to remove the pump.

2.15 JUNCTION BOX

The junction box shall be constructed of structural plastic for corrosion resistance, stability and mechanical strength. The enclosure shall be of adequate thickness and properly reinforced to provide good mechanical strength. The junction box shall have a fully gasketed cover that is held in place by four (4) captive stainless steel screws that cannot be removed from the cover, with heads totally encapsulated so that no metal parts are exposed. The screw heads shall be of adequate size so that they may easily be installed and removed without the use of special tools. The cover shall be fastened to the main body of the junction box by means of totally corrosion-resistant tether to prevent dropping the cover into the basin during service.

An adequate number of sealing-type cord grips shall be supplied for incoming pump and switch cords. The cord grips shall be made of non-corrosive material, such as PVC or nylon, and shall make an effective seal around the wire jacket. The cord grip shall also seal to the junction box wall with an "O" ring, gasket, or other effective means.

The junction box shall have a PVC solvent weld socket type conduit hub mounted in the bottom of the enclosure. The hub shall be of a corrosion resistant material and shall be of adequate size to accommodate the number of wires required to operate the pump.

The incoming wires shall be sealed by an external EYS type seal-off, (supplied by others), so that condensation from the conduit or groundwater will not enter the enclosure. The interior of the enclosure shall be of adequate size to accommodate the wires and connections required to operate the pump.

The wires running between the control panel and the junction box shall be color-coded and fastened to the pump and switch controls by means of adequately sized and insulated twist lock or crimp connectors.

The junction box shall be designed to NEMA 6 standards for occasional submergence.

2.16 OSHA CONFINED SPACE

All maintenance tasks for the grinder pump station must be possible without entry of the grinder pump station (as per OSHA 1910.146 Permit-required confined spaces). *"Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space."*

2.17 CORROSION PROTECTION

All materials exposed to wastewater shall have inherent corrosion protection: i.e., painted cast iron, fiberglass, stainless steel, PVC.

2.18 SAFETY

The Grinder Pump shall be free from electrical and fire hazards as required. As evidence of compliance with this requirement, the completely assembled and wired Grinder Pump Station in its tank shall be listed by Underwriters Laboratories, Inc., to be safe and appropriate for the intended use.

The grinder pump shall meet accepted standards for plumbing equipment, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the National Sanitation Foundation seal.

2.19 WARRANTY

The manufacturer shall provide a 3-year warranty against all factory defects in materials and workmanship from the date of delivery to the project site. The manufacturer's obligation under this warranty shall be the repair or replacement of any parts found to be defective, provided the part or assembly is returned freight prepaid to the manufacturer or authorized service center. The written warranty shall be provided with the shop drawing submittal. It shall be in the name of Perry County Sanitation District No. 1. It may be necessary for the manufacturer to modify its standard written warranty if the warranty period differs from that stated above.

The Contractor shall provide documentation acceptable to the manufacturer of the date of delivery to the project site that shall be the basis for the warranty period.

PART 3 EXECUTION

3.01 DELIVERY

All Grinder Pump units will be delivered to the job site, 100% completely assembled, including testing, ready for installation

3.02 INSTALLATION

Earth excavation and backfill are specified under Section 02200, EARTHWORK, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing. The CONTRACTOR shall be responsible for handling groundwater to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding. The Grinder Pump Stations shall not be set into the excavation until the installation procedures and excavation have been approved by the ENGINEER.

Remove packing material. Users' instructions MUST be given to the OWNER. Hardware supplied with the unit, if required, will be used at installation. The basin will be supplied with a standard 4" inlet grommet (4.50" OD) for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.

Installation shall be accomplished so that 1" to 4" of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the hole must be large enough to allow for the concrete anchor.

A 6" inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8" or more than 3/4" shall be used as bedding material under each unit. A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer's instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. Each Grinder Pump Station with its precast anti-flotation collar shall have a minimum of three (3) lifting eyes for loading and unloading purposes. The unit shall be leveled, and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.

Backfill of clean native earth, free of rocks, roots, and foreign objects (OR BACKFILL AS REQUIRED OR RECOMMENDED BY THE BASIN MANUFACTURER) shall be thoroughly compacted in lifts not exceeding 12" to a final Proctor Density of not less than 85%. Improper backfilling may result in damaged accessways. The Grinder Pump Station shall be installed at a minimum depth from grade to the top of the 1 1/4" discharge line, to assure maximum frost protection. The finish grade line shall be 1" to 4" below the bottom of the lid, and final grade shall slope away from the Grinder Pump Station.

All restoration will be the responsibility of the CONTRACTOR. Per unit costs for this item shall be included in the CONTRACTOR'S bid price for the individual Grinder Pump Stations. The properties shall be restored to their original condition in all respects, including, but not limited to, curb and sidewalk replacement, landscaping, loaming and seeding, and restoration of the traveled ways, as directed by the ENGINEER.

The electrical enclosure shall be furnished, installed and wired to the Grinder Pump Station by the CONTRACTOR. An alarm device is required on every installation, there shall be NO EXCEPTIONS. It will be the responsibility of the CONTRACTOR to coordinate with the individual property owner(s) to determine the optimum location for the control panel and disconnect.

The CONTRACTOR shall mount the control panel and alarm device in a conspicuous location, as per national and local codes.

3.03 START-UP AND FIELD TESTING

The MANUFACTURER shall provide the services of a qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the OWNER'S personnel in the operation and maintenance of the equipment before the stations are accepted by the OWNER. All equipment and materials necessary to perform testing shall be the responsibility of the OWNER or INSTALLING CONTRACTOR. This will include, as a minimum, a portable generator (if temporary power is required) and water in each basin.

Upon completion of the installation, the authorized factory technicians will perform the following test on each station:

- A. Make certain the discharge shut-off valve is fully open. This valve must not be closed when the pump is operating. In some installations, there may be a valve(s) at the street main that must also be open.
- B. Turn ON the alarm power circuit.
- C. Fill the wet well with water to a depth sufficient to verify the high level alarm is operating. Shut off water.
- D. Turn ON pump power circuit. Initiate pump operation to verify automatic "on/off" controls are operative. Pump should immediately turn ON. Within one (1) minute alarm light will turn OFF. *Within three (3) minutes the pump will turn OFF.*

Upon completion of the start-up and testing, the MANUFACTURER shall submit to the ENGINEER the start-up authorization form describing the results of the tests performed for each Grinder Pump Station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed.

PART 4 OPERATION AND MAINTENANCE

4.01 MANUALS

The MANUFACTURER shall supply four (4) copies of Operation and Maintenance Manuals to the OWNER, and one (1) copy of the same to the ENGINEER.

4.02 SPARE CORES

The provision of spare units is critical to the operation of the collection system. Without spare units it would be necessary to leave individual customers without sewer service and with sewage overflowing in their yard for extended periods of time when equipment fails.

The MANUFACTURER shall supply one spare grinder pump core for each full increment of 50 grinder pump units supplied, complete with all operational controls, level sensors, check valve, anti-siphon valve, pump/motor unit and grinder. Cores shall be properly packaged for shipment and storage.

END OF SECTION

SECTION 15100

VALVES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish all labor, materials, equipment, and incidentals required, and install complete and ready for operation, all valves and appurtenances as show on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Excavation, backfill and grading are included in Division 2
- B. Painting is included in Division 9, Section 09960.
- C. Electrical is included in Division 16.

1.03 SYSTEM DESCRIPTION

- A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of wastewater, sludge, water, air or chemicals, depending on the applications.

1.04 QUALITY ASSURANCE

- A. All of the types of valves and appurtenances shall be products of well established firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. All materials of construction shall be of an acceptable type and shall be designated for the pressure and temperature at which they are to be operated, for the materials they are to handle and for the use for which they are intended. The materials shall meet established technical standards of quality and strength necessary to assure safe installations and conform to applicable standards. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

1.05 REFERENCES

- A. Kentucky Basic Building Code.
- B. Kentucky State Plumbing Law, Regulations and Code

1.06 SUBMITTALS

- A. Copies of all materials required to establish compliance with these Specifications shall be submitted in accordance with the provisions of Division 1, Section 01300. Submittals shall include at least the following:
1. Certified drawings showing all important details of construction and dimensions.
 2. Descriptive literature, bulletins, and/or catalogs of the equipment.
 3. The total weight of each item.
 4. A complete total bill of materials.
 5. A list of the manufacturer's recommended spare parts.

1.07 OPERATING INSTRUCTIONS

- A. Operating and maintenance instructions shall be furnished to the ENGINEER as provided in Division 1. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc., that are required to instruct operating and maintenance personnel unfamiliar with such equipment.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. General
1. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
 2. All valves and appurtenances shall have the name of the maker, flow directional arrows, and the working pressure for which they are designed cast in raised letters on some appropriate part of the body.
 3. All buried valves shall open left (counterclockwise). Insofar as possible, all valves shall open counterclockwise.

2.02 VALVES

- A. Plug Valves

Eccentric plug valves shall be used in shut-off applications for pump stations and where the valves are scheduled for infrequent use.

Eccentric plug valves 3 to 12 inches in diameter shall be rated for 175 psi working pressure. The body and cover shall be cast iron conforming to ASTM A126, Class B. Flange ends shall comply with ANSI B16.1, Class 125 standards. Mechanical joint ends shall comply with AWWA C11/ANSI 21.11. The entire seat surface shall be protected by a welded nickel seat of minimum 1/8" thickness. The plug shall be cast iron ASTM A126, Class B. The portion of the plug in the valve body cavity shall be coated with Buna-N rubber using an injection-mold process. Valve bonnet shall be full sealed and bolted to the body for ease of maintenance. The seal between the body and the bonnet shall be an O-ring. Stem packing shall be Buna-N multiple "V" ring stem packing seals, conforming to AWWA C504 and AWWA C507 standards. The packing seal shall be held in place with an adjustable gland follower. Shaft bearings shall be sintered 316 stainless steel for both the upper and lower trunnions. Bearings shall be permanently lubricated. 3" valves shall be quarter-turn and shall be supplied with a position indicator marked at 10 degree increments. Valves 4" and larger shall be equipped with a worm gear operator. Eccentric plug valves shall be Clow F-5412, F-5413 or approved equal.

B. Ball Valves

Ball valves shall be used in shut-off applications for residential grinder pump stations.

Ball valves shall be rated for a minimum of 225 psi working pressure. Valves 2 inch and smaller shall be PVC body construction, with EPDM seals, PTFE ball seats, double stem seals. Valves shall operate at full port when open, be a true union with solvent cement socket ends. The valves shall be manufactured by George Fischer, Hayward or approved equal.

C. Swing Check Valves

Check valves for Polyvinyl Chloride (PVC) pipelines shall be swing type and shall meet the material requirements of ASTM Specification D2241-latest revision. The valves shall be PVC body with full flow design. Valves shall have an angle seat and PVC weighted and shielded flapper that will retain a backpressure up to 125 psi. The valves shall be manufactured by Flo Control Inc. or approved equal.

1. When there is no flow through the line, the weighted flapper shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the water-way to allow full flow.
2. Valves shall be so constructed that the body may easily be removed and replaced without removing the valve from the line.

D. Y Check Valves

Check valves for PVC pipelines shall be Y-type. The valves shall be PVC body with Viton seals, rated for 150 psi working water pressure. The disk

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KY 15 Utilities Relocation

guide shall be a PVC coil. The valves shall be manufactured by George Fischer, Hayward, or approved equal.

1. Valves shall be so constructed that the plunger assembly can be easily accessed for cleaning.
2. Valves shall be so constructed such full flow may be achieved. Minimal back pressure shall be necessary to seat the plunger.

E. Sewage Air/Vacuum Valves

1. Sewage Air/Vacuum Valves shall be furnished and installed at the locations shown on the PLANS. The valves shall be combination air valves for sewage as manufactured by A.R.I Flow Control Accessories sewage, Kfar Charuv, 12932 Israel or approved equal.
2. The valves shall be the size shown on the PLANS and be A.R.I Model D-025 or approved equal.
3. The valves shall be designed to allow entrapped air to escape from the pipeline when pumps are started and close water tight when liquid enters the valves. When the sewage line is filled, the valves shall allow air to reenter when draining, to prevent vacuum or water column separation. The valves shall allow unrestricted venting or re-entry of air through it, during filling or draining of the force main. The complete valve shall withstand 500 psi test pressure.
4. Inlet and outlet blow off valves, and five (5) feet of hose for flushing shall be provided with each valve. Fittings shall be $\frac{3}{4}$ " hose connections.
5. The body and cover of each valve assembly shall be constructed of reinforced nylon. The lower float, stem and hardware shall all be constructed of 316 stainless steel conforming to ASTM A240. The upper float shall be constructed of foamed polypropylene. The seal plug assembly, shall be constructed of reinforced nylon. O-rings shall be constructed of Buna-N rubber.

F. Air Release Valves

1. Air Release Valves shall be furnished and installed at the locations shown on the PLANS. The valves shall be kinetic air valves for sewage as manufactured by A.R.I Flow Control Accessories sewage, Kfar Charuv, 12932 Israel or approved equal.
2. The valves shall be the size shown on the PLANS and be ARI Model K-020 or approved equal.

3. The valves shall be designed to allow entrapped air to escape from the pipeline when pumps are started and close water tight when liquid enters the valves. The complete valve shall withstand 500 psi test pressure.
4. Inlet and outlet blow off valves, and five (5) feet of hose for flushing shall be provided with each valve. Fittings shall be ¾" hose connections.
5. The body and cover of each valve assembly shall be constructed of reinforced nylon. The lower float, stem and hardware shall all be constructed of 316 stainless steel conforming to ASTM A240. The upper float shall be constructed of foamed polypropylene. The stopper shall be constructed of acetyl rubber. O-rings shall be constructed of Buna-N rubber.

G. Mud Valves

1. Mud valves shall be of the iron body, bronze mounted type with non-rising stems, flanged ends, extension stem with t-bar. The frame, yoke and gate shall be sturdily proportioned for strength and rigidity and be of cast iron conforming to ASTM specifications A126, Class B. the stem, stem nuts and seats shall be bronze. The stem shall be machined with accurately cut threads. The valves shall be Troy-Valve A-25600, or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the ENGINEER before they are installed.
- B. After installation, all valves and appurtenances shall be tested at least one hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the ENGINEER.
- C. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the OWNER.
- D. Buried valves and valve boxes shall be set with the valve stem vertically aligned in the center of the box. Valves shall be set on firm foundation and supported by tamping selected excavated material under the sides of

the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade.

3.02 SHOP PAINTING

- A. Interior surfaces of all valves, the exterior surfaces of buried valves, and miscellaneous piping appurtenances shall be given a shop finish of an asphalt varnish conforming to Federal Specification TT-V51e for Varnish Asphalt.
- B. The exterior surface of various parts of the valves, operators, and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer, such as Inertol Primer No. 621, shall be applied in accordance with the instructions of the paint manufacturer.
- C. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.
- D. Field painting is specified under Division 9, Section 09960.

3.03 INSPECTION AND TESTING

- A. The various pipelines in which the valves and appurtenances are to be installed are specified to be field tested. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the ENGINEER.
- B. Various valves, or appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the ENGINEER.

END OF SECTION

SECTION 16100

GENERAL PROVISIONS

PART 1 GENERAL

- 1.01 The General and Special Conditions and all other CONTRACT DOCUMENTS are applicable to WORK under this section of the SPECIFICATIONS. All the WORK under this section of the SPECIFICATIONS shall be governed by any alternates and unit prices called for in the FORM OF PROPOSAL insofar as they affect this portion of the WORK.
- 1.02 Include furnishing of all labor, materials, equipment and other related items required to complete the WORK called for and indicated on the CONTRACT DRAWINGS and specified for a complete system, including excavation, backfilling and tamping. Classification of excavation and payment for same shall be in accordance with applicable provisions of these SPECIFICATIONS.
- 1.03 Abbreviations of organizations and publications:
- | | | |
|-------|---|---|
| NEC | - | National Electrical Code |
| UL | - | Underwriters Laboratories, Inc. |
| IPCEA | - | Insulated Power Cable Engineers Association |
| ANSI | - | American National Standards Institute |
| OSHA | - | Occupational Safety Health Act |
- 1.04 All materials shall be new and the best of their respective kinds unless otherwise specified and shall be listed by the UL and shall be so labeled. All equipment shall conform to the latest approved standards of the IEEE, NEMA, ANSI and OSHA.

PART 2 COOPERATION

- 2.01 Check with other trades on the scope of their WORK and coordinate on all locations of various items of equipment and outlets before they are finally placed and connected. Any relocation of material or equipment necessitated by failure to coordinate WORK shall be at no cost to the OWNER.
- 2.02 Do not cut the WORK of any other trade without first consulting the ENGINEER'S representative. Repair any WORK damaged employing the services of the trade whose WORK is damaged.

PART 3 SCOPE

- 3.01 The WORK covered by this section of the CONTRACT shall include the furnishing of all labor, materials, tools and equipment necessary to complete the electrical WORK as herein specified, or implied and as shown or implied on the CONTRACT DRAWINGS.
- 3.02 The CONTRACTOR shall note that most of the electrical conduit, boxes and wiring are existing. The CONTRACTOR shall visit the site prior to BID and satisfy

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Chavies Wastewater Collection System

themselves as to the extent of existing WORK and new WORK required to complete the project as indicated. Submission of a BID will be interpreted that the visit has been done and no extra will be allowed for additional WORK as a result of not doing the inspection of existing conditions.

PART 4 DRAWINGS AND SPECIFICATIONS

4.01 The CONTRACT DRAWINGS and SPECIFICATIONS are intended to cover all WORK enumerated under the respective headings. Examine all CONTRACT DRAWINGS and SPECIFICATIONS to determine any references to WORK of an electrical nature and be guided accordingly in prosecuting the electrical WORK. The CONTRACT DRAWINGS are diagrammatic only, as far as final location is concerned. Any item of WORK not clearly included, specified or shown, and any errors or conflict between CONTRACT DRAWINGS, SPECIFICATIONS, codes and field conditions shall be clarified by a written request to the ENGINEER prior to bidding, otherwise all labor and materials required to make good any damage or defect in finished WORK caused by such error, omission or conflict shall be provided at no additional cost to the OWNER.

PART 5 CODE COMPLIANCE, INSPECTION AND CERTIFICATES

5.01 The minimum standards for all electrical WORK shall be the 1996 revision of the NEC. Whenever and wherever OSHA and/or federal, state and/or local laws or regulations and/or design require higher standards than the NEC, then these laws and/or regulations and/or design shall be followed.

5.02 Furnish electrical inspection by a licensed electrical inspector. Notify the electrical inspector in writing, immediately upon the start of the WORK with a copy of the notice to the ENGINEER. The inspector shall be scheduled for rough as well as finished WORK. Approval from the electrical inspector will not be allowed as reason for deviation from the CONTRACT DRAWINGS and SPECIFICATIONS. All cost incidental to the electrical inspection shall be borne by the CONTRACTOR.

PART 6 CLEANING

6.01 At the completion of the WORK required under this contract and just prior to acceptance by the OWNER, thoroughly clean all exposed equipment fittings, fixtures and accessories.

PART 7 CONNECTIONS TO EQUIPMENT BY OTHERS

7.01 Provide all conduit, boxes and wire with required connections, including any disconnect switches required by NEC to all electrically powered or controlled equipment furnished and set in place by others. Examine all divisions of the SPECIFICATIONS and all CONTRACT DRAWINGS to determine location and size of all electrically powered or controlled equipment.

PART 8 PHASING

- 8.01.1 Verify the rotation of all three phase motors with the trade furnishing equipment. These motors shall be "bumped" or run uncoupled in the presence of the trade furnishing the equipment to insure proper rotation.

PART 9 SPECIAL NOTE

- 9.01.1 All openings in electrical equipment, enclosures, cabinet outlets and junction boxes shall be by means of standard knockouts or shall be sawed or drilled. The use of a cutting torch is prohibited.

PART 10 PIPE SLEEVES AND FIRE RATING OF OPENINGS

- 10.01 Wherever conduit pass through floor slabs in other than slab on grade construction, steel sleeves shall be provided for each conduit. Sleeves shall project 3/8" above slab and spaces between conduit and sleeves shall be caulked with a material which will provide a fire rating substantially the same as the unpierced floor.
- 10.02 Holes through walls and ceilings, chases, shafts, etc., for the passage of cable or conduit shall be made so as to substantially preserve the integrity of the fire rating of such surfaces or passages in accordance with NEC 300-21.
- 10.03 Where conduit penetrates the roof, such penetration shall be through an opening approved by manufacturer of the roof.

PART 11 EXCAVATION AND BACKFILLING

- 11.01 Perform all excavation and backfilling required for completion of WORK indicated on the CONTRACT DRAWINGS and specified herein. Classification of excavation and prices for excavation shall be in accordance with the applicable division of these SPECIFICATIONS.
- 11.02 Backfill material for conduit or direct bury cable unless otherwise specified and/or noted on the DRAWINGS shall be clean earth, free from rock and debris, thoroughly tamped in six inch (6") layers to the finished grade.
- 11.03 During the progress of the project, the premises shall be kept reasonably clean and free from accumulate rubbish and debris. Proper care shall be exercised to protect all trees, shrubbery, and etc., in the vicinity of the work. All surplus earth shall be disposed of as directed by the ENGINEER.
- 11.04 Compaction of backfill in place shall be 95% of maximum density.

PART 12 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

- 12.01 At completion of the CONTRACT, the OWNER shall be provided with two (2) bound copies of operations and maintenance instructions for the various items of the electrical equipment, including existing motor control center, new panelboards, service equipment, lighting fixtures, etc.

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- 12.02 In addition to manufacturer's approved SHOP DRAWINGS, manual shall include: (a) A listing of equipment (identified in accordance with the DRAWINGS nomenclature, e.g. LF-1, M.D.P. etc.) and distribution or supplier of the equipment. In case of lighting fixtures, the type replacement lamp including recommended voltage and other necessary designation shall be included.
- 12.03 Instructions shall be included for routine checking of circuit breakers and fused switches.

PART 13 LABELING

- 13.01 All lighting and power panels, telephone cabinets, switches in distribution equipment, safety switches for remote equipment and all other items noted for labeling shall be properly identified in accordance with the designations shown on the DRAWINGS or the function they perform. This paragraph applies to both new and existing equipment.
- 13.02 Labels shall be 1/4" high, white letters on laminated phenolic engraving stock suitably cemented to the inside of the recessed panels and on the face of surface mounted panels and other equipment.

PART 14 FISH WIRE

- 14.01 All conduit required under this contract which do not receive conductors, shall be provided with a 14 gauge galvanized steel fish wire or approved nylon wire.

PART 15 "OR EQUAL" CLAUSE

- 15.01 The SPECIFICATIONS covering this WORK are open; wherever a specific manufacturer's item is specified, it is intended as a standard to be met and items which are approved equal or superior will be accepted.

PART 16 WARRANTY

- 16.01 CONTRACTOR shall include in BID price the warranty of all labor and equipment that is a part of this CONTRACT, including existing equipment that is reused, for a period of one year from the date of final completion.

END OF SECTION

SECTION 16135

UNDERGROUND DUCTS AND MANHOLES

PART 1 GENERAL

1.01. SUMMARY

- A. Section Includes:
 - 1. Ducts.
 - 2. Duct banks.
 - 3. Manholes.
 - 4. Handholes.

1.02 DEFINITIONS

- A. Duct: General term for electrical conduit and other raceway, either metallic or nonmetallic, specified for use underground, embedded in earth or concrete.
- B. Duct Bank: Group of 2 or more ducts in continuous run between 2 points.
- C. Underfloor Conduits.
 - 1. Conduits which run underground within perimeter of building walls under building floor. This may consist of 1 conduit or several conduits grouped together.
- D. Duct Bank Conduits
 - 1. Conduits which run under ground outside perimeter of building walls. This may consist of 1 conduit, or several conduits grouped together.
- E. Underground Conduits
 - 1. Underground conduits are both underfloor conduits and duct bank conduits.
- F. Handhole: Below-the-surface enclosure in connection with ducts into which people reach, but do not enter, for purpose of installing, operating, or maintaining equipment or wiring.
- G. Manhole: Below-the-surface enclosure or chamber, large enough for person to enter, connecting with ducts and affording facilities for installing, operating, and maintaining equipment or wiring.

1.03 SUBMITTALS

- A. Submittals are not required if CONTRACTOR supplies materials or equipment of specified or named manufacturers. If CONTRACTOR proposes substitutions to material or equipment of specified or named manufacturers, submittals identified below are required.
 - 1. Product data.
 - 2. Submit in accordance with Section 01340.

1.04 QUALITY ASSURANCE

- A. Items provided under this section shall be listed or labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).
 - 1. Term "NRTL" shall be as defined OSHA Regulation
 - 2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article 100.
- B. Regulatory Requirements:
 - 1. National Electrical Code (NEC): Components and installation shall comply with National Fire Protection Association (NFPA) 70.

1.05 SEQUENCING AND SCHEDULING

- A. Coordination of Work:
 - 1. Coordinate layout and installation of manholes and handholes with final arrangement of ducts as influenced by actual final location of other utilities in field.
 - 2. Coordinate elevations of duct and raceway entrances into manholes and handholes with final profiles of ducts and raceways as determined by coordination with other utilities, underground obstructions and buildings
 - 3. Establish locations and elevations to suit field conditions and assure duct runs drain to manholes, handholes, or as shown on Drawings.

PART 2 PRODUCTS

2.01 DUCTS AND FITTINGS

- A. Comply with Section 16050.

2.02 CAST-IN-PLACE CONCRETE

- A. Comply with Section 03300 for concrete and Section 03200 for reinforcing.
- B. Aggregate For Duct Encasement: 3/8 in. maximum size.
- C. Strength: 3,000 psi minimum 28 day compressive strength.

2.03 DUCT BANK ACCESSORIES

- A. Duct Supports: Rigid PVC spacers selected to provide minimum duct spacings and concrete cover depths indicated, while rigidly supporting ducts during concreting.

2.04 RACEWAY/DUCT SEALING COMPOUND

- A. Compound:
 - 1. Nonhardening, putty-like consistency workable at temperatures as low as 35°F.
 - 2. Compound shall not slump at temperature of 300°F and shall readily adhere to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.

PART 3 EXECUTION

3.01 WIRING METHOD

- A. General: Install ducts for wiring runs indicated. Provide sizes as indicated.
- B. Duct Banks: Rigid nonmetallic conduit, Schedule 40, encased in concrete

3.02 EXCAVATION AND BACKFILL

- A. Conform to Section 02316 except as modified below:
 - 1. Do not use heavy-duty, hydraulic-operated compaction equipment.
 - 2. Excavation: Cut trenches neatly and uniformly, and slope uniformly to required pitch.

3.03 INSTALLATION OF DUCTS

- A. Slope: Pitch ducts to drain towards manholes and handholes and away

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from buildings and equipment unless otherwise shown on Drawings. Minimum slope shall be 4 in. in 100 ft. Where necessary to achieve this between manholes, slope ducts from high point in run to drain in both directions.

- B. Curves and Bends: Use manufactured elbows for stub-ups at equipment and at building entrances; For other curves and bends, except as otherwise indicated, use manufactured long sweep bends with minimum radius of 24 in. in both horizontal and vertical directions.
- C. Make joints in ducts and fittings watertight in accordance with manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
- D. Duct Entrances to Manholes and Handholes: End bells spaced approximately 10 in. center to center for 5 in. ducts and varied proportionately for other duct sizes. Change from regular spacing to end bell spacing shall start 10 ft from end bell and shall be made without reducing duct line slope and without forming trap in line. Grout end bells into manhole walls from both sides to provide watertight entrances. Provide groundable end bushings on metal ducts and connect to system grounding conductor.
- E. Duct Entrances to Buildings: Transformations from underground PVC duct to steel conduit shall be made 10 ft. minimum, outside building wall and shall use fittings manufactured for purpose. Install in accordance with following:
 - 1. Concrete-Encased Ducts: Install reinforcing in duct banks through disturbed earth near buildings and excavations and coordinate duct bank with structural design at wall so duct bank is supported at wall without reducing structural or watertight integrity.
 - 2. Waterproof Entrances: Where ducts enter buildings through waterproofed floor or wall, watertight entrance-sealing device shall be installed with sealing gland assembly on inside. Anchor device securely into masonry construction with 1 or more integral flanges and membrane waterproofing secured to device in permanently watertight manner.
- F. Concrete-Encased Ducts: Support on plastic separators coordinated with duct size and required duct spacing, -and install in accordance with following:
 - 1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, and secure separators to earth and to ducts to prevent floating during concreting. Do not use tie wires or reinforcing steel in such way as to form conductive or magnetic loops around ducts or duct groups.
 - 2. Reinforcing: Reinforce duct banks. Size and arrange reinforcing

steel as indicated on Drawings.

3. Concreting: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not use power-driven agitating equipment unless specifically designed for duct bank application. Pour each run of envelope between manholes or other terminations in one continuous operation unless approved by ENGINEER, Where more than 1 pour is necessary, terminate each pour in vertical plane and continue ductbank reinforcing minimum of 18 in. beyond termination of pour.
 4. Forms: Walls of trench may be used to form side walls of duct bank. provided soil is self-supporting and concrete envelope can be poured without soil inclusions. Use forms where soil is not self-supporting.
 5. Minimum Clearances: 3 in. between ducts and exterior envelope wall, 3 in. between ducts for like services, and 6 in. between power and ducts for other systems.
 6. Depth: Except as otherwise indicated, top of duct bank shall be 24 in. below finished grade, minimum, in nontraffic areas, and 30 in. below finished grade, minimum, in vehicular traffic areas.
- G. Stub-ups: Duct stub-ups to equipment shall be galvanized rigid steel. For equipment mounted on outdoor concrete pads, steel conduit shall extend minimum of 5 ft away from edge of pad. Install insulated grounding bushings on terminations. Couple steel conduits to ducts with adapters designed for purpose and encased concrete.
- H. Sealing: For ducts to be wired in this Project, provide temporary closure at terminations. For spare ducts, seal bore of ducts at terminations. Use sealing compound and plugs as required to withstand 15 psi minimum hydrostatic pressure.
- I. Pulling Cord: Provide 100 lb test nylon cord in ducts including spares.
- J. Marker Tape: Provide plastic marker, tape over ducts at 12in. below finished grade.

3.04 TESTING

- A. Field Quality Control:
1. Grounding: Test manhole grounding provisions to ensure electrical continuity of bonding and grounding connections. Make ground-resistance test at each ground rod and submit report of results. Use an instrument specifically designed for ground-resistance measurements.

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2. Duct Integrity: Rod ducts with mandrell 1/4 in. smaller in diameter than internal diameter of ducts. Where rodding indicates obstructions in ducts, remove obstructions and retest.
3. Water Tightness: Make internal inspection of manholes/handholes three months after completion of construction for indications of water ingress. Where leakage is noted, remove water found and seal leakage sources. Reinspect after 2 months and reseal remaining leakage sources. Repeat process at two month intervals until leakage is corrected.

3.05 CLEANING AND RESTORATION

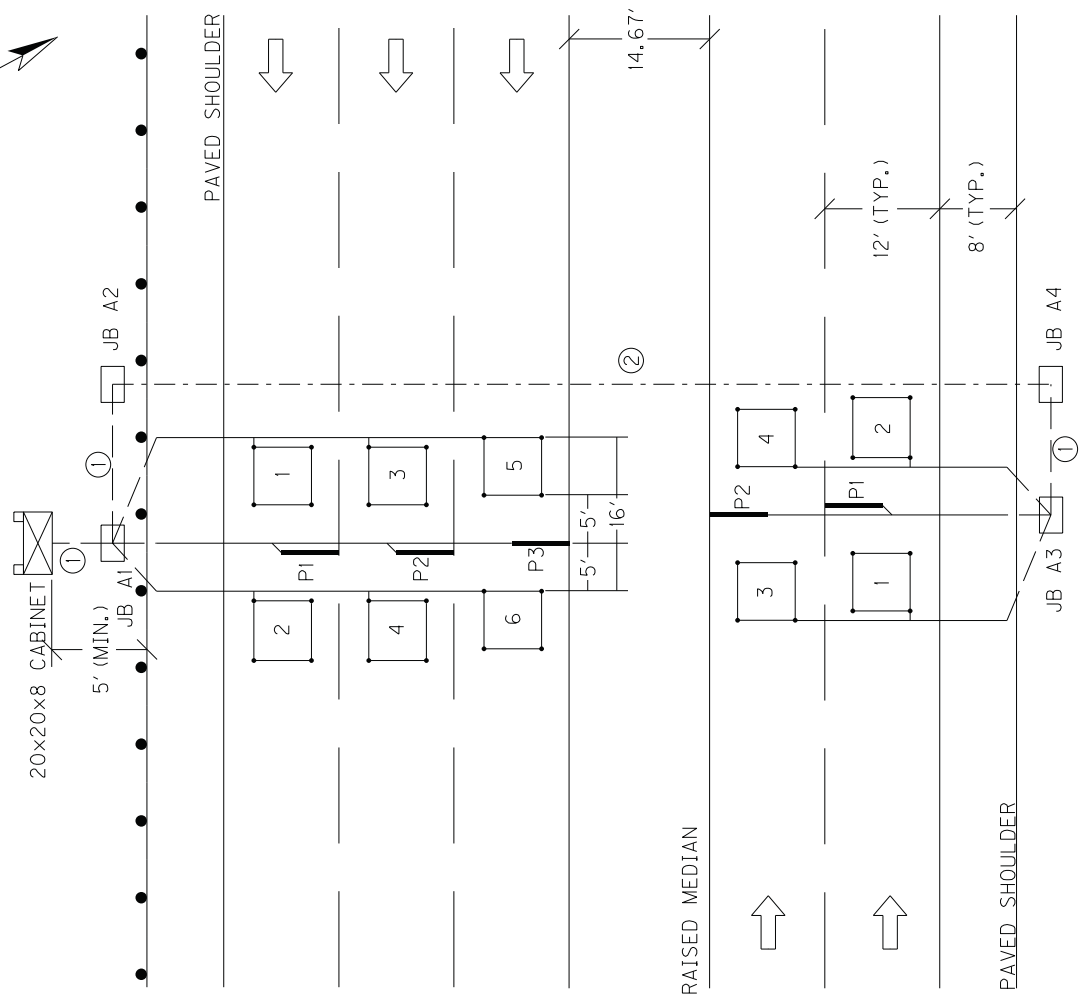
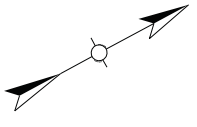
- A. Clean Ducts: Clean full length of ducts with round bristle brush with dia 1/2 in. greater than internal diameter of duct.

3.06 RESTORATION

- A. Restore surface features at areas disturbed by excavation and reestablish original grades except as otherwise indicated.
- B. Where sod has been removed, replace it as soon as possible after backfilling is completed.
- C. Restore all areas disturbed by trenching, storing of dirt, cable laying, and other work to their original condition.
- D. Include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, or mulching.
- E. Restore disturbed paving as indicated.

END OF SECTION

PERRY CO. KY 15 ~m.p. 13.4
~LAT/LONG N 37.268241, W 83.204112
~KY 15 Sta. 312+10
PLANNING COUNT STATION A95



SITE LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD AND APPROVED BY DIVISION OF PLANNING PERSONNEL PRIOR TO ANY CONSTRUCTION.

ALL LOOPS SHALL BE 6'X6' SQUARE AND SHALL BE INSTALLED 16' FROM LEADING EDGE TO LEADING EDGE AS SHOWN. PIEZOELECTRIC SENSORS (PIEZOS) SHALL BE INSTALLED 5' FROM THE EDGE OF LOOPS WITH THE EDGE OF EACH PIEZO FLUSH WITH THE EDGE OF THE CORRESPONDING DRIVING LANE. LOOPS AND PIEZOS SHALL BE INSTALLED SPLICE-FREE TO THE CABINET. BETWEEN 2' AND 3' OF WIRE FOR EACH SENSOR SHALL BE COILED AND LABELED INSIDE EACH JUNCTION BOX AND CABINET. DIVISION OF PLANNING PERSONNEL WILL CONNECT THE LOOPS AND PIEZOS INSIDE THE CABINET.

INSTALL FOUR (4) TYPE A JUNCTION BOXES (JB A1, A2, A3, A4)

INSTALL ONE (1) 1/4" CONDUIT FROM EACH SAW SLOT TO NEAREST JUNCTION BOX.

INSTALL TWO (2) 20"x20"x8" CABINETS MOUNTED TO TWO (2) WOOD POSTS EACH.

CODED NOTE:

- ① INSTALL ONE (1) 2" CONDUIT.
- ② INSTALL ONE (1) 2" CONDUIT UNDER ROADWAY. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH PRIME CONTRACTOR TO INSTALL CONDUIT ON THE NORTHBOUND SIDE WHILE THE EX. GROUND IS BEING BROUGHT TO GRADE. THIS WILL BE PAID AS TRENCHING AND BACKFILLING. CONTRACTOR SHALL OPEN CUT EX. ROAD AND INSTALL CONDUIT ON SOUTHBOUND SIDE AFTER TRAFFIC IS SHIFTED TO THE NORTHBOUND DIRECTION.

Permanent Traffic Data Acquisition Station
Estimate Of Quantities

Revised April, 2017

**PERMANENT TRAFFIC DATA ACQUISITION STATIONS
ESTIMATE OF QUANTITIES**

Bid Item Code	Description	Unit	Quantity
2562	TEMPORARY SIGNS	SQ FT	
2650	MAINTAIN AND CONTROL TRAFFIC	LP SUM	
2775	ARROW PANEL	EACH	
4791	CONDUIT ¾ INCH	LIN FT	
4793	CONDUIT 1 ¼ INCH	LIN FT	60
4795	CONDUIT 2 INCH	LIN FT	150
4811	ELECTRICAL JUNCTION BOX TYPE B	EACH	
4820	TRENCHING AND BACKFILLING	LIN FT	150
4821	OPEN CUT ROADWAY	LIN FT	50
4829	PIEZOELECTRIC SENSOR	EACH	5
4830	LOOP WIRE	LIN FT	3200
4850	CABLE NO. 14/1 PAIR	LIN FT	
4871	POLE – 35’ WOODEN	EACH	
4895	LOOP SAW SLOT AND FILL	LIN FT	450
4899	ELECTRICAL SERVICE	EACH	
20213EC	INSTALL PAD MOUNT ENCLOSURE	EACH	
20359NN	GALVANIZED STEEL CABINET	EACH	1
20360ES818	WOOD POST	EACH	2
20391NS835	ELECTRICAL JUNCTION BOX TYPE A	EACH	4
20392NS835	ELECTRICAL JUNCTION BOX TYPE C	EACH	
20468EC	ELECTRICAL JUNCTION BOX 10x8x4	EACH	
21543EN	BORE AND JACK PIPE – 2 IN	LIN FT	
23206EC	INSTALL CONTROLLER CABINET	EACH	

MATERIAL, INSTALLATION, AND BID ITEM NOTES FOR PERMANENT TRAFFIC DATA ACQUISITION STATIONS

1. DESCRIPTION

Except as specified in these notes, all work shall consist of furnishing and installing all materials necessary for permanent data acquisition station equipment installation(s) and shall be performed in accordance with the current editions of:

- The Contract
- Division of Planning Standard Detail Sheets
- Kentucky Transportation Cabinet, Department of Highways, *Standard Specifications for Road and Bridge Construction*
- Kentucky Transportation Cabinet, Department of Highways, Standard Drawings
- National Fire Protection Association (NFPA) 70: *National Electrical Code*
- Institute of Electrical and Electronic Engineers (IEEE), *National Electrical Safety Code*
- Federal Highway Administration, *Manual on Uniform Traffic Control Devices*
- American Association of State Highway and Transportation Officials (AASHTO), *Roadside Design Guide*.
- Standards of the utility company serving the installation, if applicable

The permanent traffic data acquisition station layout(s) indicate the extent and general arrangement of the proposed installation and are for general guidance. Any omission or commission shown or implied shall not be cause for deviation from the intent of the plans and specifications. Information shown on the plans and in this proposal and the types and quantities of work listed are not to be taken as an accurate or complete evaluation of the material and conditions to be encountered during construction. The bidder must draw his own conclusion as to the conditions encountered. The Department of Highways (Department) does not give any guarantee as to the accuracy of the data and no claim will be considered for additional compensation if the conditions encountered are not in accordance with the information shown. If any modifications of the plans or specifications are considered necessary by the Contractor, details of such modifications and the reasons, therefore, shall be submitted in writing to the Engineer for written approval prior to beginning such modified work.

The Contractor shall contact all utility companies and the district utility agent prior to beginning construction to insure proper clearance and shielding from existing and proposed utilities. The Contractor shall use all possible care in excavating on this project so as not to disturb any existing utilities whether shown on the plans or not shown on the plans. Any utilities disturbed or damaged by the Contractor during construction shall be replaced or repaired to original condition by the Contractor at no cost to the department. If necessary, to avoid existing utilities, the Contractor shall hand dig areas where poles or conduit cross utilities.

Material, Installation, and Bid Item Notes for
Permanent Traffic Data Acquisition Stations

Revised April, 2017

The Contractor shall be responsible for all damage to public and/or private property resulting from his work.

The Contractor shall inspect the project site prior to submitting a bid and shall be thoroughly familiarized with existing conditions. Submission of a bid will be considered an affirmation of this inspection having been completed. The Department will not honor any claims resulting from site conditions.

2. MATERIALS

All proposed materials shall be approved prior to being utilized. The Contractor shall submit for material approval an electronic file of descriptive literature, drawings and any requested design data for the proposed materials. After approval, no substitutions of any approved materials may be made without the written approval of the Engineer.

Materials requiring sampling shall be made available a sufficient time in advance of their use to allow for necessary testing.

2.1. Anchoring

2.1.1. Anchor and Anchor Rod

Anchor, except rock anchor, shall be expanding type, with a minimum area of 135 square inches.

Anchor rod shall be galvanized steel, double-eye, have a minimum diameter of 5/8 inches, and a minimum length of 84 inches. Minimum holding capacity shall be 15,400 lbs.

Rock anchor shall be galvanized steel, triple-eye, expanding type, with a minimum diameter of 3/4 inch, a minimum 53 inches long, and a minimum tensile strength of 23,000 lb.

2.1.2. Guy Wire and Guy Guard

Guy wire shall be Class A, Zinc-coated, 3/8 inch diameter, high strength grade steel (minimum 10,800 lb.) and galvanized per ASTM A475. Guy guard shall be 8' long, fully-rounded, yellow, and able to be securely attached to the guy wire.

2.1.3. Strandwise for Guy Wire

Strandwise for guy wire shall be 3/8 inch and rated to hold a minimum of 90% of the rated breaking strength (RBS) of the strand used.

2.2. Asphalt

Asphalt shall be a minimum CL2 Asph Surf 0.38C PG64-22 and conform to the *Standard Specifications for Road and Bridge Construction*.

2.3. Backer Rod

Backer rod shall be 1/2 inch diameter, closed cell polyethylene foam and shall meet or exceed the following physical properties:

- Density (average): 2.0 lbs/cu.ft. (minimum): ASTM D 1622 test method
- Tensile Strength: 50 PSI (minimum): ASTM D 1623 test method
- Compression Recovery: 90% (minimum): ASTM D 5249 test method
- Water Absorption: 0.03 gm/cc (maximum): ASTM C 1016 test method

2.4. Cabinets

2.4.1. Galvanized Steel Cabinet

Galvanized Steel Cabinet shall be constructed of 16 or 14 gauge galvanized steel and shall meet or exceed the industry standards set forth by UL 50 and NEMA 3R. The finish shall be an ANSI 61 gray polyester powder finish inside and out over the galvanized steel. Cabinet shall have minimum inside dimensions of 20 inches high by 20 inches wide by 8 inches deep.

The cabinet shall be equipped with the following:

- Drip shield top
- Seam-free sides, front, and back, to provide protection in outdoor installations against rain, sleet, and snow
- Hinged cover with 16 gauge galvanized steel continuous stainless steel pin.
- Cover fastened with captive plated steel screws, knob or latch
- Hasp and staple for padlocking
- No gaskets or knockouts
- Back panel for terminal block installation
- Post mounting hardware
- Terminal Blocks

2.4.2. Anchor Bolt for Pad Mounted Cabinet

Anchor bolt for pad mounted cabinet shall be galvanized steel with minimum dimensions of 3/8 inch by 6 inches.

2.5. Concrete

Concrete shall be Class A and conform to the *Standard Specifications for Road and Bridge Construction*.

2.6. Conduit and Conduit Fittings

Conduit and conduit fittings shall be rigid steel unless otherwise specified.

Conduit shall be zinc galvanized inside and out and conform to the NEC, UL Standard 6, and ANSI C-80.1.

Rigid Steel Conduit Fittings shall be galvanized inside and out and conform to the NEC, UL Standard 514B, and ANSI C-80.4. Intermediate Metal Conduit (IMC) will not be approved as an acceptable alternative to rigid steel conduit.

2.7. Conduit sealant

Conduit sealant shall be weather-, mold-, and mildew-resistant and chemically resistant to gasoline, oil, dilute acids and bases. Conduit sealant shall be closed cell type and shall meet or exceed the following properties:

- Cure Time 20 minutes max.
- Density 64.4 kg/m³; 6 lbs/ft³
- Compressive Strength (ASTM 1691) 13.8 MPa; 330 or 300 psi

- Tensile Strength (ASTM 1623) 15.9 MPa; 270 or 250 psi
- Flexural Strength (ASTM D790) 14.5 MPa; 460 or 450 psi
- Service Temperature -20 to 200 F

2.8. Electrical Service Meter Base

Electrical service meter base shall meet or exceed all requirements of the National Electrical Code and the local utility providing the electrical service.

2.9. Electrical Service Disconnect

Electrical service disconnect shall meet or exceed all requirements of the National Electrical Code and the local utility providing the electrical service.

2.10. Flashing Arrow

Flashing Arrow shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.11. Ground Fault Circuit Interrupter (GFCI) Receptacle

Ground Fault Circuit Interrupter Receptacle shall be 2-pole, 3-wire, 20 Amp, 125 Volt, 60 Hz, NEMA 5-20R configuration and meet or exceed the following standards and certifications:

- NEMA WD-1 and WD-6
- UL 498 and 943
- NOM 057
- ANSI C-73

This item shall include a UL listed, 4 inch x4 inch x 2¹/₈ inch box with ¾ inch side and end knockouts and a 1½ inches deep, single-receptacle cover to house the GFCI receptacle. Box and cover shall be hot rolled, galvanized steel with a minimum thickness of 0.62 inches.

2.12. Grounding

2.12.1. Ground Rod

Ground Rod shall be composite shaft consisting of a pure copper exterior (5 mil minimum) that has been inseparably molten welded to a steel core. Ground Rod shall have a minimum diameter of 5/8 inch, a minimum length of 8 feet and shall be manufactured for the sole purpose of providing electrical grounding.

2.12.2. Ground Rod Clamp

Ground rod shall be equipped with a one piece cast copper or bronze body with a non-ferrous hexagonal head set screw and designed to accommodate a 10 AWG solid through 2 AWG stranded grounding conductor.

2.13. Grout

2.13.1. Grout for Inductive Loop Installation

Grout for inductive loop installation shall be non-shrink, shall meet the requirements of the *Standard Specifications for Road and Bridge Construction*,

and shall be included on the KYTC Division of Materials, *List of Approved Materials*.

2.13.2. Grout for Piezoelectric Sensor Installation

Grout for piezoelectric sensor installation shall be per the piezoelectric sensor manufacturer's recommendation. Grout shall be suitable for installation in both asphalt and Portland cement pavements. Grout shall have a short curing time (tack free in ten minutes; open to traffic in forty minutes; and fully cured within sixty minutes) to prevent unnecessary lane closure time and should be of sufficient consistency to prevent running when applied on road surfaces with a drainage cross slope. Particulate matter within the grout shall not separate or settle and the grout shall not shrink during the curing process.

2.14. Hardware

Except where specified otherwise, all hardware such as nuts, bolts, washers, threaded ends of fastening devices, etc. with a diameter less than 5/8 inch shall be passivated stainless steel, alloy type 316 or type 304. Stainless steel hardware shall meet ASTM F593 and F594 for corrosion resistance. All other nuts and bolts shall meet ASTM A307 and shall be galvanized.

2.14.1. Conduit Strap

Conduit strap shall be double-hole, stainless steel, and sized to support specified conduit. Conduit strap shall attach to wood pole or post with two 2 1/4 inch wood screws.

2.14.2. Mounting Strap for Pole Mount Cabinet

Mounting strap for pole mount cabinet shall be 3/4 inch x 0.03 inch stainless steel; equipped with clips or buckles to securely hold strap.

2.14.3. Metal Framing Channel and Fittings

Metal framing channel shall be 1 5/8 inches wide galvanized steel that conforms to ASTM A1011 and ASTM A653. One side of the channel shall have a continuous slot with in-turned edges to accommodate toothed fittings.

Fittings shall be punch pressed from steel plates and conform to ASTM A575 and the physical requirements of ASTM A1011.

2.15. Junction Box

2.15.1. Junction Box Type A, B, or C

Junction Box Type A, B, or C shall meet or exceed ANSI/SCTE 77-2007, Tier 15. Box shall have an open bottom. A removable, non-slip cover marked "PLANNING" shall be equipped with a lifting slot and attached with a minimum of two 3/8 inch stainless steel hex bolts and washers. Type A Box shall have nominal inside dimensions of 13 inches wide by 24 inches long by 18 inches deep. Type B Box shall have nominal inside dimensions of 11 inches wide by 18 inches long by 12

inches deep. Type C Box shall have nominal inside dimensions of 24 inches wide by 36 inches long by 30 inches deep.

2.15.2. Aggregate for Junction Box Type A, B, or C

Aggregate for junction box type A, B, or C shall be gradation size no. 57 and conform to the *Standard Specifications for Road and Bridge Construction*.

2.15.3. Junction Box 10x8x4

Junction Box Type 10x8x4 shall be constructed of a UV-stabilized, nonmetallic material or non-rusting metal and be weatherproof in accordance with NEMA 4X. Box shall be equipped with an overhanging door with a continuous durable weatherproof gasket between the body and door. Door shall be hinged with stainless steel screws, hinge(s) and pin(s) and shall be equipped with a stainless steel padlockable latch on the side opposite the hinge(s). Junction Box 10x8x4 shall have minimum inside dimensions of 10 inches high by 8 inches wide by 4 inches deep.

2.16. Maintain and Control Traffic

Materials for the bid item Maintain and Control Traffic shall conform to the *Standard Specifications for Road and Bridge Construction*, and the KYTC Department of Highways *Standard Drawings*.

2.17. Piezoelectric Sensor

Piezoelectric sensor (piezo) shall provide a consistent level voltage output signal when a vehicle axle passes over it, shall have a shielded transmission cable attached, and shall meet the following requirements:

- Dimensions: such that sensor will fit in a ¾ inch wide by 1 inch deep saw cut. Total length shall be 6 feet unless specified otherwise.
- Output uniformity: ± 7% (maximum)
- Typical output level range: 250mV (minimum) from a wheel load of 400 lbs.
- Working temperature range: -40° to 160° F.
- Sensor life: 30 million Equivalent Single Axle Loadings (minimum)

Shielded transmission cable shall be coaxial and shall meet the following requirements:

- RG 58C/U with a high density polyethylene outer jacket rated for direct burial
- Length shall be a minimum of 100 feet. Installations may exceed 100 feet so the piezo shall be supplied with a lead-in of appropriate length so that the cable can be installed splice-free from the piezo to the cabinet.
- Soldered, water resistant connection to the sensor.

One installation bracket for every 6 inches of sensor length shall also be supplied. Piezo shall be a RoadTrax BL Class I or approved equal.

2.18. Saw Slot Sealant

Saw Slot Sealant shall be non-shrink, non-stringing, moisture cure, polyurethane

encapsulant suitable for use in both asphalt and concrete pavements. It shall provide a void-free encapsulation for detector loop cables and adequate compressive yield strength and flexibility to withstand heavy vehicular traffic and normal pavement movement.

The cured encapsulant shall meet or exceed the following:

- Hardness (Indentation): 35-65 Shore A, ASTM D2240
- Tensile Strength: 150 psi minimum, ASTM D412
- Elongation: 125% minimum 2 inch/minute pull, ASTM D412
- Tack-free Drying Time: 24 hours maximum, ASTM C679
- Complete Drying Time: 30 hours maximum, KM 64-447
- Chemical Interactions (seven day cure at room temperature, 24-hour immersion, KM 64-446):
 - Motor Oil: No effect
 - Deicing Chemicals: No effect
 - Gasoline: Slight swell
 - Hydraulic Brake Fluid: No effect
 - Calcium Chloride (5%): No effect

2.19. Seeding and Protection

Material for Seeding and Protection shall be Seed Mixture Type I and conform to the *Standard Specifications for Road and Bridge Construction*.

2.20. Signs

Materials for signs shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.21. Splicing Materials

2.21.1. Electrical Tape

Electrical tape shall be a premium grade, UL-listed, all-weather, vinyl-insulating tape with a minimum thickness of 7 mil. Tape shall be flame retardant and resistant to abrasion, moisture, alkalis, acids, corrosion, and weather (including ultraviolet exposure).

2.21.2. Splice Kit

Splice kit shall be inline resin-type and rated for a minimum of 600V. Resin shall be electrical insulating-type and shall provide complete moisture and insulation resistance.

2.22. Steel Reinforcing Bar

Steel reinforcing bar shall be #5 and shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.23. Terminal Block

Terminal block shall be rated for a minimum of 300 V and have a minimum of six

terminal pairs with 9/16-inch nominal spacing (center to center) for connecting loop and piezoelectric sensor wires to cable assemblies. Terminal block shall have screw type terminal strips to accommodate wire with spade-tongue ends.

2.24. Warning Tape

Warning tape shall be acid and alkali resistant formulated for direct burial. Tape shall be a minimum of 3 inches wide by 4.0 mils (nominal) thick, and shall be permanently imprinted with a minimum 1 inch black legend on a red background warning of an electric line. Tape shall meet or exceed the following industry specifications:

- American Gas Association (AGA) 72-D-56
- American Petroleum Institute (API) RP 1109
- American Public Works Association (APWA) Uniform Color Code
- Department of Transportation (DOT) Office of Pipeline Safety USAS B31.8
- Federal Gas Safety Regulations S 192-321 (e)
- General Services Administration (GSA) Public Buildings Service Guide: PBS 4-1501, Amendment 2
- National Transportation Safety Board (NTSB) PSS 73-1
- Occupational Safety and Health Administration (OSHA) 1926.956 (c) (1)

2.25. Wire and Cable

All cable and wire shall be plainly marked in accordance with the National Electrical Code (NEC).

2.25.1. Loop Wire

Loop wire shall be 14 AWG, stranded, copper, single conductor, and shall conform to the International Municipal Signal Association (IMSA) Specification No. 51-7.

2.25.2. Cable No. 14/1 Pair

Cable No. 14/1 pair loop lead-in cable shall be 14 AWG, stranded, copper paired, electrically shielded conductors, and shall conform to IMSA 19-2.

2.25.3. Grounding conductor

Grounding conductor and bonding jumper shall be solid or stranded, 4 AWG bare copper.

2.25.4. Service Entrance Conductor

Service entrance conductor shall be stranded, copper, Type USE-2, sized as required to comply with the NEC.

2.25.5. Terminal for electrical wire or cable

Terminal for electrical wires or cables shall be insulated, solderless, spade tongue terminals of correct wire and stud size. Terminal for electrical wires or cables shall be incidental to the wire or cable (including piezoelectric sensor transmission cable) to be connected to terminal strips.

2.26. Wood Post

Wood post shall be Southern Pine pretreated to conform to the American Wood Preservers' Association (AWPA) C-14 and shall have minimum dimensions of 4 inches by 4 inches by 8 feet long (for Galvanized Steel Cabinet) or 4 feet long (for Junction Box 10x8x4), sawed on all four sides with both ends square.

2.27. Wooden Pole

Wooden pole shall be a Class IV wood pole of the length specified and shall conform to the *Standard Specifications for Road and Bridge Construction* except the pole shall be treated in accordance with AWPA P9 Type A.

3. CONSTRUCTION METHODS

The plans indicate the extent and general arrangement of the installation and are for guidance. When the Contractor deems any modifications to the plans or specifications necessary, details of such changes and the reasons shall be submitted in writing to the engineer for written approval prior to beginning the modified work.

After the project has been let and awarded, the Division of Construction shall notify the Division of Planning of the scheduled date for a Pre-Construction meeting so that prior arrangements can be made to attend. This will allow the Division of Planning an opportunity to address any concerns and answer any questions that the Contractor may have before beginning the work.

The Division of Planning Equipment Management Team (502-564-7183) shall be notified a minimum of seven days before any work pertaining to these specifications begins to allow their personnel the option to be present during installation.

Unless otherwise specified, installed materials shall be new.

Construction involving the installation of loops or piezoelectric sensors shall not be performed when the temperature of the pavement is less than 38°F.

A final inspection will be performed by a member of the Central Office Division of Planning equipment staff after the installation is complete to verify that the installation is in compliance with the plans and specifications.

Any required corrective work shall be performed per the *Standard Specifications for Road and Bridge Construction*.

3.1. Anchoring

Furnish: Anchor, anchor rod, guy wire, strand vise, guy guard.

Anchor shall be installed in relatively dry and solid soil. Rock anchor shall be installed in solid rock. Excavate the hole at a 45° to 60° angle in line with the guy (hole size shall be slightly larger than the expanded anchor – see manufacturer's recommendation). Attach rod to anchor, install assembly into hole, and expand anchor. Backfill and tamp entire disturbed area. The effectiveness of the anchor is dependent upon the thoroughness of backfill tamping. Attach guy to strand vise on pole and anchor rod and tighten to required tension. Install guy guard on guy.

3.2. Bore and Jack Pipe – 2”

Furnish: Steel Encasement Pipe, 2”

Bore and jack pipe – 2” shall conform to the Section 706 of the *Standard Specifications for Road and Bridge Construction*.

3.3. Cleanup and Restoration

Furnish: Seed Mix Type 1 (as required); fertilizer (as required); agricultural limestone (as required); mulch or hydromulch (as required); tackifier (as required).

The Contractor shall be responsible for repairing any damage to public and/or private property resulting from his work. Upon completion of the work, restore all disturbed highway features in like kind design and materials. This shall include filling any ruts and leveling ground appropriately. Contractor shall dispose of all waste and debris off the project. Sow all disturbed earthen areas with Seed Mix Type 1 per Section 212 of the *Standard Specifications for Road and Bridge Construction*. All materials and labor necessary for cleanup and restoration shall be considered incidental to other bid items.

3.4. Conduit

Furnish: Conduit; conduit fittings; bushings (grounding where required); LB condulets (as required); weatherheads (as required); conduit straps; hardware; conduit sealant.

Conduit that may be subject to regular pressure from traffic shall be laid to a minimum depth of 24 inches below grade. Conduit that will not be subject to regular pressure from traffic shall be laid to a minimum depth of 18 inches below grade.

Conduit ends shall be reamed to remove burrs and sharp edges. Cuts shall be square and true so that the ends will butt together for the full circumference of the conduit. Tighten couplings until the ends of the conduit are brought together. Do not leave exposed threads. Damaged portions of the galvanized surfaces and untreated threads resulting from field cuts shall be painted with an Engineer-approved, rust inhibitive paint. Conduit bends shall have a radius of no less than 12 times the nominal diameter of the conduit, unless otherwise shown on the plans.

Contractor shall install a bushing (grounding bushing where required) on both ends of all conduits. Cap spare conduits on both ends with caps or conduit sealant.

Conduit openings in junction boxes and cabinets shall be waterproofed with a flexible, removable conduit sealant, working it around the wires, and extending it a minimum 1 inch into the end of the conduit.

After the conduit has been installed and prior to backfilling, the conduit installation shall be inspected and approved by the Engineer.

3.5. Electrical Service

Furnish: Meter base, service disconnect, wire, GFCI AC duplex receptacle with box and cover; conduit, conduit fittings, bushings (grounding where required); LB condulets (as required); weatherhead; conduit straps; hardware; conduit sealant; ground rod with clamp; grounding conductor.

Prior to any construction, the Contractor shall initiate a work order with the local power

company for the installation of electrical service to the site. A representative from the Division of Planning and the local power company shall be consulted prior to choosing an exact location for the pole. The Contractor shall clear the right-of-way for the electrical service drop.

Contractor shall obtain electrical inspections, memberships, meter base, service disconnect and any other requirements by the utility serving the installation and pay all fees as required.

Install meter-base and disconnect panel with a 30-ampere, fused, circuit breaker inside. Install a manufactured weatherproof hub connectors to connect the conduit to the top of the meter base and service disconnect.

Install a rigid $\frac{3}{4}$ inch conduit with three 8 AWG service conductors from the cabinet, through the service disconnect to the meter base and a 1 $\frac{1}{4}$ " conduit with three 8 AWG service conductors from the meter base to a weatherhead two feet from the top of the electrical service pole. Install conduit straps 30 inches on center and provide a drip loop where the wire enters the weatherhead. Splice electric drop with service entrance conductors at the top of the pole.

The limit of conduit incidental to "Install Electrical Service" for a pad mounted cabinet is 24 inches beyond face of service pole.

Install a 120-volt, 20-amp GFCI AC duplex receptacle with box and cover in the automatic data recorder (ADR) cabinet.

Install a ground rod with clamp. Install a grounding conductor wire from the meter base, through the disconnect panel, to the ground rod clamp. Install grounding conductor in 1- $\frac{3}{4}$ " conduit from service disconnect to ground rod.

After completing the installation and before the electrical service is connected, obtain a certificate of compliance from the Kentucky Department of Housing, Buildings and Construction, Electrical Inspection Division.

3.6. Flashing Arrow

Furnish: Arrow Panel

Construction of Flashing Arrow shall conform to the *Standard Specifications for Road and Bridge Construction*.

3.7. Galvanized Steel Cabinet

Furnish: Cabinet; wood posts; concrete; conduit fittings; metal framing channel; pipe clamp; terminal block(s); spade tongue wire terminals; wire labels; hardware.

Where right-of-way allows, locate the cabinet such that it is outside the clear zone in accordance with the *Roadside Design Guide*. Install Cabinet such that the door of the

cabinet faces the roadway.

Excavate as required and install wood posts to a depth of 36 inches and place concrete around posts as shown on the standard detail sheets. Install metal framing channel with pipe clamp between posts.

Install Cabinet on wood posts 38 inches above the finished grade as shown on the standard detail sheets. Install a unistrut between posts when two posts are specified.

Install the required number of terminal blocks on the cabinet back plate. Install a spade tongue terminal on each loop and piezo sensor wire entering the cabinet and connect wires to terminal block(s). Wiring shall be neat and orderly. Label all wires and cables inside cabinet.

Install conduit from ground to cabinet and attach to pipe clamp. Install locknuts to attach conduit to cabinet and install a conduit bushing as shown on the standard detail sheets.

3.8. Grounding

Furnish: Ground rod with clamp; grounding conductor.

At sites with electrical or solar service, all conduits, poles, and cabinets shall be bonded to ground rods and the electrical system ground to form a complete grounded system.

Install such that top of ground rod is a minimum of 3 inches below finished grade.

Grounding systems shall have a maximum 25 ohms resistance to ground. If the resistance to ground is greater than 25 ohms, two or more ground rods connected in parallel shall be installed. Adjacent ground rods shall be separated by a minimum of 6 feet.

3.9. Install Pad Mount Enclosure

Furnish: Concrete; anchor bolts with washers and nuts; conduit; conduit fittings; conduit grounding bushings; ground rod with clamp; grounding conductor; conduit sealant; wooden stakes (where required); wire labels; hardware.

The Contractor shall be responsible for securing the enclosure from the Central Office Division of Planning Warehouse in Frankfort and transporting it to the installation site.

Where right-of-way allows, locate the enclosure such that it is outside the clear zone in accordance with the *Roadside Design Guide*.

Excavate as required, and place concrete to construct the enclosure foundation as specified on the standard detail sheets. Install enclosure on the concrete base such that the door(s) of the enclosure opens away from traffic (hinges away from traffic). Install anchor bolts, washers, and nuts to secure the enclosure to the foundation.

Install ground rod with clamp and install one ¾ inch rigid conduit from enclosure base to

ground rod. Install a grounding conductor from ground rod to enclosure base and bond to each conduit bushing in the base.

Install one ¾ inch rigid steel conduit for electrical service from the base of the enclosure to 24 inches beyond the concrete base. Make all field wiring connections to the electrical service, as applicable.

If electrical service is not provided as a bid item in the contract, plug conduit on both ends with a cap, conduit sealant, or electrical tape. Mark the location of the buried conduit end with a wooden stake labeled “¾ in. conduit.”

Install specified rigid steel conduit(s) into the base of the enclosure for sensor wire entry. Install one spare 2 inch conduit from the enclosure base to 2 feet beyond the concrete base. Plug spare conduit on both ends with a cap, conduit sealant or electrical tape.

The limit of all conduits incidental to “Install Pad Mount Enclosure” is 24 inches beyond the edge of the concrete base.

Wiring in enclosure shall be neat and orderly. Label all wires and cables inside enclosure. KYTC personnel will furnish and install terminal blocks and connect sensors to terminal blocks.

3.10. Install Controller Cabinet

Furnish: Mounting brackets; mounting straps; conduit; LB condulets; conduit fittings; conduit grounding bushings; ground rod with clamp; grounding conductor; cable staples; conduit sealant; wooden stakes (where required); wire labels; hardware.

The Contractor shall be responsible for securing the cabinet from the Central Office Division of Planning Warehouse in Frankfort and transporting it to the installation site. Any existing holes in the cabinet not to be reused shall be covered or plugged to meet NEC requirements.

Install mounting brackets and secure cabinet to pole with mounting straps.

Install a ground rod with clamp. Install grounding conductor in 1-¾” conduit from cabinet to ground rod.

Install one ¾ inch rigid steel conduit with two lb condulets from cabinet to electrical service disconnect box. Make all field wiring connections to the electrical service, as applicable.

If electrical service is not provided as a bid item in the contract, plug conduit on both ends with cap, plumbers putty, conduit sealant, or electrical tape. Mark the location of the buried conduit end with a wooden stake labeled “¾ in. conduit”.

Install specified rigid steel conduit(s) and type LB condulet(s) into the bottom of the

cabinet for sensor wire entry. The limit of conduits incidental to "Install Controller Cabinet" is 24 inches beyond the face of the pole.

Wiring in cabinet shall be neat and orderly. Label all wires and cables inside cabinet. KYTC personnel will furnish and install terminal blocks and connect sensors to terminal blocks.

3.11. Junction Box Type 10x8x4

Furnish: Junction box; wood post; conduit fittings; wire labels; hardware.

Where right-of-way allows, locate the junction box such that it is outside the clear zone in accordance with the Roadside Design Guide.

Excavate as required and install wood post(s) to a depth of 18 inches. Install junction box on wood post such that the bottom of the box is 18 inches above the finished grade as shown on the standard detail sheets. Box shall be installed with four (4) 2½ inch wood screws and washers.

Install locknuts to attach conduit to junction box and install a conduit bushing as shown on the standard detail sheets.

Wiring inside box shall be neat and orderly. Label all wires and cables inside box.

3.12. Junction Box Type A, B, or C

Furnish: Junction box, No. 57 aggregate; grounding conductor

Excavate as required and place approximately 12 inches of No. 57 aggregate beneath the proposed junction box to allow for drainage. Install specified junction box type A, B, or C near the edge of pavement, flush with finished grade per the detail sheets. Where required, orient the box so that the dimensions comply with the National Electrical Code. Stub conduits with grounding bushings into junction box at its base to accommodate wires and connect grounding conductor to all grounding bushings. Backfill to existing grade, and restore disturbed area to the satisfaction of the Engineer.

Wiring inside box shall be neat and orderly. Label all wires and cables inside box.

3.13. Loops - Proposed

Furnish: Wire; saw slot sealant; backer rod; grout; conduit sealant.

The plans and notes specify the approximate location for loop installations. Prior to sawing slots or drilling cores, the Contractor shall meet with a representative of the Division of Planning to verify the precise layout locations on site. Avoid expansion joints and pavement sections where potholes, cracks, or other roadway flaws exist.

Upon completion of this meeting, the Contractor shall measure out and mark the proposed loop locations with spray paint or chalk such that the saw slots will be parallel

and perpendicular to the direction of traffic. Marked lines shall be straight and exact to the locations determined and sized as shown on the plans. Unless indicated otherwise, loops shall be 6 feet by 6 feet square and loops in the same lane shall be spaced 16 feet from leading edge to leading edge.

On resurfacing, rehabilitation, and new construction projects that include new asphalt pavement, the Contractor shall install loops prior to laying the final surface course. On projects with milling and texturing, the Contractor may install the loops prior to or after the milling operation; however, if installed prior to milling, the Contractor shall be responsible for ensuring that the loops are installed at a depth such that the milling operation will not disturb the newly installed loops. The Contractor shall correct damage caused by the milling operations to newly installed loops prior to placement of the final surface course at no additional cost to the Cabinet.

For projects that include the installation of new asphalt and piezoelectric sensors, the Contractor shall mark or otherwise reference all loops installed prior to the final surface course such that the loops can be accurately located when the piezoelectric sensors are installed after placement of the final surface course.

For projects that do not have asphalt surfacing, the Contractor shall install the loops in the surface of the pavement.

The Prime Contractor shall coordinate the installation of loops with the electrical sub-Contractor and the Engineer to ensure correct operation of the completed installation.

The following is a typical step by step procedure for the installation of a loop.

- Carefully mark the slot to be cut, perpendicular to the flow of traffic and centered in the lane.
- Make each saw-cut 3/8-inch wide and at a depth such that the top of the backer rod is a minimum of 2 inches below the surface of rigid (PCC/Concrete) pavement or 4 inches below the surface of asphalt pavement.
- Drill a 1½ inch core hole at each corner and use a chisel to smooth corners to prevent sharp bends in the wire.
- Clean ALL foreign and loose matter out of the slots and drilled cores and within 1 foot on all sides of the slots using a high pressure washer.
- Completely dry the slots and drilled cores and within 1 foot on all sides of the slots using oil-free forced air, torpedo heaters, electric heaters, or natural evaporation, depending on weather conditions. Be very careful not to burn the asphalt if heat is used.
- Measure 9-12 inches from the edge of the paved surface (shoulder break or face of curb) and drill a 1½ inch hole on a 45° angle to the conduit adjacent to the roadway.
- Closely inspect all cuts, cores, and slots for jagged edges or protrusions prior to the placement of the wire. All jagged edges and protrusions shall be ground or re-cut and cleaned again.

- Place the loop wire splice-free from the termination point (cabinet or junction box) to the loop, continue around the loop for four turns, and return to the termination point.
- Push the wire into the saw slot with a blunt object such as a wooden stick. Make sure that the loop wire is pushed fully to the bottom of the saw slot.
- Install conduit sealant to a minimum of 1" deep into the cored 1½ inch hole.
- Apply loop sealant from the bottom up and fully encapsulate the loop wires in the saw slot. The wire should not be able to move when the sealant has set.
- Cover the encapsulated loop wire with a continuous layer of backer rod along the entire loop and home run saw slots such that no voids are present between the loop sealant and backer rod.
- Finish filling the saw cut with non-shrinkable grout per manufacturer's instructions. Alleviate all air pockets and refill low spaces. There shall be no concave portion to the grout in the saw slot. Any excess grout shall be cleaned from the roadway to alleviate tracking.
- Clean up the site and dispose of all waste off the project.
- Ensure that the grout has completely cured prior to subjecting the loop to traffic. Curing time varies with temperature and humidity.

Exceptions to installing loop wire splice-free to the junction box or cabinet may be considered on a case-by-case basis and must be pre-approved by the Engineer. If splices are allowed, they shall be located in a junction box and shall conform to the construction note for Splicing.

If loop lead-in cable (Cable No. 14/1 Pair) is specified, cable shall be installed splice free to the cabinet ensuring that extra cable is left in each junction box or cabinet. All wires and cables shall be labeled in each junction box and cabinet.

Loop inductance readings shall be between 100 and 300 microhenries. The difference of the loop inductance between two loops in the same lane shall be ± 20 microhenries. Inductance loop conductors shall test free of shorts and grounds. Upon completion of the project, all loops must pass an insulation resistance test of a minimum of 100 million ohms to ground when tested with a 500 Volt direct current potential in a reasonably dry atmosphere between conductors and ground.

3.14. Loops – Existing

When noted on a data collection station layout sheet that there are existing inductive loops within the limits of the project, notify the Engineer in writing, a minimum of 14 calendar days prior to beginning milling operations. After milling and prior to placing asphalt inlay, conduct an operating test on the existing inductance loops at the control cabinet in the presence of the Engineer to determine if the inductance loop conductors have an insulating resistance of a minimum of 100 megohms when tested with a 500 volt direct current potential in a reasonably dry atmosphere between conductors and ground. The Department may also conduct its own tests with its own equipment.

If the tests indicate the loop resistances are above the specified limit and the Engineer determines the system is operable, proceed with the asphalt inlay. If the test indicates the loop resistance is not within the specified limits or if the Engineer determines the system is otherwise not operable, prior to placing the asphalt inlay install and test new loop detectors according to the station layout, notes, and Detail Drawings.

The Engineer will contact and maintain liaison with the District Planning Engineer and the Division of Planning in order to coordinate any necessary work.

3.15. Maintain and Control Traffic

Furnish (all as required): Drums, traffic cones, barricades used for channelization purposes, delineators, and object markers.

Maintain and Control Traffic shall conform to the plans, the Standard Specifications for Road and Bridge Construction, and the KYTC Department of Highways Standard Drawings.

3.16. Open Cut Roadway

Furnish: Concrete, reinforcing bars.

Excavate trench by sawing and chipping away roadway to dimensions as indicated on the detail sheets. After placing conduit, install concrete and steel reinforcing bars per the *Standard Specifications for Road and Bridge Construction*. Restore any disturbed sidewalk to its original condition.

3.17. Piezoelectric Sensor

Furnish: Piezoelectric sensor and cable; sensor support brackets; saw slot sealant; backer rod; grout; conduit sealant.

The plans and notes specify the approximate location for piezoelectric sensor (piezo) installations. Prior to sawing slots or drilling cores, the Contractor shall meet with a representative of the Division of Planning to verify the final layout on site. Avoid expansion joints and pavement sections where potholes, cracks, or other roadway flaws exist. Roadway ruts at the proposed piezo location shall not be in excess of 1/2 inch under a 4-foot straight edge.

Install the piezo perpendicular to traffic in the final surface course of the pavement. Locate the sensor in the lane as shown on the site layout drawing. Eleven-foot length sensors shall be centered in the lane.

The following is a typical step by step procedure for the installation of a piezo. Refer specifically to the manufacturer's instructions provided with the sensor prior to installation.

- Carefully mark the slot to be cut, perpendicular to the flow of traffic and properly positioned in the lane.

- It is strongly recommended that a ¾ inch wide diamond blade be used for cutting the slot, or that blades be ganged together to provide a single ¾ inch wide cut. The slot shall be wet cut to minimize damage to the pavement.
- Cut a slot ¾ inch wide ($\pm 1/16$ inch) by 1 inch minimum deep. The slot should be a minimum of 2 inches longer than the sensor (including the lead attachment). Drop the saw blade an extra ½ inch down on both ends of the sensor. The lead out of the passive cable should be centered on the slot.
- Cut the slot for the passive cable ¼ inch wide and at a depth so that the top of the backer rod is a minimum of 2 inches below the road surface.
- Clean ALL foreign and loose matter out of the slot and within 1 foot on all sides of the slot using a high pressure washer.
- Completely dry the slot and within 1 foot on all sides of the slot using oil-free forced air, torpedo heaters, electric heaters, or natural evaporation, depending on weather conditions. Be very careful not to burn the asphalt if heat is used.
- Measure 9-12 inches from the edge of the paved surface (shoulder break or face of curb) and drill a 1½ inch hole on a 45° angle to the conduit adjacent to the roadway.
- Place strips of 2-4 inch wide tape strips on the pavement along the lengths of both sides of the sensor slot, 1/8 inch away from the slot.
- Wear clean, protective latex (or equivalent) gloves at all times when handling sensors. Visually inspect sensor to ensure it is straight. Check lead attachment and passive cable for cuts, gaps, cracks and/or bare wire. Verify that the correct sensor type and length is being installed by checking the data sheet. Verify there is sufficient cable to reach the cabinet. Piezo lead-in cable shall not be spliced.
- Test the sensor for capacitance, dissipation factor and resistance, according to the directions enclosed with the sensor. Capacitance and dissipation should be within $\pm 20\%$ of the piezo data sheet. Resistance (using the 20M setting) should be infinite. Record the sensor serial number and the test results and label "pre-installation." This information should be stored in the counter cabinet and/or returned to Department Planning personnel.
- Lay the sensor next to the slot and ensure that it is straight and flat.
- Clean the sensor with steel wool or an emery pad and wipe with alcohol and a clean, lint-free cloth.
- Place the installation bracket clips every 6 inches along the length of the sensor.
- Bend the tip of the sensor downward at a 30° angle. Bend the lead attachment end down at a 15° angle and then 15° back up until level (forming a lazy Z).
- Place the sensor in the slot, with the brass element 3/8 inch below the road surface along the entire length. The tip of the sensor should be a minimum of 2 inches from the end of the slot and should not touch the bottom of the slot. The top of the plastic installation bracket clips should be 1/8 inch below the surface of the road. The lead attachment should not touch the bottom or sides of the slot. Ensure the sensor ends are pushed down per the manufacturer's instructions.
- Visually inspect the length of the sensor to ensure it is at uniform depth along its length and it is level (not twisted, canted or bent).

- On the passive cable end, block the end of the slot approximately 3-5 inches beyond the end of the lead attachment area creating an adequate “dam” so that the sensor grout does not flow out.
- Use one bucket of sensor grout per piezo installation. Overfill the slot with sensor grout and allow to cure for a minimum of 10 minutes before continuing with the installation. Ensure that sensor grout fills around and beneath the sensor completely and that there is not a trough on top.
- Remove the tape along the sides of the saw slot when the adhesive starts to cure.
- Carefully remove the dam from the end of the sensor.
- Route the lead-in cable through the saw slot
- Install conduit sealant to a minimum of 1” deep into the cored 1½ inch hole.
- Cover the lead-in cable with encapsulant, backer rod, and grout.
- If necessary, after the grout has hardened, grind with an angle grinder until the profile is a 1/16 inch mound. There shall be no concave portion to the mound.
- Clean up the site and dispose of all waste off the project.
- Ensure that the sensor grout has completely cured prior to subjecting the sensor to traffic. Curing time will vary with temperature and humidity.

Upon installation, test the sensor for capacitance, dissipation factor and resistance, according to the directions enclosed with the sensor. Capacitance and dissipation should be within $\pm 20\%$ of the piezo data sheet. Resistance (using the 20M setting) should be infinite. Perform a functional test of the piezo with an oscilloscope to ensure that the sensor is generating a proper response to the passage of vehicles.

Record the sensor serial number and the test results and label “post-installation.” This information should be stored in the counter cabinet and/or returned to Department Planning personnel.

3.18. Pole – Wooden

Furnish: Pole; anchoring equipment (as required); hardware (as required).

Excavate and install wood pole to a minimum depth of one-sixth the total pole height. Place backfill material in hole and compact until flush with existing grade. Install guy wire, guy guard, anchor, anchor rod, and strand vise, if necessary. Anchor shall be a minimum of one-third the pole height from the face of the pole. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer.

3.19. Removal of Existing Equipment

The Contractor shall remove existing materials (including but not limited to: poles, anchors, cabinets, junction boxes, conduit and wire) not to be reused. Contractor shall dispose of all removed materials off the project. All materials and labor necessary for the removal of existing equipment shall be considered incidental to other bid items.

3.20. Signs

Furnish: Signs; sign standards; hardware.

Construction of signs shall conform to the *Standard Specifications for Road and Bridge Construction*.

3.21. Splicing

Furnish: Splice kit; solder.

These notes describe the splicing process (if permitted) and are not intended to grant permission to splice. Permission to splice shall be determined by the Division of Planning and the locations shall be shown on the layout sheet. If splicing is needed but not shown on the layout sheet, the Contractor shall receive prior written approval from the Division of Planning.

All splices shall conform to the provisions of the NEC.

Splices for loop and loop lead-in wire shall be twisted and soldered. Abrade the outer jacket of both wires to promote good adhesion and prevent capillary leak paths. Seal the splice with an electrical sealing resin. Spliced loop conductors shall test free of shorts and unauthorized grounds and shall have an insulating resistance of at least 100 megohms when tested with a 500 volt direct current potential in a reasonably dry atmosphere between conductors and ground.

For piezos, the same type coax cable, supplied by the manufacturer, shall be used to splice to the sensor's lead-in cable. Cables shall be soldered. Abrade the outer jacket of both cables to promote good adhesion and prevent capillary leak paths. Seal the splice with an electrical sealing resin. Spliced piezo cables shall be tested and have a minimum resistance of 20 megohms, a maximum dissipation factor of 0.03, a capacitance within the manufacturer's recommended range based upon the length of additional cable. A functional test of the piezo shall be performed to ensure that the sensor is generating a proper response to the passage of vehicles.

3.22. Trenching and Backfilling

Furnish: Warning tape; seed mix type I; cereal rye or German foxtail-millet; mulch; concrete (as required); asphalt (as required).

Excavate trench and provide required cover as shown on the standard detail sheets. After placing conduit, backfill material shall be placed and compacted in lifts of 9 inches or less. Install warning tape as shown on the detail sheet. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer. This item shall include concrete, asphalt or approved replacement material for sidewalks, curbs, roadways, etc. (if required).

3.23. Wiring

Furnish: Wire; wire labels; spade tongue wire terminals (as required).

Installation of all wiring shall conform to the NEC. Permanent identification numbers shall be affixed to all wires in all junction boxes and cabinets (see Layout(s) for loop and piezo numbers).

Additional lengths of each loop and piezo sensor wire shall be neatly coiled in all cabinets and junction boxes as follows:

<u>Enclosure Type</u>	<u>Additional length of each wire</u>
Galvanized Steel Cabinet	2' - 3'
Pad Mount Cabinet (332)	6' - 8'
Pole Mount Cabinet (336)	3' - 4'
Junction Box Type 10x8x4	2' - 3'
Junction Box Type A, B, or C	2' - 3'

3.24. Wood Post

Furnish: Wood post; concrete (as required); seed mix type I; cereal rye or German foxtail-millet; mulch.

Excavate hole to specified depth and place concrete, if required. Install post, backfill to existing grade, and tamp backfill. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer.

4. BID ITEM NOTES AND METHOD OF MEASUREMENT FOR PAYMENT

Only the bid items listed will be measured for payment. All other items required to complete the vehicle detection installation shall be incidental to other items of work. Payment at the contract unit price shall be full compensation for all materials, labor, equipment and incidentals to furnish and install these items.

4.1. Bore and Jack Pipe – 2”

Bore and jack pipe – 2” shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.2. Conduit

Conduit shall include furnishing and installing specified conduit in accordance with the specifications. This item shall include conduit fittings, bodies, boxes, weatherheads, expansion joints, couplings, caps, conduit sealant, electrical tape, clamps, bonding straps and any other necessary hardware. Conduit will be measured in linear feet.

4.3. Electrical Service

Electrical Service shall include furnishing and installing all necessary materials and payment of all fees toward the complete installation of an electrical service which has passed all required inspections. Incidental to this item shall be furnishing and installing:

- Meter-base per utility company’s specifications
- Service disconnect panel per utility company’s specifications
- Meter base and service disconnect entrance hubs, waterproof
- Service entrance conductors
- Rigid steel conduit
- Rigid steel conduit fittings
- Conduit straps
- Weatherhead
- Duplex GFCI receptacle, 120-volt, 20-amp
- Ground rod with clamp
- Grounding conductor

Also incidental to this item shall be any necessary clearing of right of way for the electrical service drop.

Electrical service will be measured in individual units each.

4.4. Flashing Arrow

Flashing Arrow shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.5. Galvanized Steel Cabinet

Galvanized Steel Cabinet shall include furnishing and installing galvanized steel cabinet on post as specified. Incidental to this item shall be furnishing and installing grounding hardware, and any necessary post/pole mounting hardware. Also incidental to this item shall be furnishing and installing the required number of terminal blocks and connection of all

sensors to the terminal blocks. Galvanized Steel Cabinet will be measured in individual units each.

4.6. Install Pad Mount Enclosure

Install Pad Mount Enclosure shall include installing a Department-furnished enclosure as specified on the detail sheets.

This item shall include obtaining the enclosure from KYTC and transporting it to the installation site and furnishing and installing the following:

- Concrete foundation (including any excavation necessary)
- Anchor bolts, lock washers, and nuts
- Conduit
- Conduit fittings (including grounding bushings)
- Weatherhead
- Terminal Strip(s)
- Ground rod with clamp
- Grounding conductor

Install Pad Mount Enclosure will be measured in individual units each.

4.7. Install Controller Cabinet

Install Controller Cabinet shall include installing a Department-furnished cabinet as specified on the detail sheets.

This item shall include obtaining the cabinet from KYTC and transporting it to the installation site and furnishing and installing the following:

- Conduit
- Conduit Fittings
- Terminal Strip(s)
- Ground rod with clamp
- Grounding conductor

Install Controller Cabinet will be measured in individual units each.

4.8. Junction Box Type 10" x 8" x 4"

Junction Box Type 10"x8"x4" shall include furnishing and installing specified junction box in accordance with the specifications. This item shall include connectors, splice sleeves, conduit fittings, mounting materials and any other items required to complete the installation. Incidental to this item shall be furnishing and installing specified post (wood, channel, metal, etc.) as required for the installation. Junction Box Type 10"x8"x4" will be measured in individual units each.

4.9. Junction Box Type A, B, or C

Junction Box Type A, B, or C shall include furnishing and installing specified junction box in accordance with the specifications. This item shall include excavation, furnishing and installing #57 aggregate, backfilling around the box, and restoration of disturbed areas to the satisfaction of the Engineer. Incidental to this item shall be furnishing and installing a

grounding conductor bonding all conduit grounding bushings in the box. Junction Box Type A, B, or C will be measured in individual units each.

4.10. Loop Saw Slot and Fill

Loop Saw Slot and Fill shall include sawing and cleaning saw slots and furnishing and installing conduit sealant, loop sealant, backer rod, grout, or other specified material. Loop Saw Slot and Fill will be measured in linear feet of sawed slot.

4.11. Maintain and Control Traffic

Maintain and Control Traffic shall be measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.12. Open Cut Roadway

Open Cut Roadway shall include excavating trench (sawing and chipping roadway) to dimensions as indicated on the detail sheets and furnishing and placing concrete, steel reinforcing bars, and asphalt. This item also includes restoring any disturbed sidewalk to its original condition. Open Cut Roadway will be measured in linear feet.

4.13. Piezoelectric Sensor

Piezoelectric sensor (piezo) shall include sawing and cleaning saw slots and furnishing and installing piezo in accordance with the specifications. This item shall include furnishing and installing lead-in wire, conduit sealant, encapsulation material, backer rod, grout, testing, and accessories. Piezo will be measured in individual units each.

4.14. Pole – 35' Wooden

Pole – 35' Wooden shall include excavation, furnishing and installing specified wood pole, backfilling and restoring disturbed areas to the satisfaction of the Engineer. Incidental to this item shall be furnishing and installing guy wire, anchor and anchor rod, strand vise, and guy guard, if specified.

Pole – 35' Wooden will be measured in individual units each.

4.15. Signs

Signs shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.16. Trenching and Backfilling

Trenching and Backfilling shall include excavation, warning tape, backfilling, temporary erosion control, seeding, protection and restoration of disturbed areas to original condition. This item shall include concrete, asphalt or approved replacement material for sidewalks, curbs, roadways, etc. (if required). Trenching and backfilling will be measured in linear feet.

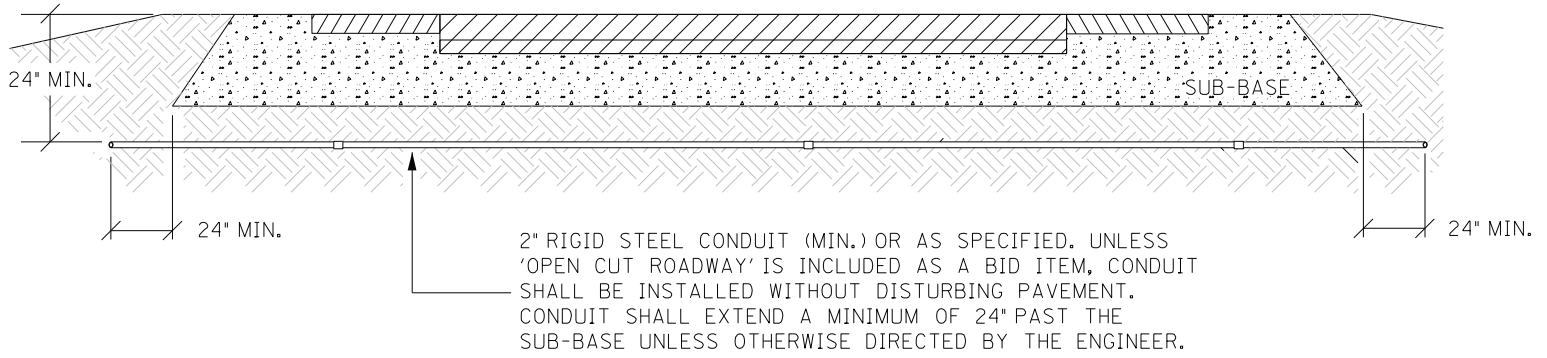
4.17. Wire or Cable

Wire or cable shall include furnishing and installing specified wire or cable within saw slot, conduit, junction box, cabinet, or overhead as indicated on the detail sheets. Incidental to this item shall be the labeling of all wires and cables in each junction box, cabinet and splice

box, and furnishing and installing other hardware required for installing cable. Wire or Cable will be measured in linear feet.

4.18. Wood Post

Wood Post shall include furnishing and installing wood post as specified. This item shall include excavation, furnishing and placing concrete (if required), backfilling around the post, and restoration of disturbed areas to the satisfaction of the engineer. Wood Post will be measured in individual units each.

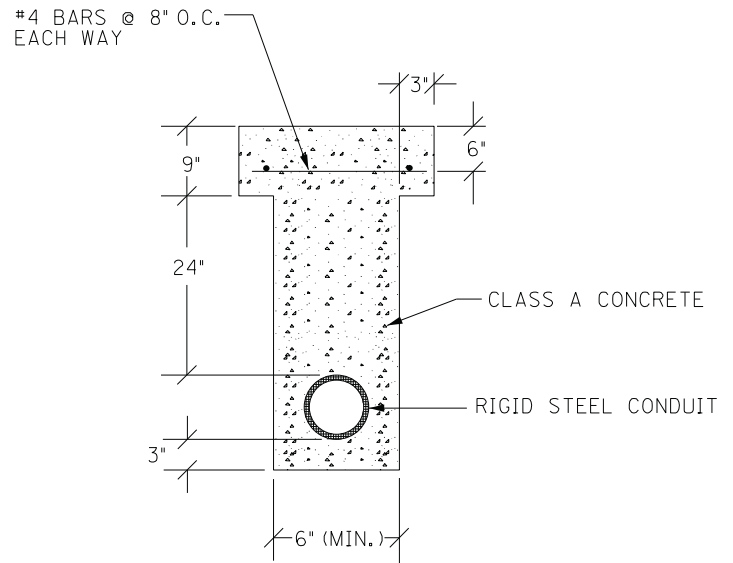
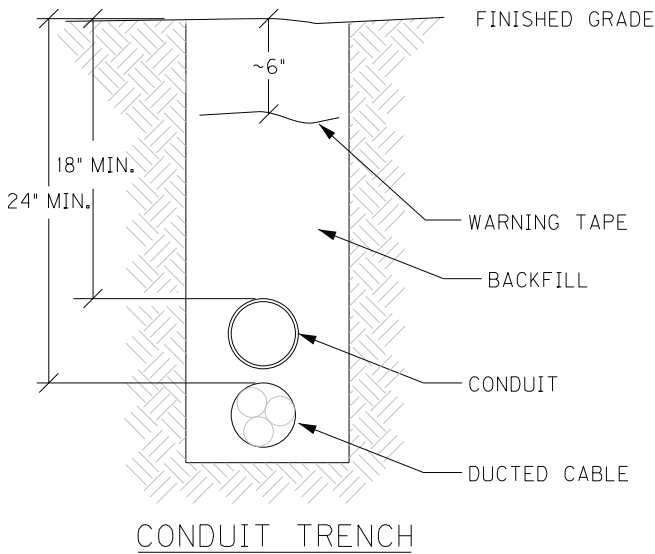


CONDUIT UNDER PAVEMENT

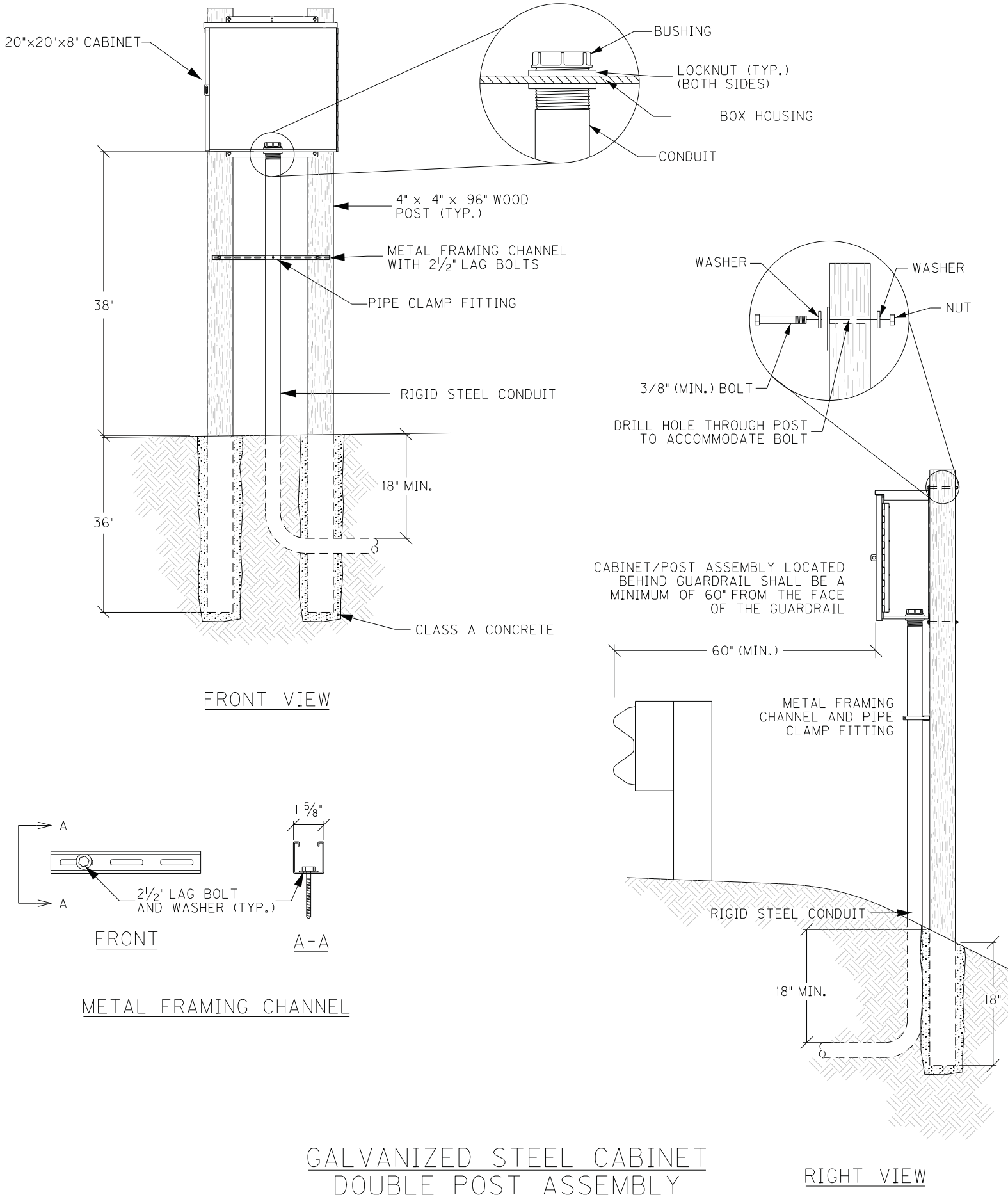
TOTAL TRENCH WIDTH SHALL BE 3" (NOM.) WIDER THAN THE SUM OF THE OUTSIDE DIAMETER(S) OF THE CONDUIT(S) INSTALLED. CONDUIT(S) SHALL BE CENTERED IN TRENCH.

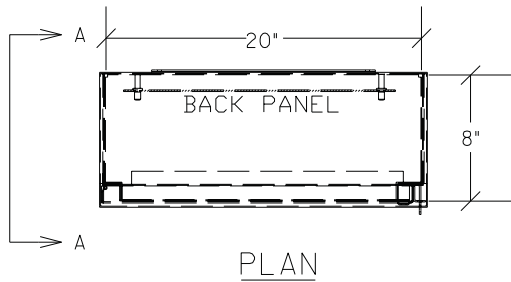
CONTRACTOR SHALL PLACE BACKFILL IN LIFTS (9" MAX.) COMPACT BACKFILL, AND RESTORE DISTURBED AREA TO THE SATISFACTION OF THE ENGINEER

CONTRACTOR SHALL INSTALL UNDERGROUND UTILITY WARNING TAPE ABOVE CONDUIT AS SHOWN.

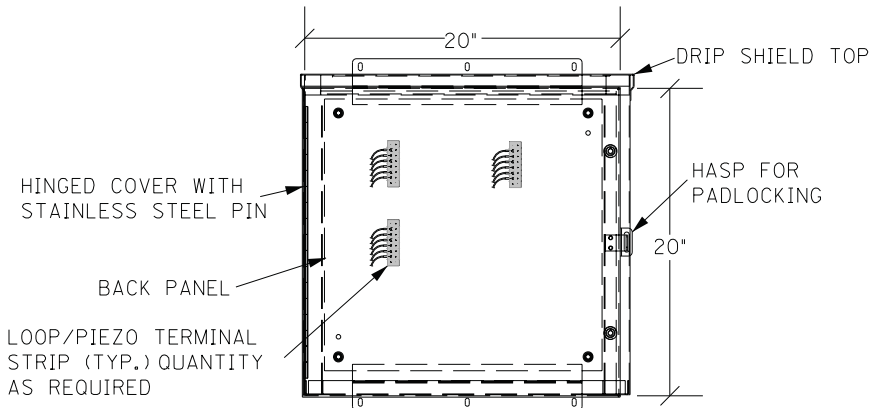
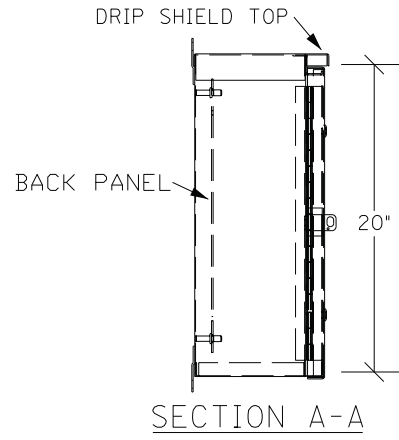


CONDUIT INSTALLATION



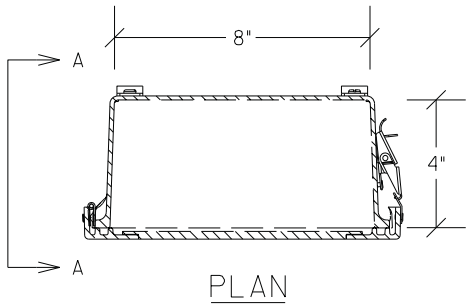


PLAN

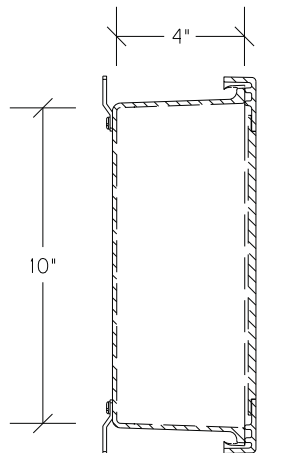


ELEVATION

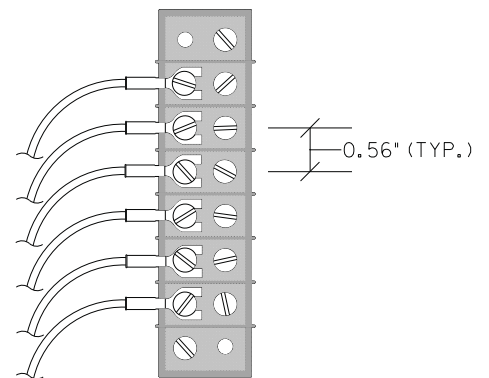
GALVANIZED STEEL CABINET



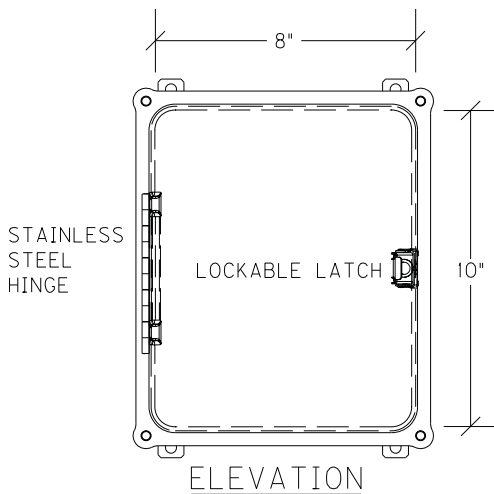
PLAN



SECTION A-A

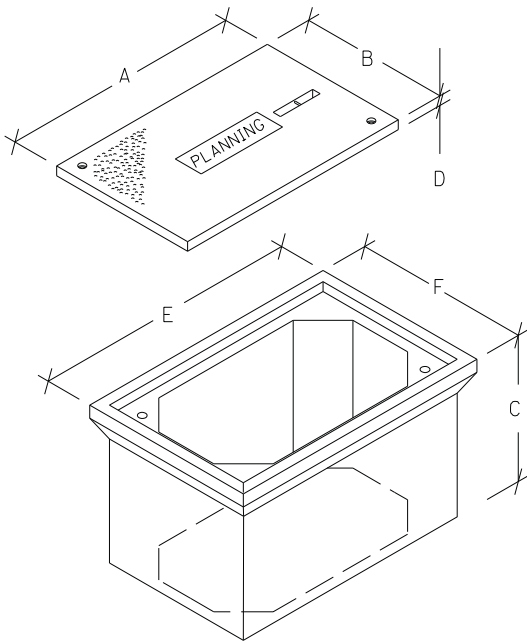


TERMINAL STRIP (TYP.)



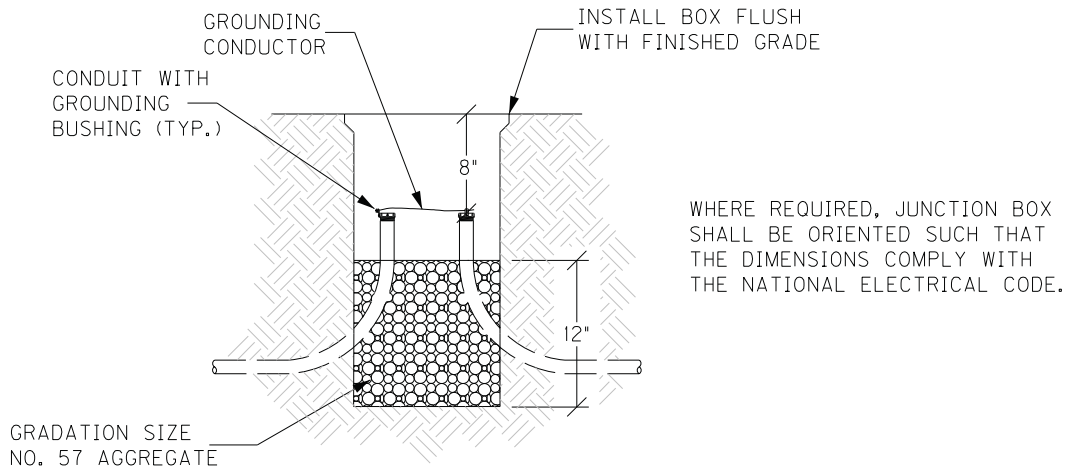
ELEVATION

JUNCTION BOX 10"X8"X4"



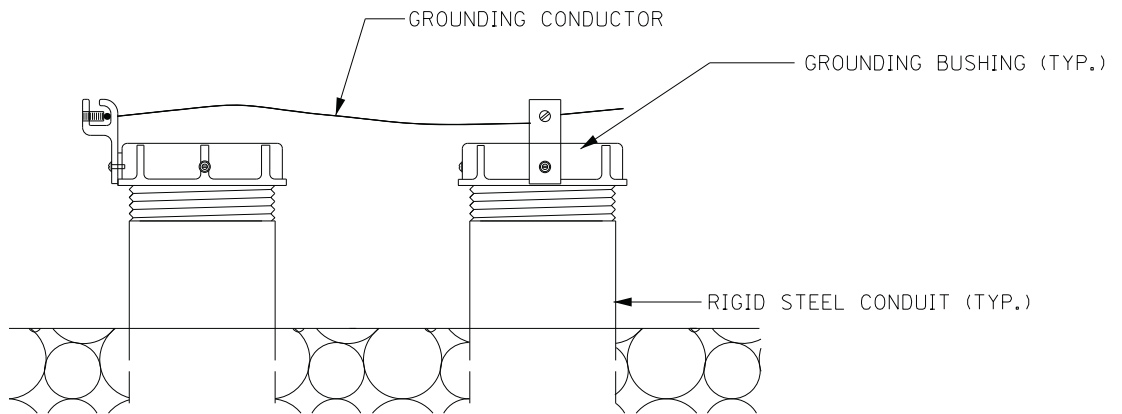
JUNCTION BOX DIMENSIONS (NOMINAL)						
	A	B	C	D*	E	F
TYPE A	23"	14"	18"	2"	25"	16"
TYPE B	18"	11"	12"	1¾"	20"	13"
TYPE C	36"	24"	30"	3"	38"	26"

* MINIMUM
STACKABLE BOXES ARE PERMITTED



WHERE REQUIRED, JUNCTION BOX SHALL BE ORIENTED SUCH THAT THE DIMENSIONS COMPLY WITH THE NATIONAL ELECTRICAL CODE.

ELEVATION

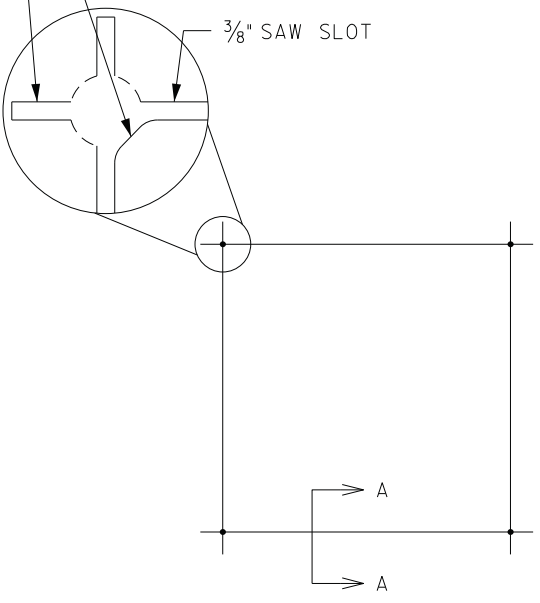


GROUNDING DETAIL

JUNCTION BOX - TYPE A, TYPE B, TYPE C

PERRY COUNTY
NHPP 0151(086)

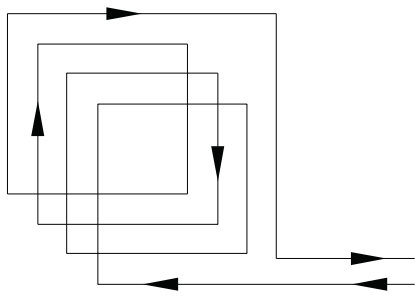
CORE DRILL 1 1/2" HOLE AND/OR
CHISEL CORNER TO SLOT DEPTH
TO ELIMINATE SHARP EDGES



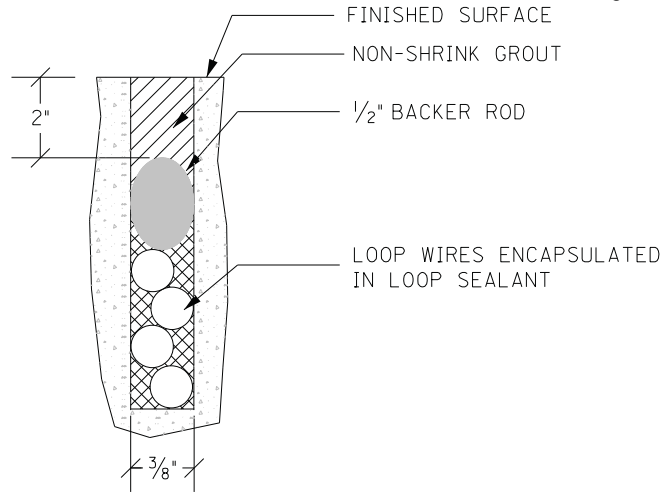
SAW CUT PLAN

UNLESS SPECIFIED OTHERWISE, ALL LOOPS SHALL BE 6' x 6' SQUARE, CENTERED IN EACH LANE, WITH FOUR TURNS OF 14 AWG LOOP WIRE.

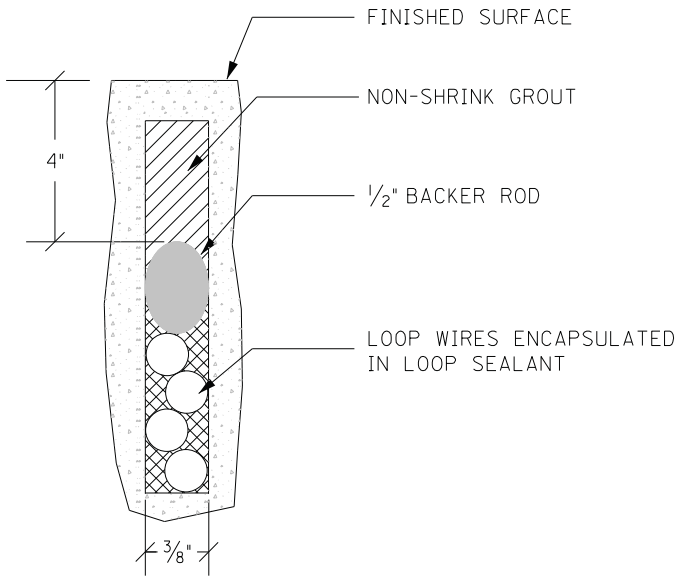
ADJACENT SAW SLOTS SHALL BE A MINIMUM OF 12" APART.



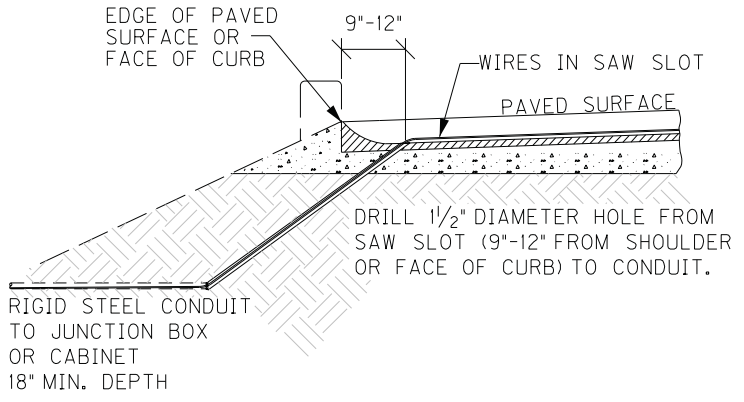
WIRING PLAN



SECTION A-A (CONCRETE)

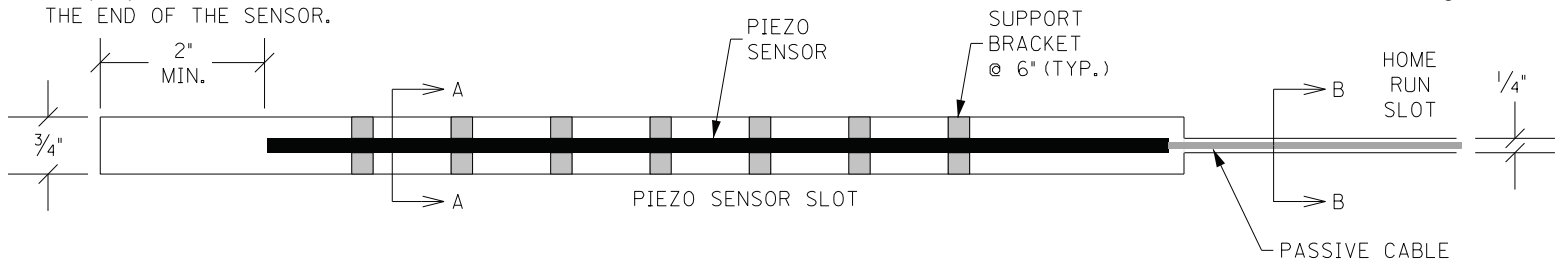


SECTION A-A (ASPHALT)

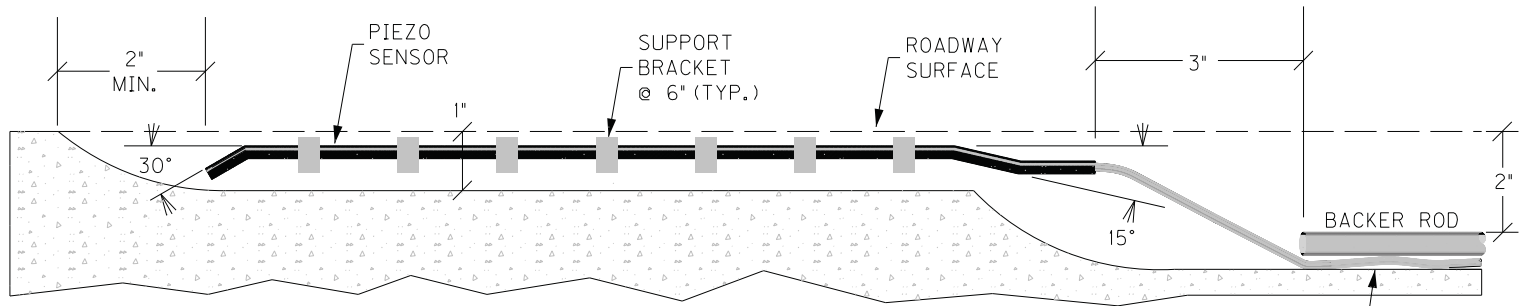


SAW SLOT EDGE OF PAVEMENT TRANSITION

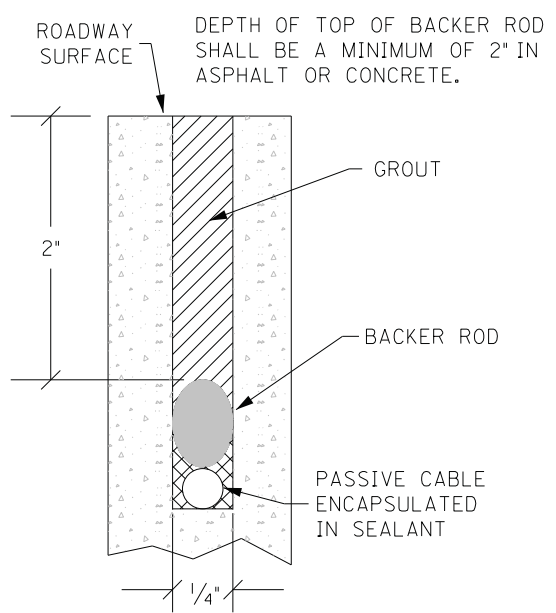
INDUCTIVE LOOP DETECTOR



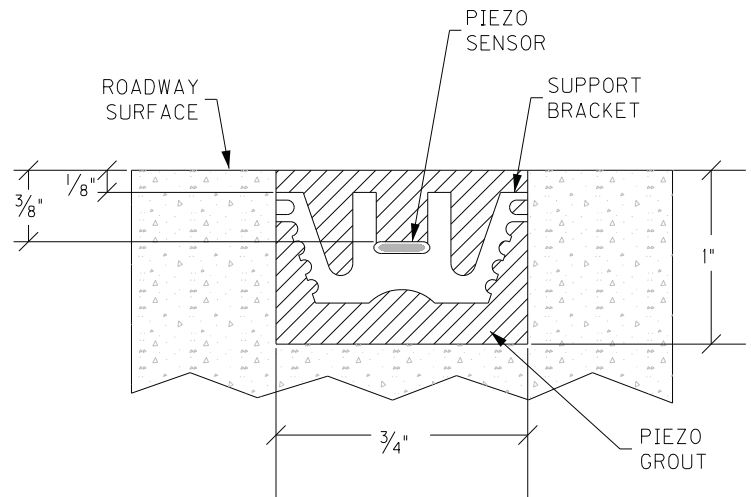
PLAN



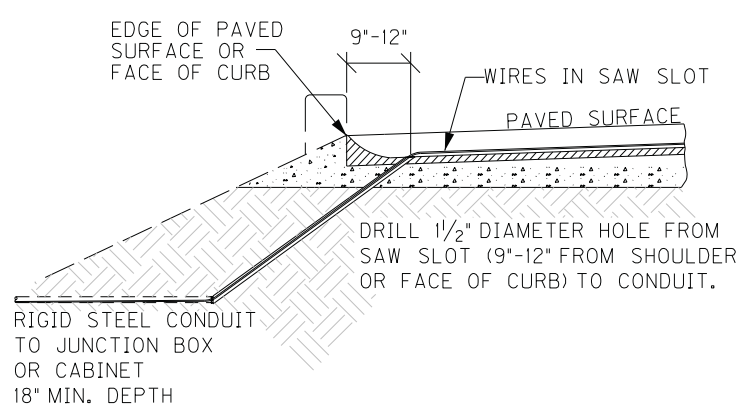
ELEVATION



SECTION B-B



SECTION A-A



SAW SLOT EDGE OF PAVEMENT TRANSITION

PIEZOELECTRIC SENSOR INSTALLATION

**SPECIAL NOTE FOR
TREATMENT OF END BENT OR ABUTMENT BACKFILLS USING GEOTEXTILE
REINFORCEMENT AND ELASTIC INCLUSION**

May 21, 2013

I. DESCRIPTION

Geotextile Reinforced Backfill and Elastic Inclusion work shall consist of installation of an elasticized Expanded Polystyrene (EPS) and geotextile separation fabric between the back of concrete surfaces and backfill material, in accordance with these specifications and in conformity with manufacturer’s recommendations, the lines shown on the plans or as established by the Engineer. It also includes placing Geotextile reinforcement within the granular backfill. Construction shall be in accordance with Special Provision No. 69, Embankment at End Bent Structures, Standard Drawing RGX-100, and Standard Drawing RGX-105 except where the requirement of this note direct otherwise.

II. MATERIALS

- (a) **Geotextile Reinforcement:** The Geotextile Reinforcement utilized in the backfill shall be a woven fabric meeting the requirements Type V High Strength Geotextile Fabric of Section 843 of the Standard Specifications except that the Geotextile Reinforcement shall have a minimum Ultimate Strength of 1350 lb/ft and a minimum Strength at 2% strain of 380 lb/ft when tested by ASTM D 4595.
- (b) **Elasticized Expanded Polystyrene (EPS):** The EPS shall have a size tolerance of 1/8 inch for each dimension and conform to the following:

Physical Property	ASTM Test Method	Requirements
Compressive strength	D-1621	720 psf +/-60 psf @10% strain
Water absorption	C-272	Max. 3% by volume
Insect Resistance	D-3345-74	Resistance to ants, termites, etc.

The EPS shall be elasticized, with a linear-elastic stress-strain behavior up to 10 percent strain and linear proportional stress-strain behavior up to 30 percent strain.

The EPS shall contain no chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) or formaldehyde. It shall be chemically and biologically inert when in contact with acidic and alkaline soils. It shall be treated to prevent insect attack.

Materials shall withstand temperature variations from 0°F to 140°F without deforming and shall maintain their original dimensions and placement without chipping, spalling, or cracking. Material shall not deteriorate because of contact with sodium chloride, calcium chloride, mild alkalis and acids, or other ice control materials.

The EPS shall contain a flame retardant additive.

- (c) **Spill Protection Layer:** The exposed top and side surfaces of the blocks shall be protected against chemical spill, particularly petroleum products, using a geomembrane liner. The geomembrane shall be resistant to petroleum products such as gasoline and diesel fuel. The geomembrane shall be manufactured from a tripolymer consisting of polyvinyl chloride, ethylene interpolymers, and polyurethane, or a similar combination. The geomembrane shall have a minimum thickness of 0.7 mm. Seaming, if required, shall be by thermal or solvent methods. The geomembrane shall extend a minimum of twelve inches beyond the EPS surface and overlap with adjacent concrete surfaces. The geomembrane shall be stored and installed according to the manufacturer’s recommendations or as directed by the Engineer.

Special Note for Treatment of End Bent or Abutment Backfills
Using Geotextile Reinforcement and Elastic Inclusion
May 21, 2013

- (d) **Geotextile Separation Fabric:** Geotextile Fabric Type IV meeting the requirements of Section 843 of the Standard Specifications shall be placed between the geomembrane wrapped EPS and the backfill material. Fabric joints shall have a minimum overlap of twelve inches. Fabric shall extend a minimum of twelve inches beyond the EPS surface and overlap with adjacent concrete or geomembrane surfaces. Geotextile separation fabric for subsurface installation shall not be exposed to direct sunlight for more than 24 hours during installation.
- (e) **Adhesive:** Adhesive shall be used to bond the EPS to concrete surfaces, the geomembrane to the EPS and concrete, and the separation fabric to the geomembrane wrapped EPS or concrete. It shall be applied in accordance with the EPS, geomembrane, and separation fabric manufacturer's recommendations.
- (f) **Granular Backfill:** Granular Backfill material shall be crushed stone meeting the requirements of Section 805 of the Standard Specifications and conform to the following gradation:

Sieve Size	Percent Passing
1-1/2 inch	100%
No. 4	0 – 25%
No. 8	0 – 5%

III. PROCEDURES

- (a) **Preparation of Concrete Surface:** Before placement of EPS, concrete surfaces shall be abrasive blast cleaned with a positive contact sandblaster or adhesives manufacturer's recommendation and approved by the Engineer to remove all non-adherent laitance, oil, grease or other foreign or deleterious matter.
- (b) **Installation of EPS Material and Geotextile Separation Fabric:** The EPS shall be attached to the back of the concrete surfaces with an adhesive compatible with the material.

The concrete surface must be thoroughly dry and clean for adhesive for the application of the EPS. Adhesive shall be applied in accordance with the adhesive manufacturer's recommendation or approval.

The geomembrane and separation fabric may be installed after the EPS has been installed or it may be pre-attached to the EPS. The geomembrane shall cover all exposed surfaces of the EPS. The separation fabric shall cover all exposed surfaces of the geomembrane.

EPS, geomembrane, and separation fabric shall be installed in accordance with the manufacturer's recommendations.

- (c) **Installation of Wrapped Geotextile Reinforcement and Backfill:** Place Geotextile Fabric Type IV in accordance with Section 214 of the Standard Specifications where the Granular Backfill material will come in contact with embankment material. The Granular Backfill material shall be completely wrapped with Geotextile Fabric Type IV.

Place two 4-inch perforated underdrain pipes wrapped with Geotextile fabric in the bottom of the backfill trench at the base of the end bent/abutment as shown on the attached drawing. Place Granular Backfill in the bottom of the trench and compact as noted below. A minimum of 1 foot but no more than 2 feet of Granular Backfill should be placed in the bottom of the trench, and the actual depth should be determined in the field such that the 1 foot lifts of Geotextile Reinforcement and Granular Backfill will result in the required final grade.

Place Geotextile Reinforcement and Granular Backfill as shown in the attached drawing in lifts not to exceed 1 foot. The Geotextile Reinforcement shall be placed so that the strongest direction is perpendicular to the end bent/abutment and shall be laid so that it is taut and free of wrinkles prior to

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backfilling. If needed the Geotextile fabric may be overlapped or mechanically connected (sewn) in accordance with the manufacturer's specifications except that overlaps may not be used within 4 feet of the back wall of the end bent/abutment. Vehicles shall not be allowed to operate directly on the fabric. The Geotextile Reinforcement shall wrap around to enclose the backfill material on three sides (at the end bent and side slopes).

Granular Backfill material shall be placed and spread starting at the back of the End Bent/Abutment and moving perpendicularly away from the End Bent/Abutment so that the Geotextile Reinforcement does not become wrinkled or develop slack. Each lift of the backfill material shall be compacted using a suitable compactor until there is no visible sign of further compression. A minimum of four passes shall be applied per lift. Hand operated compaction equipment such as lightweight mechanical tampers, vibratory plates, or rollers are required within 3 feet of the back of the end bent/abutment.

IV. TESTING

Elasticized EPS shall be tested by an independent commercial laboratory, to verify the material requirements specified herein. The Contractor shall provide written documentation of all tests specified. Documentation shall include style, lot, roll numbers, and actual results of each test. In addition, the name, address, phone number of the testing laboratory, and date of testing shall be provided.

Geotextile Reinforcement and geomembranes shall be tested by an independent commercial laboratory, to verify the material requirements specified herein. The Contractor shall provide written documentation of all tests specified. Documentation shall include style, lot, roll numbers, and actual results of each test. In addition, the name, address, phone number of the testing laboratory, and date of testing shall be provided.

After the EPS has been installed and before the work has been accepted, the Contractor and Inspector shall perform a visual inspection of EPS coverage and adhesion to the concrete surface. Any area deemed unacceptable and questionable as to remaining in position during the placement of the backfill material shall be replaced or repaired, as required.

V. REPAIR OF FAILED AREA OF EPS

Unacceptable portion of the EPS shall be removed and the concrete surface shall be prepared and the EPS installed in accordance with this special provision. New EPS in the repair areas shall be visually inspected after curing. The cost of all additional work for repairing or replacing of the defective joint material shall be borne by the Contractor.

VI. MEASUREMENT AND PAYMENT

Elasticized EPS will be measured in square yards along the back of backwall surface area, complete-in-place, and will be paid for at the contract unit price per square yard. Such price shall be full compensation for cleaning surface, for furnishing and installing the EPS material in accordance with these Specifications and the manufacturer's recommendations, testing, and for all material, labor, tools, equipment and incidentals necessary to complete the work. The department will not measure for payment the geomembrane and will consider it incidental to the Elasticized EPS.

Granular Backfill will be measured in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204 of the Standard Specifications. The Department will not measure for payment any Granular Backfill not called for in the plans. The Department will not measure for payment the 4-inch perforated underdrain pipe and will consider it incidental to the Granular Backfill.

Geotextile Reinforcement and Geotextile Fabric Type IV will be measured as specified in Section 214 of the Standard Specifications.

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Payment will be made under:

Pay Item	Pay Unit
Elasticized EPS (Thickness)	Square Yard
Geotextile Reinforcement	Square Yard
Fabric-Geotextile, Type IV	Square Yard
Granular Backfill	Cubic Yard

SPECIAL NOTE

Perry Park Road Closure

One planned 5-day closure at Perry Park Road is proposed in the plans. Variable message boards shall be placed a minimum of one week prior to its closure, and remain in place through its duration. Planning and coordination for the closure with representatives of local government, emergency response teams (Police, Fire, and Ambulance), postal service, school board, as well as affected residents and businesses and other entities as designated by the Engineer must occur before the closure is allowed. Closure will not be allowed on days in which schools are in session. Signing plans for the detour route must be submitted to and approved by the Engineer. Alternate routes and plans should address pedestrian as well as vehicular traffic. If the closure of Perry Park Road lasts longer than 5 days then damages will be assessed at the rate of \$4,750 per day or any portion of a day until the road is reopened.

SPECIAL NOTE FOR PAVER MOUNTED TEMPERATURE PROFILES

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

1.0 DESCRIPTION. Provide a paver mounted infrared temperature equipment to continually monitor the temperature of the asphalt mat immediately behind all paver(s) during the placement operations for all driving lanes (including ramps for Interstates and Parkways) within the project limits. Provide thermal profiles that include material temperature and measurement locations.

2.0 MATERIALS AND EQUIPMENT. In addition to the equipment specified in Subsection 403.02 Utilize a thermal equipment supplier that can provide a qualified representative for on-site technical assistance during the initial setup, pre-construction verification, and data management and processing as needed during the Project to maintain equipment within specifications and requirements.

Provide operator settings, user manuals, required viewing/export software for analysis. Ensure the temperature equipment will meet the following:

(A) A device with one or more infrared sensors that is capable of measuring in at least 1 foot intervals across the paving width, with a minimum width of 12 feet, or extending to the recording limits of the equipment, whichever is greater. A **Maximum of two (2)** brackets are allowed in the influence area under the sensors. A temperature profile must be made on at least 1 foot intervals longitudinally down the road:

(B) Infrared sensor(s):

(1) Measuring from 32°F to 400°F with an accuracy of $\pm 2.0\%$ of the sensor reading.

(C) Ability to measure the following:

(1) The placement distance using a Global Positioning System (GPS) or a Distance Measuring Instrument (DMI) and a Global Positioning System (GPS).

(2) Stationing

(D) GPS: Accuracy ± 4 feet in the X and Y Direction

(E) Latest version of software to collect, display, retain and analyze the mat temperature readings during placement. The software must have the ability to create and analyze:

(1) Full collected width of the thermal profiles,

(2) Paver speed and

(3) Paver stops and duration for the entire Project.

(F) Ability to export data automatically to a remote data server ("the cloud").

At the preconstruction meeting, provide the Department with rights to allow for web access to the data file location.

This web-based software must also provide the Department with the ability to download the raw files and software and to convert them into the correct format.

(G) The thermal profile data files must provide the following data in a neat easy to read table format.

(1) Project information including Road Name and Number, PCN, Beginning and Ending MPs.

(2) IR Bar Manufacturer and Model number

(3) Number of Temperature Sensors (N)

(4) Spacing between sensors and height of sensors above the asphalt mat

(5) Total number of individual records taken each day (DATA BLOCK)

(a) Date and Time reading taken

(b) Latitude and Longitude

(c) Distance paver has moved from last test location

(d) Direction and speed of the paver

(e) Surface temperature of each of the sensors

3.0 CONSTRUCTION. Provide the Engineer with all required documentation at the pre-construction conference.

(A) Install and operate equipment in accordance with the manufacturer’s specifications.

(B) Verify that the temperature sensors are within ± 2.0% using an independent temperature device on a material of known temperature. Collect and compare the GPS coordinates from the equipment with an independent measuring device.

(1) Ensure the independent survey grade GPS measurement device is calibrated to the correct coordinate system (using a control point), prior to using these coordinates to validate the equipment GPS.

(2) The comparison is considered acceptable if the coordinates are within 4 feet of each other in the X and Y direction.

(C) Collect thermal profiles on all Driving Lanes during the paving operation and transfer the data to the “cloud” network or if automatic data transmission is not available, transfer the data to the Engineer at the end of daily paving.

(D) Contact the Department immediately when System Failure occurs. Daily Percent Coverage will be considered zero when the repairs are not completed within two (2) working days of System Failure. The start of this two (2) working day period begins the next working day after System Failure.

(E) Evaluate thermal profile segments, every 150 feet, and summarize the segregation of temperature results. Results are to be labeled as Minimal 0°-25°F, Moderate 25.1°-50°F and Severe >50°. Severe readings over 3 consecutive segments or over 4 or more segments in a day warrant investigation on the cause of the differential temperature distribution.

4.0 MEASUREMENT. The Department will measure the total area of the driving lanes mapped by the infrared scanners. Full payment will be provided for all driving lanes with greater than 85% coverage. Partial payment will be made for all areas covered from 50% coverage to 85% coverage at the following rate Coverage area percentage X Total bid amount. And area with less than 50% coverage will not be measured for payment.

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

1. Payment is full compensation for all work associated with providing all required equipment, training, and documentation.
2. Delays due to GPS satellite reception of signals or equipment breakdowns will not be considered justification for contract modifications or contract extensions.

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24891EC	PAVE MOUNT INFRARED TEMP EQUIPMENT	SQFT

SPECIAL NOTE FOR MECHANICALLY STABILIZED EARTH RETAINING WALLS PERRY COUNTY KENTUCKY 10-269.10

1.0 DESCRIPTION

1.01 General and Experience Requirements:

The work under this section consists of designing, furnishing all materials and constructing Mechanically Stabilized Earth (MSE) retaining walls in accordance with the current Standard Specifications, this Special Note, in compliance with the lines and grades, dimensions and details shown on the project plans, and as directed by the Engineer.

The Contractor shall provide the MSE wall designer with a complete set of project plans and specifications and shall ensure that the wall design is compatible with all other project features that can impact the design and construction of the wall. The following terms are used in this specification for identification of various entities for which the Contractor shall be fully responsible:

Term	Entity
Wall Manufacturer	The entity contractually retained by the contractor to provide materials and construction services for an accepted MSE wall system as identified in Subsection 1.02.
Wall Designer	The entity contractually retained by the contractor to provide design of an accepted MSE wall system as identified in Subsection 1.02. The wall designer may be a representative of the wall manufacturer.
Department / Engineer	Refers to the Kentucky Transportation Cabinet representative and/or a designated consultant acting on behalf of KYTC.

1.02 Accepted Systems:

The contractor shall provide an MSE Wall System that uses inextensible reinforcement and reinforced concrete panels or modular block and is one of the pre-approved systems below. Inclusion of a system on this list does not relieve the Contractor and/or wall manufacturer of the contractual responsibility to satisfy all specific requirements herein and/or elsewhere in the contract documents.

- Reinforced Earth (Reinforced Earth and Retained Earth)
- Hilfiker RSE
- Tricon Retained Soil Wall System
- ISOGRID Retaining Wall System
- Keystone Keysystem I
- Sine Wall MSE Panel System
- Sanders Pre-Cast Concrete Systems

Heights and lengths of earth retaining walls may vary from, but shall not be less than, those shown on the plans. The height and length to be used for any system shall be the minimum for that system that will effectively retain the earth behind the wall for the loading conditions and the contours, profile, or slope lines shown on the plans, or on the approved working drawings, and in accordance with all relevant

internal and external stability design criteria, but not more than the pre-approved height for the particular MSE wall system selected.

1.03 MSE Wall Design Engineer:

Requirements for the Wall Designer's **MSE Wall Design Engineer** (who may be employed by the wall manufacturer or may be a consultant) are:

- Licensed Professional Engineer in the Commonwealth of Kentucky with a minimum of 5 years of geotechnical and/or structural engineering experience.
- Design and/or construction experience on at least five (5) MSE Walls and a minimum of 50,000 square feet of MSE Wall completed in the past five (5) years. Experience on a Reinforced Soil Slope may be substituted for one wall and up to 10,000 square feet.
- Design experience on at least three (3) MSE Walls and a minimum of 30,000 square feet of MSE Wall on highway infrastructure projects using the wall system that will be used on this project completed in the past five (5) years.
- Completion of at least 15 Professional Development Hours related to the design and/or construction of MSE Walls in the past five (5) years. This training may consist of attendance at a related short course, conference, seminar, workshop, or college course. Include documentation of this training with the submittal of the Design Engineer's credentials.

1.04 Wall Aesthetics:

Wall aesthetics shall be as specified in the project documents and request for proposals.

1.05 Certifications:

- (A) Certification of Design Parameters: See Subsection 2.01 herein specified.
- (B) Certification of Materials: See Subsections 3.04, 3.07, 3.09 & 3.10 herein specified.

1.5 QUALITY CONTROL:

The Department will perform construction inspection for the MSE Walls. However, the Contractor will be required to proactively implement the quality control procedures described herein. All costs associated with MSE Wall Quality Control will be incidental to the cost of the wall.

1.51 MSE Wall Quality Coordinator:

The Contractor shall designate a MSE Wall Quality Coordinator who shall:

- have a minimum of 3 years of construction field experience,
- be responsible for ensuring that the Contractor's quality control procedures are implemented including maintaining and submitting the checklists required in Section 1.57, (but may have other duties and/or responsibilities),
- have sufficient authority to carry out quality coordinator responsibilities, and
- be in the field during MSE Wall construction.

1.52 Mandatory MSE Wall Construction Training:

The MSE Wall Designer or an approved appointee will provide training related to proper MSE Wall construction for Contractor and Department personnel. This training should occur after the contractor has selected the MSE Wall system and the Department has confirmed that the MSE Wall Design Engineer and Manufacturer's Technical Field Representative meet the specified requirements. The training will be

conducted in the District by the Manufacturer's Technical Field Representative or an outside consultant meeting the experience requirements of the Manufacturer's Technical Field Representative. The MSE Wall Construction Training is expected to last one full day. Department personnel who will attend will include project inspection personnel and may include other district and central office personnel. The following contractor personnel are required to attend:

- On-Site Supervisor in charge of MSE Wall construction
- MSE Wall Quality Coordinator
- At least one office management level person representing the MSE Wall contractor
- If the MSE Wall is to be constructed by a subcontractor, at least one management level representative (field or office) of the Prime Contractor
- Manufacturer's Technical Field Representative referenced in Section 1.55 herein

At least one week before the training begins, the Contractor shall submit a list of specific persons who plan to attend.

1.53 Quality Control Plan:

The contractor shall submit a Quality Control Plan to the Engineer for review and acceptance which details measurements and documentation (including daily documentation checklists) that will be maintained by the Contractor during construction to assure consistency in meeting specification requirements. The Contractor shall coordinate the development of the Quality Control Plan with the MSE Wall System Manufacturer and the MSE Wall Design Engineer. The Quality Control Plan shall be submitted to the Engineer for acceptance at least four weeks before beginning MSE wall construction.

1.54 MSE Pre-Activity Meeting:

A pre-activity meeting will be scheduled and shall occur after the Quality Control Plan has been submitted and accepted by the Engineer and no later than two (2) weeks prior to commencement of MSE wall construction activity. As a minimum, this meeting shall be attended by representatives of the Contractor and MSE Wall Sub-Contractor (including wall construction crew chiefs and MSE Wall Quality Coordinator), MSE Wall Manufacturer's Technical Field Representative, Department District personnel as designated by the Branch Manager for Project Delivery and Preservation, Central Office Construction, and Geotechnical Branch. No wall construction activity shall be performed until the contractor's final submittals have been approved as having satisfactorily resolved all review comments and the pre-activity meeting has been held.

1.55 Manufacturer's Technical Field Representative:

The MSE Wall System Manufacturer shall provide a technical field representative to provide assistance to the MSE Wall Contractor. The requirements for the **Manufacturer's Technical Field Representative** are:

- At minimum, an associate's or bachelor's degree with a major in a technical or scientific field such as engineering, engineering or construction technology, geology, physics, mathematics, etc.
- A minimum of five (5) years of technical experience related to engineering and/or construction.
- Construction experience on at least five (5) MSE Walls and a minimum of 50,000 square feet of MSE Wall completed in the past five (5) years. Experience on a Reinforced Soil Slope may be substituted for one wall and up to 10,000 square feet.

- Construction experience on at least three (3) MSE Walls and a minimum of 30,000 square feet of MSE Wall on highway infrastructure projects using the wall system that will be used on this project completed in the past five (5) years.
- Completion of at least ten (10) Professional Development Hours related to the design and/or construction of MSE Walls in the past five (5) years. This training may consist of attendance at a related short course, conference, seminar, workshop, or college course. Include documentation of this training with the submittal of the Technical Field Representative's credentials.

At least four weeks before beginning MSE wall construction, the Contractor shall submit documentation that the Technical Field Representative meets the above requirements.

The minimum required duties of the Manufacturer's Technical Field Representative are:

- Participate in the mandatory training referenced in Section 1.52 herein.
- Participate in the preparation of the Quality Control Plan referenced in Section 1.53 herein.
- Attend the MSE Pre-Activity Meeting referenced in Section 1.54 herein.
- Ensure that the contractor obtains all "Certificates of Analysis" required in Section 3.0 (Materials Requirements) of this Special Note.
- Review all "Certificates of Analysis" and supporting documentation and provide written documentation to the Contractor and Engineer that the reviews have been completed and that all materials meet the specified requirements.
- Review all Supervisor Checklists described in Section 1.57 herein.
- Be present at a minimum, during construction of the initial 10-foot height of the full length of wall for each wall system. Additionally the representative shall be present for the initial 10-foot height of the full length of wall for each wall system as constructed by each additional contractor, and as called upon thereafter by the Engineer, to assist the contractor and Engineer at no additional cost to the Agency.
- After each on-site visit, the Contractor is required to submit a letter to the Engineer written by the Manufacturer's Technical Field Representative documenting the observations of each visit with documentation that the MSE Wall Design Engineer has reviewed the letter.
- The manufacturer's technical field representative may recommend field changes subject to the approval of the MSE Wall Design Engineer and the Department. Any such changes shall be documented in writing within 24 hours of the approved changes. This written document shall be sealed by the MSE Wall Design Engineer prior to implementation of the changes.
- The Department reserves the right to discuss matters pertaining to this project directly with the technical field representative and to require the Contractor to call the technical field representative to the site for assistance at no additional cost to the Department if, in the opinion of the Engineer, the Contractor is not satisfactorily complying with the plans and specifications.

1.56 Certificates of Analysis:

The Contractor will be responsible for performing and/or subcontracting all testing required to produce the Certificates of Analysis required in Section 3.0 (Materials Requirements) of this Special Note and for submitting the Certificates to the Engineer as required.

1.57 Checklists:

The Contractor's MSE Wall On-Site Supervisor and MSE Wall Quality Coordinator shall complete and both sign the checklists below and submit them to the Engineer with copies to the Manufacturer's Technical Field Representative. The first three of these checklists can be found in FHWA Publication No. FHWA-NHI-10-025 "*Design and Construction of Mechanically Stabilized Earth Walls and Reinforced*

Soil Slopes – Volume II”, dated November 2009 (these tables are located in the appendix of this document).

Checklists	
Checklist Title	Submittal Requirements
Checklist for Drawing Review (FHWA Table 11-2)	At least two weeks before starting MSE wall construction
Checklist for Specification Compliance (FHWA Table 11-3)	Weekly
Checklist for Construction (FHWA Table 11-5)	Weekly
Quality Control Documentation (Quality Control Plan)	Daily

1.58 MSE Wall Design Engineer:

The MSE Wall Design Engineer will be required to play an active role in the construction of the MSE walls and to be available to answer any questions that may arise during construction. Specifically, the MSE Wall Design Engineer is required to:

- Assist the Contractor and Manufacturer’s Technical Field Representative with preparing the Quality Control Plan referenced in Section 1.53 herein.
- Make at least one site visit (4 hour minimum) while the Contractor is installing panels and reinforced fill material during the first 10 working days of panel and reinforced fill installation
- Review documentation of the Manufacturer’s Technical Field Representative’s site visits.

Additionally, the Design Engineer is required to attend the MSE Wall Construction Training and MSE Pre-Activity Meeting.

2.0 DESIGN SUBMITTALS (WORKING DRAWINGS AND DESIGN CALCULATIONS):

2.01 Submittals:

(A) General:

Design calculations and working drawings clearly showing conformance with the current Standard Specifications; AASHTO LRFD Bridge Design Specifications, current edition; KYTC Geotechnical Manual and project requirements shall be submitted for review. The format for the working drawings shall be in accordance with the Division of Structural Design's Guidance Manual. The first sheet shall be a title sheet.

Working drawings and design calculations shall be sealed by a licensed Professional Engineer in the Commonwealth of Kentucky. The MSE wall designer/supplier shall document on the working drawings all assumptions made in the design. The following statement shall be included near the P.E. seal on the first sheet of the working drawings: “All design assumptions are validated through notes or details on these drawings.”

The Department assumes no responsibility for errors or omissions in the working drawings. Acceptance of the final working drawings submitted by the contractor shall not relieve the contractor of any responsibility under the contract for the successful completion of the work. Construction of the wall shall

not commence until the contractor receives a written Notification to Begin MSE Wall Construction from the Engineer which will be issued once the complete wall package (drawings, calculations and construction procedures) is accepted. Fabrication of any of the wall components before the written Notification to Begin MSE Wall Construction shall be at the sole risk of the Contractor.

A Certificate of Analysis for the Reinforced Fill Material (See Sections 3.05 and 3.07 herein) may be required prior to final acceptance of the MSE Wall design.

(B) Review Submittals:

All review submittals shall be submitted electronically in pdf format through the Contractor to the Project Resident Engineer. The Project Resident Engineer shall forward the plans, calculations, and working drawings to the Department. Submittals may be directly emailed to applicable reviewers with the permission of the Contractor and Resident Engineer provided that the Contractor and Resident Engineer receive email copies of the submittals. Contact the Department before beginning any work on the wall designs and construction plans.

The submittals required shall include working drawings, the Contractor's and MSE Wall supplier's construction procedures, supporting design calculations, verification of experience, and a transmittal letter. The transmittal letter shall only list the documents included in the submittal. No technical information shall be included in the transmittal letter.

Working drawings, design calculations and MSE supplier's construction procedures modified as necessary by the contractor and Wall Designer for site-specific conditions shall be submitted to the Engineer for review. The Engineer shall have 30 calendar days after receiving the six complete sets to finish a review. The revised package shall be resubmitted to the Engineer for review. The Engineer shall have 15 calendar days to complete this review. This review process shall be repeated until the entire submittal is accepted by the Engineer. Additional time required by the Department to review resubmissions shall not be cause for increasing the number of contract working days. The additional work required by the contractor to provide resubmissions shall be at no cost to the Department.

The Department reserves the right to require the contractor to verify that the Reinforced Wall Fill Material meets all applicable requirement before final acceptance of the design.

(C) Final Submittals:

All final wall tracings, with drawing number, shall be submitted on 3 mil, or thicker, 22" X 36" mylar film. The final mylar tracings of the accepted working drawings submitted to the Division of Structural Design shall be dated, sealed, and signed on Sheet 1 by the licensed Professional Engineer performing the work. Nine copies of the accepted working drawings shall be submitted.

2.02 Working Drawings:

The contractor shall submit complete working drawings and specifications for each installation of the system. Working drawings shall include the following at a minimum:

- (1) Layout of the wall including plan and elevation views;
- (2) All design parameters and assumptions including design life;
- (3) Existing ground elevations and utilities impacted by the wall, and those that should be field verified by the contractor, for each location;
- (4) Complete details of all elements and component parts required for the proper construction of the system at each location and any required accommodations for drainage systems, foundation subgrades or other facilities shown on the contract documents;

- (5) The working drawing submittal shall clearly detail any special design requirements, if applicable. These special design requirements may include, but are not limited to: structural frames to place reinforcements around obstructions such as deep foundations and storm drain crossings, drainage systems, placement sequence of drainage and unit core fill with respect to reinforced (structure) fill behind a wall face using modular block facing units, guardrail post installation, scour protection, foundation subgrade modification, all corner details (acute, obtuse and 90 degrees), slip joints, joint details of MSE walls with other cast-in-place structures, wedges, shims and other devices such as clamps and bracing to establish and maintain vertical and horizontal wall facing alignments;
- (6) A complete listing of components and materials specifications; and
- (7) Other site-specific or project specific information required by the contract.

2.03 MSE Wall Design:

(A) General:

The working drawings shall be supplemented with all design calculations for the particular installation as required herein. Installations that deviate from the accepted design (by the Contractor's MSE Wall Design Engineer) shall be accompanied by supporting stability (internal; external; and global/overall and/or compound if required in the project documents) calculations of the proposed structure as well as supporting calculations for all special details not contained in the accepted design. The MSE wall designer/supplier shall note all deviations of the proposed wall design from the accepted design.

The proposed design shall satisfy the design parameters shown on the project plans and listed in this Special Note, and comply with the design requirements of AASHTO LRFD Bridge Design Specifications, current edition and the KYTC Geotechnical and Bridge Design Guidance Manuals. Unless otherwise specified in the contract, all structures shall be designed to conform to the requirements shown in Table 1 and other requirements specified herein.

If the designer uses software other than MSEW, a minimum of one analysis corresponding to the most critical design case for each MSE wall shall be submitted using MSEW software. Sample hand calculations containing a sketch, all external analysis for the design case, and internal analyses for a minimum of three reinforcement levels shall also be submitted for the most critical design case for each MSE wall.

Table 1 - MSE Wall Design Criteria and Parameters

Design Life	100 years
Friction angle of granular retained backfill (<u>where required</u>)	36°
Friction angle of MSE reinforced fill material	34° *
Total Unit weight of granular retained backfill	120 pcf
Total Unit weight of MSE reinforced fill material	120 pcf **
Minimum reinforcement length	Greater of 8 ft. or 0.7 times effective height
Friction angle for sliding calculation (through reinforced fill)	34° *
Resistance factor for sliding	As specified in AASHTO LRFD Bridge Design Specifications
Wall Eccentricity	Verify as specified in AASHTO LRFD Bridge Design Specifications, current edition
Bearing Resistance Factor	As specified in AASHTO LRFD Bridge Design Specifications
Surcharge Loading (due to vehicle loading behind the walls)	As specified in AASHTO LRFD Bridge Design Specifications
Minimum top of leveling pad embedment	2 ft. below final grade or as specified by the Geotechnical Report
<p>* For internally reinforced fill material, a minimum friction angle of 34 degrees shall be substantiated by laboratory tests discussed in Subsection 3.05(D). If the measured friction angle in laboratory tests as per Subsection 3.05(D) is greater than 34 degrees and the fill material is well-graded according to the Unified Soil Classification System (USCS), then the design friction angle may be increased up to a maximum of <u>38</u> degrees. See Table 5.</p> <p>** The Total Unit Weight of the reinforced fill material shall be substantiated by laboratory tests discussed in Subsection 3.05(F). If the Total Unit Weight (i.e. SSD Bulk Density) obtained from laboratory tests as per Subsection 3.05(F) varies by more than +/- 5.0 pcf from the design value, then the design must be adjusted accordingly or reinforced fill material falling within this range must be used. See Table 5.</p> <p>“H” is the design height of the wall and is defined as the difference in elevation from the finished grade at the top of wall and the top of leveling pad. The length of reinforcement, “L”, is measured from the backface of the wall facing unit. If applicable, the length of grid type reinforcement is measured from the backface of the wall to the last full transverse member. “H” is the effective height of the wall and is defined as: the design height “H” + (strap length “L” – distance from the wall face to the toe of slope) * tan (slope angle of backfill). In the case of horizontal backfill design height “H” equals effective height “H”. The top of the leveling pad shall always be below the minimum embedment reference line as indicated on the plans for that location. If applicable, the total base length for modular block facing units, BT, as measured from the front face of the wall is the length L as defined above plus the width of the modular block unit (the horizontal dimension of the block unit measured perpendicular to the wall face).</p>	

(B) Subsurface Drainage Systems:

Walls shall be provided with subsurface drainage measures as shown on the project plans and specifications. As a minimum, an underdrain system shall be provided for leading subsurface and surface water away from the reinforced fill material and outside the limits of the wall. Geocomposite drains, if used for subsurface drainage, shall be in accordance with Section 845 of the current Standard Specifications.

(C) Obstructions in Reinforced Fill:

(1) General:

Where obstructions, such as deep foundations or storm drains crossings, are located in the reinforced fill material zone, cutting of reinforcements to avoid obstructions shall not be permitted. A minimum offset of one diameter but not less than three (3) feet shall be maintained between the face of any pipe crossings and the back face of retaining wall panels. A minimum clearance of three (3) feet shall be maintained between the face of any other obstruction and the back face of retaining wall panels.

(2) Horizontal Deflection of Reinforcements:

In the horizontal plane at a reinforcing level, a deviation up to fifteen (15) degrees from the normal to the face of the wall may be allowed for strip reinforcement and bolted connection. This deviation is herein referred to as the splay angle. Grid reinforcements may not be splayed, unless connection has been specifically fabricated to accommodate a splay and connection detail has been approved by the Department. If used, the splay in grid reinforcement is limited to fifteen (15) degrees. For obstructions that cannot be accommodated with splayed reinforcement, structural frames and connections shall be required, and shall be designed in accordance with the AASHTO LRFD Bridge Design Specifications, current edition. The structural frame design shall be such that bending moments are not generated in the fill reinforcement or the connection at the wall face. The design, along with supporting calculations, shall be included in the working drawings.

(3) Vertical Deflection of Reinforcements:

Vertical deflection of the reinforcement to avoid obstructions such as utilities along the wall face shall be limited to a maximum of 15 degrees from normal to face of wall. Bends in the reinforcement shall be smooth and gradual to ensure that galvanization remains intact.

(D) Hydrostatic Pressures:

As determined by the Designer and/or as noted on the plans, for walls potentially subject to inundation, such as those located adjacent to rivers, canals, detention basins or retention basins. Effective unit weights shall be used in the calculations for internal and external stability beginning at levels just below the equivalent surface of the pressure head line. Where the wall is influenced by water fluctuations, the wall shall be designed for rapid drawdown conditions which could result in differential hydrostatic pressure.

(E) Acute Angle Corners:

Wall corners with an included angle of less than 70 degrees shall be designed for bin-type lateral pressures

for the extent of the wall where the full length of the reinforcement cannot be installed without encountering a wall face. Acute angle corner structures shall not be stand-alone separate structures. Computations shall be provided that demonstrate deformation compatibility between the acute angle corner structure and the rest of the MSE wall. Full-height vertical slip joints shall be provided at the acute angle corner and after the last column of panels where full length of the reinforcements can be placed. The soil reinforcement attached to the slip joints shall be oriented perpendicular to the slip joint panels and shall be the full design length. Special connection and compaction details shall be provided on the working drawings.

(F) Spacing of Metallic Reinforcement for Flexible Face Wall Systems:

Permanent Flexible Face Wall Systems are not allowed.

(G) Fill Reinforcement for Modular Block Wall Systems:

The reinforcement lengths and percent coverage at a given reinforcement level shall be in accordance with the plans. All reinforcement shall be positively connected to the modular block facing units that is capable of resisting 100% of the maximum tension in the reinforcements at any level within the wall. Detailed documentation for connection strength shall be submitted as noted in Subsection 3.10. The vertical spacing of the reinforcement for walls with modular block facing units shall be as follows:

1. The first (bottom) layer of reinforcement shall be no further than 16 inches above the top of the leveling pad.
2. The last (top) layer of reinforcement shall be no further than 20 inches on the average below the top of the uppermost MBW unit.
3. The maximum vertical spacing between layers of adjacent reinforcement shall not exceed 32 inches. For walls deriving any part of their connection capacity by friction the maximum vertical spacing of the reinforcement should be limited to two times the block depth (front face to back face) to assure construction and long-term stability. The top row of reinforcement should be one-half the vertical spacing.

(H) Initial Batter of Wall:

The initial batter of the wall, both during construction and upon completion, shall be within the vertical and horizontal alignment tolerances included in this Special Note. The initial batter of the wall panels at the start of construction and the means and methods necessary to achieve the batter shall be provided on the working drawings. Subject to Engineer's approval, the initial batter of the wall panels may be modified at the start of construction by the manufacturer's field representative based on the evaluation of the reinforced fill material selected by the contractor. Any such changes shall be documented in writing within 24 hours of the approved changes. This written document shall be sealed by the manufacturer's design engineer who is a licensed Professional Engineer in the Commonwealth of Kentucky. Details of the wedges or shims or other devices, such as clamps and external bracing used to achieve or maintain the wall batter, and the details for removal of temporary wedges or shims shall be as shown on the working drawings and/or accompanying construction manual. Permanent shims shall comply with the design life criteria, and shall maintain the design stress levels required for the walls.

(I) Bridge Abutment Design Considerations:

Shallow Bridge Foundations supported by MSE wall systems are not allowed. All bridge loads must be supported by deep foundations.

3.0 MATERIAL REQUIREMENTS:

The contractor shall furnish the Engineer with Certificates of Analysis documenting that all materials meet the requirements herein.

3.01 Precast Concrete Elements:

Precast concrete shall attain a minimum 28-day compressive strength of 4,000 psi unless a higher strength is specified by the wall supplier. The concrete shall be air entrained containing $5.5 \pm 1.5\%$ entrained air at the time the concrete is placed in the forms. A proposed mix design shall be submitted.

Prior to casting, all embedded components shall be set in place to the dimensions and tolerances designated in the plans and specifications. Wall aesthetics shall be in accordance with project plans, special notes, and/or other applicable contract documents.

(A) Concrete Testing and Inspection:

Precast concrete elements shall be subjected to compressive strength testing and inspected for dimensional tolerances and surface conditions. Panels delivered to the site without Department approval will be rejected.

(B) Casting:

Precast concrete face panels shall be cast on a horizontal surface with the front face of the panel at the bottom of the form. Connection hardware shall be set in the rear face. The concrete in each precast concrete panel shall be placed without interruption and shall be consolidated by deploying an approved vibrator, supplemented by such hand tamping as may be necessary to force the concrete into the corner of the forms, and to eliminate the formation of stone pockets or cleavage planes. Form release agents shall be used on all form faces for all casting operations.

The contractor shall advise the Engineer of the starting date for concrete panel casting at least 14 calendar days prior to beginning the operation if the casting operation is within the State, or 21 calendar days if the casting operation is outside the State.

(C) Finish:

(1) Non-Exposed Surfaces:

Rear faces of precast concrete panels shall be a face floated surface finish and screeded to eliminate open pockets of aggregate and surface distortions in excess of $\frac{1}{4}$ inch.

(2) Exposed Surfaces:

The type of finish required on exposed surfaces shall be as shown in the plans.

(a) Exposed Aggregate Finish:

- (1) Prior to placing concrete, a set retardant shall be applied to the casting forms in accordance with the manufacturer's instructions.

- (2) After removal from the forms and after the concrete has set sufficiently to prevent its dislodging, the aggregate shall be exposed by a combination of brushing and washing with clear water. The depth of exposure shall be between 3/8 inch and 1/2 inch.
- (3) An acrylic resin sealer consisting of 80 percent thinner and 20 percent acrylic solids by weight shall be applied to the exposed aggregate surface at a rate of one (1) gallon per 250 square feet.

(b) Concrete Panel Finish:

Concrete panel finish shall be in accordance with the plans and specifications. A sample of the proposed finish consisting of four full-sized panels shall be fabricated for inspection by the Engineer. Fabrication of the remaining panels is not authorized until the Engineer has inspected the sample panels and approved the finish as acceptable.

(D) Tolerances:

Connection device placement shall be within ± 1 inch of the dimensions shown on the drawings. Panel squareness as determined by the difference between the two diagonals shall not exceed 1/2 inch.

(E) Identification and Markings:

The date of manufacture, the production lot number, and the piece mark shall be inscribed on a non-exposed surface of each element.

(F) Handling, Storage and Shipping:

All panels shall be handled, stored, and shipped in such a manner to eliminate the dangers of chipping, discoloration, cracks, fractures, and excessive bending stresses. Panels in storage shall be supported in firm blocking to protect panel connection devices and the exposed exterior finish. Storing and shipping shall be in accordance with the manufacturer's recommendations.

(G) Compressive Strength:

Precast concrete elements shall not be shipped or placed in the wall until a compressive strength of 3,400 pounds per square inch has been attained. The facing elements shall be cast on a flat and level area and shall be fully supported until a compressive strength of 1,000 pounds per square inch has been attained.

(H) Precast Concrete Panel Joints:

(1) General:

Where the wall wraps around an inside corner, a corner block panel shall be provided with flange extensions that will allow for differential movement without exposing the panel joints. The back face of vertical and horizontal joints shall be covered with geotextile filter. Joint filler, bearing pads, and geotextile filter shall be as recommended by the wall manufacturer and shall meet the requirements shown on the approved working drawings.

If required, as indicated on the plans, flexible open-cell polyurethane foam strips shall be used for filler for vertical joints between panels, and in horizontal joints where pads are used.

All joints between panels on the back side of the wall shall be covered with a Type IV geotextile fabric meeting the requirements of Section 843 of the current Standard Specifications. The minimum width shall be one (1) foot.

(2) Bearing Pads:

All horizontal and diagonal joints between panels shall include bearing pads. Bearing pads shall meet or exceed the following material requirements:

- Preformed EPDM (Ethylene Propylene Diene Monomer) rubber pads conforming to ASTM D 2000 Grade 2, Type A, Class A with a Durometer Hardness of 70.
- Preformed HDPE (High Density Polyethylene) pads with a minimum density of 0.946 grams per cubic centimeter in accordance with ASTM D 1505.

The stiffness (axial and lateral), size, and number of bearing pads shall be determined such that the final joint opening shall be $\frac{3}{4} \pm \frac{1}{8}$ inch unless otherwise shown on the plans. The MSE wall designer shall submit substantiating calculations verifying the stiffness (axial and lateral), size, and number of bearing pads assuming, as a minimum, a vertical loading at a given joint equal to 2 times the weight of facing panels directly above that level. As part of the substantiating calculations, the MSE wall designer shall submit results of certified laboratory tests in the form of vertical load-vertical strain and vertical load-lateral strain curves for the specific bearing pads proposed by the MSE wall designer. The vertical load-vertical strain curve should extend beyond the first yield point of the proposed bearing pad.

3.02 Steel Components:

(A) Galvanization:

Fill reinforcement steel shall be hot-dip galvanized in accordance with AASHTO M 111 (ASTM A123). Connection hardware steel can be galvanized by hot-dipping or other means, provided the method satisfies the requirements of AASHTO M 111 (ASTM A123). A minimum galvanization coating of 2.0 oz/ft² (605 g/m²) or 3.4 mils (85 μm) thickness is required. Fill reinforcement steel shall be adequately supported while lifting and placing such that the galvanization remains intact. Steel members with damaged (peeled) galvanization shall be repaired according to ASTM A780 and as specified in approved working drawings, at no additional cost to the Department.

(B) Metallic Reinforcing Strips and Tie Strips:

Reinforcing strips shall be hot-rolled from bars to the required shape and dimensions. The strips' physical and mechanical properties shall conform to the requirements of ASTM A572, Grade 65 minimum. Tie strips shall be shop fabricated of hot-rolled steel conforming to the requirements of ASTM A1101, Grade 50 minimum. The minimum bending radius of the tie strips shall be $\frac{3}{8}$ inch. Galvanization shall be applied after the strips are fabricated, inclusive of punch holes for bolts as shown on approved drawings.

(C) Metallic Reinforcing Mesh:

Reinforcing mesh shall be shop fabricated of cold-drawn steel wire conforming to the requirements of AASHTO M 32, and shall be welded into the finished mesh fabric in accordance with AASHTO M 55. Galvanization shall be applied after the mesh is fabricated. A minimum galvanization coating of 2.0 oz/ft² (605 g/m²) or 3.4 mils (85 μm) thickness is required.

(D) Connector Pins:

Connector pins and mat bars shall be fabricated and connected to the fill reinforcement mats as shown in the approved working drawings. Connector bars shall be fabricated of cold drawn steel wire conforming to the requirements of AASHTO M 32.

(E) Welded Wire Fabric:

All welded wire fabric shall conform to the requirements of AASHTO M 32, AASHTO M 55, and the approved working drawings. Welded wire fabric shall be galvanized in conformance with the requirements of ASTM A123.

(F) Fasteners:

Connection hardware shall conform to the requirements shown in the approved working drawings. Connection hardware shall be cast in the precast concrete panels such that all connectors are in alignment and able to transfer full and even load to the fill reinforcement. Once the reinforcement is connected to the panel, the amount of slack shall not exceed 1/8 inch between the connector and the reinforcement during field installation. (If wedges are to be used to remove slack, the size, shape, and installation procedure with illustrations shall be included on the drawings and in the construction procedures.) Fasteners shall be galvanized and conform to the requirements of AASHTO M 164 or equivalent.

3.03 Geosynthetic Reinforcement:

Geosynthetic fill reinforcement is not allowed.

3.04 Certificate of Analysis for Fill Reinforcements:

For metallic wall reinforcement, a mill test report containing the ultimate tensile strength for the fill reinforcement shall be included in the certification. For metallic wall reinforcement, a mill test report containing the galvanization coverage shall be included in the certification. For metallic mesh wall reinforcement, a mill test report containing the ultimate weld strength for the fill reinforcement shall be included in the certification.

3.05 Reinforced Wall Fill Material:

Provide internally reinforced wall fill material consisting of quarry-processed limestone from a Department-approved quarry meeting all applicable general requirements of Section 805 of the Standard Specifications, current edition, and requirements herein. Provide material meeting the specific requirements for "Reinforced Fill Material" in Section 805 of the Standard Specifications, current edition, defined as "Non-Erodible" according to Section 805, and meeting all other requirements herein. Approval of the material source by the Department is required prior to beginning MSE wall construction.

(A) General:

Reinforced wall fill material shall be free of shale, organic matter, mica, gypsum, smectite, montmorillonite, or other soft poor durability particles. No salvaged material, such as asphaltic concrete millings or Portland Cement Concrete rubble, etc., will be allowed.

(B) Soundness and Shale:

The reinforced fill material shall have a soundness loss of 30 percent or less when tested in accordance with AASHTO T104 using a magnesium sulfate solution with a test duration of four cycles. Alternatively, the material shall have a soundness loss of 15 percent or less when tested in accordance with AASHTO T104 using a sodium sulfate solution with a test duration of five cycles. A maximum of 2.0% shale is permitted as determined by KM 64-604.

(C) Gradation:

Gradations will be determined per AASTHO T27 and shall be in accordance with Table 2, unless

otherwise specified.

Table 2	
REINFORCED FILL GRADATION REQUIREMENTS	
Sieve Size	Percent Passing
4 inch	100
2 inch	40 – 90
No. 4	0 - 10
No. 200	0 – 5
<p>This is the same gradation as required in Section 805.11 of the Standard Specifications except the requirement for the 2 inch sieve has been added.</p> <p>Size # 23 in the Standard Specifications falls within these gradation limits.</p>	

(D) Internal Friction Angle Requirement:

The reinforced wall fill material shall exhibit an effective (drained) angle of internal friction of not less than 34 degrees, as determined by performing a Direct Shear Test in accordance with AASHTO T236 or ASTM D3080. A minimum of three (3) points (i.e. three normal stresses) is required to constitute a complete test.

The direct shear test shall be performed on the portion finer than the 1-inch sieve. In order to comply with the test method, a minimum 12-inch diameter circular box or minimum 12-inch square box is required. The sample shall be compacted directly in the shear device at the saturated surface dry (SSD) condition and in general accordance with the rodding procedure in AASHTO T-19.

(E) Electrochemical Requirements:

The reinforced wall fill material shall meet the electrochemical requirements of Table 3.

Table 3		
ELECTROCHEMICAL REQUIREMENTS FOR METALLIC REINFORCEMENTS		
Characteristic	Requirement	Test Method
Resistivity	> 3,000 ohm-cm	AASHTO T-288
pH	5.0 to 10.0	AASHTO T-289
Chlorides	< 200 ppm	ASTM D4327
Sulfates	< 1000 ppm	ASTM D4327
Organic Content	< 1.0 %	AASHTO T-267
<p>* If the resistivity is greater or equal to 5,000 ohm-cm, the chloride and sulfate requirements may be waived.</p>		

Table 4 – VACANT

(F) Saturated Surface Dry (SSD) Bulk Density:

The Bulk Density of the Reinforced Fill Material shall be obtained in accordance with AASHTO T19. The Bulk Density at the oven-dry condition shall then be corrected using the Absorption determined according to AASHTO T-85 to determine the SSD Bulk Density, which shall be within +/- 5.0 pcf of the design total unit weight of MSE reinforced fill material or the design shall be adjusted. (See Table 1.)

(G) Limits of Reinforced Wall Fill Material:

The reinforced fill material shall extend to at least one (1) foot beyond the free end of the reinforcement. If applicable, back-to-back walls wherein the free ends of the reinforcement of the two walls are spaced apart less than or equal to one-half the design height of the taller wall, reinforced wall fill material shall be used for the space between the free ends of the reinforcements as well. The design height of the wall is defined as the difference in elevation between finished grade at top of wall and the top of leveling pad. The top of the leveling pad shall always be below the minimum embedment reference line as indicated on the plans for the location under consideration.

3.06 Granular Embankment for Foundation and Retained Backfill:

Provide granular foundation material and granular external retained backfill consisting of “Granular Embankment” meeting the material requirements of Section 805 in the current edition of the Standard Specifications and defined as “Non-Erodible” according to Section 805. If required by design, the extent of the granular foundation material and granular external retained backfill shall be shown in the Geotechnical Notes. Contrary to the Standard Specifications, no natural sand is permitted. Also contrary to the Standard Specifications, the maximum size limit for “Granular Embankment” is 4 inches where shown in the Geotechnical Sheets. Approval of the material source by the Department is required prior to beginning placement of this material.

3.07 Sampling & Testing of Reinforced Wall Fill and Granular Embankment Materials

(A) Reinforced Wall Fill:

To obtain source approval, the contractor shall furnish the Engineer with an 80-pound representative sample of the reinforced wall fill material and a Certificate of Analysis containing results of all tests referenced in Table 5 at least four weeks prior to beginning construction of the MSE wall. During construction, the reinforced fill material shall be sampled and tested by the Engineer for acceptance and quality control testing. A new sample and Certificate of Analysis shall be provided any time the material and/or source changes.

Table 5 - Sampling Frequency for Reinforced Wall Fill Material

Function	Tests	Frequency
Source Approval	Soundness (AASHTO T104)* % Shale (KM 64-604)* Gradation (AASHTO T27)*	At least four (4) weeks prior to beginning MSE wall construction and once per material change and/or change in source.
Testing by Contractor and/or its Consultant(s)	Direct Shear (AASHTO T236 or ASTM D3080)* Organic Content (AASHTO T267)* SSD Bulk Density (AASHTO T19 & T85)* Resistivity (AASHTO T288)** pH (AASHTO T289)** Chlorides and Sulfates (ASTM D4327)**	Except for Direct Shear, one test is valid for up to 10,000 ft ² of MSE wall area if there is no material change or change in source. **** Generally, only one Direct Shear test is required unless there is a change in material, source, or gradation.
Acceptance and Quality Control	Gradation (AASHTO T27) % Shale (KM 64-304) At the discretion of the Engineer.	One per 2,000 cubic yards at job site. (A change of more than +/- 5.0 percent passing any sieve size <u>will</u> require additional SSD Bulk Density testing and <u>may</u> require additional Direct Shear testing, both by the Contractor.)
Testing by Department	Any other applicable requirements of Section 805 of the current Standard Specifications	As required by the current Materials Field Sampling and Testing Manual, Standard Specifications, and/or other Department policy.
<p>* The laboratory performing these tests must be accredited by the AASHTO Materials Reference Laboratory (AMRL) for the tests they perform. AMRL accreditation for AASHTO T104 & T27 is required to perform KM 64-604.</p> <p>** Although accreditation for the specific test methods may not be available, the laboratory performing these tests must be accredited or certified by one of the organizations below. A laboratory's accreditation or certification status does not relieve the laboratory of its responsibility to perform the tests in accordance with the specified methods.</p> <ul style="list-style-type: none"> • AMRL - Soil and/or Aggregate (Resistivity and pH only) • American Association for Laboratory Accreditation (A2LA) - Chemical and/or Environmental • Kentucky Division of Water - Drinking Water Chemical Analyses <p>The Contractor may consult the Geotechnical Branch to ensure that a lab is accredited or certified.</p> <p>**** e.g. 1 to 10,000 ft² of wall requires 1 test, 10,001 to 20,000 ft² requires 2 tests, etc.</p>		

(B) Granular Embankment Material for Foundation and Retained Backfill:

To obtain source approval, the contractor shall furnish the Engineer with an 80-pound representative sample of the Granular Embankment material and a Certificate of Analysis at least four weeks prior to beginning Granular Embankment construction.

Function	Frequency
Source Approval	At least four weeks prior to beginning granular embankment construction and once per material change and/or change in source.
Acceptance and Quality Control	In accordance with standard procedures for "Granular Embankment".

3.08 Cast-in-Place Concrete:

Cast-in-place concrete shall be Class A, except that the leveling pads shall be Class B, both in accordance with the current Standard Specifications.

3.09 Modular Block (Segmental) Facing Units:

This section covers dry-cast hollow and solid concrete masonry structural retaining wall units, machine made from Portland cement, water, and suitable mineral aggregates. The units are intended for use as facing units in the construction of mortarless, modular block walls (MBW) also known as segmental retaining walls (SRW). Metallic reinforcement specified in Section 3.02 shall be used as reinforcement in the reinforced (structure) wall fill zone.

(A) Casting:

Cementitious material in the modular block facing unit shall be Portland cement conforming to the requirements of ASTM C 150. If fly ash is used it shall not exceed 20% by weight of the total cement content and shall conform to ASTM C 618. Aggregates used in concrete blocks shall conform to ASTM C 33 for normal weight concrete aggregate. Efflorescence control agent shall be used in concrete mix design to prevent efflorescence on the block.

The contractor shall advise the Engineer of the starting date for concrete panel casting at least 14 calendar days prior to beginning the operation if the casting operation is within the State, or 21 calendar days if the casting operation is outside the State.

(B) Physical Requirements:

At the time of delivery to the work site, the modular block facing units shall conform to the following physical requirements:

- 1) Minimum required compressive strength of 4,000 psi (average 3 coupons)
- 2) Minimum required compressive strength of 3,500 psi (individual coupon)
- 3) Minimum oven dry unit weight of 125 pcf
- 4) Maximum water absorption of 5 % after 24 hours
- 5) Maximum number of blocks per lot of 2,000. Tests on blocks shall be submitted at the frequency of one set per lot.

Acceptance of the concrete block, with respect to compressive strength, water absorption and unit weight, will be determined on a lot basis. The lot shall be randomly sampled and tested in accordance with ASTM C140. As no additional expense to the Department, the manufacturer shall perform the tests at a Department approved laboratory and submit the results to the Engineer for approval. Compressive strength test specimens shall be cored or shall conform to the saw-cut coupon provisions of ASTM C 140. Block lots represented by test coupons that do not reach an average compressive strength of 4,000 psi will be rejected.

(C) Freeze-Thaw Durability:

In areas where repeated freezing and thawing under saturated conditions occur, the units shall be tested to demonstrate freeze-thaw durability in accordance with Test Method ASTM C1262. Freeze thaw durability shall be based on tests from five specimens made with the same materials, concrete mix design, manufacturing process, and curing method, conducted not more than 18 months prior to delivery. Specimens used for absorption testing shall not subsequently be used for freeze-thaw testing. Specimens shall comply with either or both of the following acceptance criteria depending on the severity of the project location as determined by the Department:

- 1) The weight loss of four out of five specimens at the conclusion of 150 cycles shall not exceed

1% of its initial weight when tested in water.

- 2) The weight loss of each of four out of the five test specimens at the conclusion of 50 cycles shall not exceed 1.5% of its initial mass when tested in a saline (3% sodium chloride by weight) solution.

(D) Tolerances for Modular Block Dimensions:

Modular blocks shall be manufactured within the following tolerances:

- 1) The length and width of each individual block shall be within $\pm 1/8$ inch of the specified dimension. Hollow units shall have a minimum wall thickness of $1/4$ inches.
- 2) The height of each individual block shall be within $\pm 1/16$ inch of the specified dimension.
- 3) When a broken (split) face finish is required, the dimension of the front face shall be within ± 1.0 inch of the theoretical dimension of the unit.

(E) Finish and Appearance:

Units that indicate imperfect molding, honeycomb or open texture concrete and color variation on front face of block due to excess form oil or other reasons shall be rejected. All units shall be visually efflorescence free. All units shall be sound and free of cracks or other defects that would interfere with the proper placing of the unit or significantly impair the strength or permanence of the construction. Minor cracks (e.g. no greater than $1/50$ inch in width and no longer than 25% of the unit height) incidental to the usual method of manufacture or minor chipping resulting from shipment and delivery, are not grounds for rejection.

The exposed faces shall be free of chips, cracks or other imperfections when viewed from a distance of 30 feet under diffused lighting. Up to five (5) percent of a shipment may contain slight cracks or small chips not larger than 1.0 inch.

Color and finish shall be as shown on the plans and shall be erected with a running bond configuration.

(F) Pins:

If pins are required to align modular block facing units, they shall consist of a non-degrading polymer or hot-dipped galvanized steel and be made for the express use with the modular block units supplied. Connecting pins supporting the reinforcement shall be hot-dipped galvanized steel and be capable of holding the reinforcement in the proper design position during backfilling.

(G) Cap Units and Adhesive:

The cap unit connection to the block unit immediately under it shall be of a positive interlocking type and not frictional. Cap units shall be cast to or attached to the top of modular block facing units in strict accordance with the requirements of the manufacturer of the blocks and the adhesive. The surface of the block units under the cap units shall be clear of all debris and standing water before the approved adhesive is placed. Contractor shall provide a written 10-year warranty, acceptable to Owner, that the integrity of the materials used to attach the cap blocks will preclude separation and displacement of the cap blocks for the warranty period.

(H) Unit (Core) Fill:

Unit (core) fill is defined as free-draining, coarse grained material that is placed within the empty cores of the modular block facing units. Unit (core) fill shall be a well graded crushed stone or granular fill meeting the gradation shown in Table 7. Gradation for unit fill shall be tested at the frequency of 1 test per 50 yd³ at the job site and for every change in the material source.

**Table 7
Gradation for Unit (Core) Fill**

U.S. Sieve Size	Percent Passing
1½-inch	100
1-inch	75-100
¾-inch	50-75
No. 4	0-60
No. 40	0-50
No. 200	0-5

3.10 Certificate of Analysis for Modular Block Connection:

For modular block facing units, a certification shall be provided with detailed calculations according to AASHTO and the results of laboratory test results performed in accordance with Section C.3 in Appendix B of FHWA NHI-10-025, dated 2009 (“Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume II”). Such certification shall demonstrate that all connections, including block-to-reinforcement and block-to-block connections, and all related components meet or exceed the current AASHTO 100 year design life requirements and are capable of resisting 100% of the maximum tension in the soil reinforcements at any level within the wall. Long-term connection testing for extensible reinforcements is also required. The effect of wall batter and normal pressures representative of the full range of wall configurations and heights shall be incorporated in the tests.

4.0 CONSTRUCTION REQUIREMENTS:

Construction of MSE walls may be subject to special requirements as specified in the Geotechnical Report and Geotechnical MSE Wall Note Sheets developed by the Design Build Team. These requirements may include but are not limited to: monitoring devices (refer to section 4.5), phased panel and reinforced fill construction, waiting period intervals and foundation modification.

4.01 Excavation:

The contractor shall ensure that temporary slopes are safe during the period of wall construction, and shall adhere to all applicable local, state and federal regulations. During construction of the MSE walls, the contractor shall design, construct, maintain and, when called for, remove temporary excavation support systems (shoring). Temporary excavation support systems may be left in place if approved by the Engineer. The back slope of the excavation shall be benched. Where shoring is required, the contractor shall submit the shoring design, and a plan outlining construction and removal procedures, to the Engineer for review and approval prior to proceeding with the work. Shoring plans shall be prepared and submitted as part of the working drawings and shall bear the seal and signature of a licensed Professional Engineer in the Commonwealth of Kentucky. All shoring design shall include appropriate input and review by a geotechnical engineer.

4.02 Foundation Preparation:

(A) General:

If required, specific ground improvement requirements shall be outlined in the Geotechnical Report and the Geotechnical Note Sheets.

In general the following applies:

The foundation for the reinforced wall fill and retained backfill shall be graded level for the entire area of the base of such backfills, plus an additional 12 inches on all sides, or to the limits shown in the plans. If soil reinforcement components are to be positioned on native soil, the top one (1) foot of native soil shall meet the requirements of the reinforced backfill material specified in Subsection 3.05.

Foundation replacement material shall consist of “Granular Embankment” meeting the requirements of Section 3.06 herein. The material shall be compacted in accordance with Section 206 of the current Standard Specifications except that the maximum loose lift thickness (prior to compaction) is 12 inches. Type IV Geotextile Fabric shall be placed between the existing embankment material and the proposed “Granular Embankment” in accordance with Sections 214 and 843 of the Standard Specifications.

(B) Proof-Rolling:

The contractor shall perform proof-rolling to evaluate the stability and uniformity of the subgrades on which the MSE structure will be constructed. Proof rolling shall be performed on the entire areas at the following locations:

- 1) At the bottom of the overexcavation and recompaction zones.
- 2) At the bottom of the overexcavation and replacement zones.
- 3) At the base of all walls.
- 4) At the top of native soil layers and/or existing fill material that has been scarified, moisture-conditioned, and recompacted (if different from the bottom of the overexcavation and recompaction zones, or overexcavation and replacement zones).

Proof-rolling shall be done immediately after subgrade compaction while the moisture content of the subgrade soil is near optimum, or at the moisture content that was used to achieve the required compaction. Proof-rolling shall be performed again within one day prior to beginning MSE Wall construction.

If proof-rolling is performed after installation of pipe underdrains, the proof-roller shall not be used within 1½ feet of the underdrains.

Proof-rolling shall be performed with a pneumatic-tired tandem axle roller with at least three wheels on each axle, a gross weight of 25 tons (50,000 pounds), a minimum tire pressure of 75 pounds per square inch, and a minimum rolling width of 75 inches. A Caterpillar PS-300B (or PF-300B), Ingersoll-Rand PT-240R, BOMAG BW24R, Dynapac CP271, or equipment with equivalent capabilities shall be used for proof-rolling.

Proof-rolling equipment shall be operated at a speed between 1.5 and 3 miles per hour, or slower as required by the Engineer to permit measurements and/or observations of the deformations, ruts and/or pumping.

Proof-rolling shall be carried out in two directions at right angles to each other with no more than 24 inches between tire tracks of adjacent passes. The contractor shall operate the proof-roller in a pattern that readily allows for the recording of deformation data and complete coverage of the subgrade.

The following actions shall be taken based on the results of the proof-rolling activity:

- 1) Rutting (i.e. deformation that does not rebound) less than ¼-inch – The grade is acceptable.
- 2) Rutting greater than ¼-inch and less than 1½ inches – The grade shall be scarified and re-compacted.
- 3) Rutting greater than 1½ inches – The compacted area shall be removed and reconstructed.
- 4) Pumping (i.e. deformation that rebounds, or materials that are squeezed out of a wheel’s path) greater than one (1) inch – The area shall be remediated as directed by the Engineer.

The contractor shall be responsible for maintaining the condition of the approved proof-rolled soils throughout the duration of the retaining wall construction. Wall construction shall not commence until

the foundation subgrade has been approved by the Engineer.

4.03 Concrete Leveling Pad:

Leveling pads shall be constructed of unreinforced Class B concrete meeting the requirements of Section 601 of the current Standard Specifications as shown on the working drawings. Gravel leveling pads shall not be allowed. The elevation of the top of leveling pad shall be within $\frac{1}{8}$ inch from the design elevation when measured by a straightedge over any 10-foot run of the leveling pad.

The minimum width of the leveling pad shall be the width of the facing unit plus 8-inches. The centerline of the leveling pad shall be within 1 inch from design location. When the facing units are centered on the leveling pad, the leveling pad shall extend approximately 4-inches beyond the limits of the facing unit as measured in the direction perpendicular to the face of the wall.

Cast-in-place leveling pads shall be cured for a minimum of 48 hours before placement of wall facing units. A geotextile shall be applied over the back of the area of any openings greater than $\frac{1}{4}$ inch between the facing units and leveling pad steps. The geotextile shall extend a minimum of six (6) inches beyond the edges of the opening. The opening shall be filled with Class B concrete, or shall be concurrently backfilled on both sides with soil.

4.04 Subsurface Drainage:

Prior to wall erection, the contractor shall install a subsurface drainage system as shown on the working drawings.

4.05 Wall Erection:

(A) General:

Walls shall be erected in accordance with the approved manufacturer's written construction procedures. The contractor shall be responsible for ensuring that a field representative from the manufacturer is available at the site during construction of the initial 10-foot height of the full length of wall for each wall system. Additionally the representative shall be present for the initial 10-foot height of the full length of wall for each wall system as constructed by each additional contractor, and as called upon thereafter by the Engineer, to assist the contractor and Engineer at no additional cost to the Department. All temporary construction aids (e.g., wedges, clamps, etc.) shall be in accordance with the manufacturer's recommendations.

(B) Placement Tolerances for Walls with Precast Facing:

For walls with rigid facing, such as precast concrete panels, the panels shall be placed such that their final position is vertical or battered as shown on the working drawings. As wall fill material is placed, the panels shall be maintained in the correct vertical alignment by means of temporary wedges, clamps, or bracing as recommended by the manufacturer. A minimum of two, but not more than three, rows of panel wedges shall remain in place at all times during wall erection. Wedges shall be removed from lower rows as panel erection progresses, so as to prevent chipping or cracking of concrete panels. The contractor shall repair any damage to erected concrete panels as directed by the Engineer and to the Engineer's satisfaction. No external wedges in front of the wall shall remain in place when the wall is complete.

Erection of walls with panel facing shall be in accordance with the following tolerances:

- Vertical and horizontal alignment of the wall face shall not vary by more than $\frac{3}{4}$ inch when measured along a 10-foot straightedge.
- The overall vertical tolerance (plumbness) of the finished wall shall not exceed $\frac{1}{2}$ inch per 10 feet of wall height. Negative (outward leaning) batter is not acceptable.
- The maximum permissible out of plane offset at any panel joint shall not exceed $\frac{3}{8}$ inch.

- The final horizontal and vertical joint gaps between adjacent facing panel units shall be within 1/8 inch and 1/4 inch, respectively, of the design final joint opening per the approved calculations required in Subsection 3.01(H).

Wall sections not conforming to these tolerances shall be reconstructed at no additional cost to the Department.

(C) Placement Tolerances for Permanent Walls with Flexible Facing:

Permanent Flexible Facing is not allowed.

(D) Placement Tolerances for Modular Block Units:

Erection of walls with Modular Block Units shall be as per the following requirements:

- Vertical and horizontal alignment of the wall face shall not vary by more than 3/4-inch when measured along a 10-foot straightedge.
- Overall vertical tolerance (plumbness) of the wall shall not exceed 1 1/4-inch per 10-ft of wall height from the final wall batter. Negative (outward leaning) batter is not acceptable.
- The first row of units shall be level from unit-to-unit and from front-to-back. Use the tail of the units for alignment and measurement.
- All units shall be laid snugly together and parallel to the straight or curved line of the wall face.
- Unless otherwise noted, all blocks shall be dry-stacked and placed with each block evenly spanning the joint in the row below (running bond). Shimming or grinding shall control the elevations of any two adjacent blocks within 1/16 inch.
- The top of blocks shall be checked with a minimum length of 3-foot long straight edge bubble level. Any high points identified by the straight edge shall be ground flat. Block front to back tilting shall be checked frequently, however correction by shimming shall be done no later than 3 completed courses.
- Wall sections not conforming to these tolerances shall be reconstructed at no additional cost to the Department.

(E) Placement of Metallic Reinforcement Elements:

Metallic reinforcement elements shall be placed normal (perpendicular) to the face of the wall, unless otherwise shown on the approved plans. All reinforcement shall be structurally connected to the wall face.

At each level of the reinforcement, the reinforced wall fill material shall be roughly leveled and compacted before placing the next layer of reinforcement. The reinforcement shall bear uniformly on the compacted reinforced fill from the connection to the wall to the free end of the reinforcing elements. The reinforcement placement elevation shall be at the connection elevation to two (2) inches higher than the connection elevation.

Where overlapping of reinforcing may occur, such as at corners, reinforcing connections to panels shall be adjusted to maintain at least three (3) inches of vertical separation between overlapping reinforcement.

(F) Placement of Geotextile:

All joints between precast concrete panels shall be covered with geotextile on the backside of the wall. Adhesive shall be applied to panels only. Adhesive shall not be applied to geotextile fabric or within two

(2) inches of a joint. The contractor shall provide geotextile having a minimum width of 12 inches, and shall overlap fabric a minimum of four (4) inches. If applicable, the placement of the geotextile fabric for modular block walls shall be in accordance with the plans.

(G) Joint Pads and Fillers:

The contractor shall install joint pads and fillers as shown on the working drawings.

(H) Placement of Geosynthetic Reinforcement:

Geosynthetic reinforcement is not allowed.

4.06 Reinforced Wall Fill Placement:

(A) General:

Reinforced wall fill material shall be compacted using a static-weighted or vibratory roller. Sheeps-foot or grid-type rollers shall not be used for compacting material within the limits of the fill reinforcement. Compaction within three (3) feet of the wall facing shall be achieved by a lightweight mechanical tamper or roller system.

Reinforced wall fill placement shall closely follow erection of each course of facing panels. Reinforced fill material shall be placed in such a manner to avoid damage or disturbance of the wall materials, misalignment of facing panels, or damage to fill reinforcement or facing members. The contractor shall place fill material to the level of the connection and in such a manner as to ensure that no voids exist directly beneath reinforcing elements.

If applicable, the fill material for walls with modular block facing units shall not be advanced more than the height of a modular block unit until the drainage fill, core fill and all fill in all openings within the blocks at that level have been placed. The filled units shall be swept clean of all debris before installing the next level of units and/or placing the geogrid materials

The maximum compacted lift thickness shall not exceed eight (8) inches. The contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

For metallic reinforcements, the fill shall be spread by moving the machinery parallel to or away from the wall facing and in such a manner that the steel reinforcement remains normal to the face of the wall. Construction equipment shall not operate directly on the steel reinforcement. A minimum fill thickness of three (3) inches over the steel reinforcement shall be required prior to operation of vehicles. Sudden braking and sharp turning shall be avoided.

Wall materials which are damaged during reinforced fill material placement shall be removed and replaced by the contractor, at no additional cost to the Department. The contractor may submit alternative corrective procedures to the Engineer for consideration. Proposed alternative corrective procedures shall have the concurrence of the MSE wall supplier and designer, in writing, prior to submission to the Engineer for consideration. All corrective actions shall be at no additional cost to the Department.

(B) Compaction Criteria:

Trial fill sections shall be constructed with Department personnel present to determine appropriate criteria to achieve adequate compaction. The trial fill sections shall be performed as follows:

- One trial fill section is valid for up to 10,000 ft² of MSE wall area (e.g. 1 to 10,000 ft² of wall requires 1 trial fill section, 10,001 to 20,000 ft² requires 2, etc.) and for no more than one individual MSE wall.
- The minimum dimensions of the test pad shall be 15 ft. wide by 50 ft. long.
- The lift thickness shall not exceed eight (8) inches after compaction.
- Compaction shall be determined by using a level to measure the settlement of the trial section at a number of points after each pass (e.g., a minimum of 5 points measured at the center of a 1 ft square metal plate or other method approved by the Engineer).
- A thickness of approximately 2.5 feet shall be constructed to determine the appropriate number of passes, which will maximize compaction without excessively crushing the rock at the surface.
- The number of passes to achieve at least 80 percent of the maximum settlement will be required for production work.
- Only those methods used to establish compaction compliance in the trial fill section shall be used for production work.
- A material change, change in source, a difference of more than +/- 5.0 percent passing any sieve size, and/or change in the approved equipment shall require the contractor to conduct a new trial fill section and obtain re-approval by the Engineer of the minimum number of passes and rolling pattern.
- The Department reserves the right to use other test methods to evaluate the adequacy of the compaction criteria.
- The trial fill sections are incidental to the bid price for Retaining Wall.

Within three (3) feet of the wall facing, compaction criteria shall be determined using test pad sections with Department personnel present to determine appropriate criteria to achieve adequate compaction. The test pad sections shall be performed as follows:

- The minimum dimensions of the test pad shall be 5 ft. wide by 15 ft. long.
- The lift thickness shall not exceed eight (8) inches after compaction.
- Compaction shall be determined by using a level to measure the settlement of the test pad section at a number of points after each pass (e.g., a minimum of 3 points measured at the center of a 1 ft square plate or other method approved by the Engineer).
- A thickness of approximately 2.5 feet shall be constructed to determine the minimum number of passes of a lightweight mechanical tamper or roller system.
- The number of passes to achieve at least 80 percent of the maximum settlement will be required for production work.
- Only those methods used to establish compaction compliance in the test pad section shall be used for production work.
- A material change, change in source, a difference of more than +/- 5.0 percent passing any sieve size, and/or change in the approved equipment shall require the contractor to conduct a new test pad section.
- The test pad sections are incidental to the bid price for Retaining Wall.

(C) Moisture Control:

The free moisture content of the reinforced fill material, as determined by KM 64-306, shall not exceed 2.0% during compaction.

(D) Protection of the Work:

The contractor shall not allow surface runoff from adjacent areas to enter the wall construction site at any time during construction operations. In addition, at the end of each day's operation, the contractor shall

slope the last lift of fill material away from the wall facing so that runoff is directed away from the structure. If the subgrade is damaged due to water or otherwise, such that it does not meet the requirements of Subsection 4.02, then as directed by the Engineer, the contractor shall rework and repair the damaged subgrade at no additional expense to the Department. The criteria in Subsection 4.02 shall be used to judge the adequacy of the repair. Rework and repair shall extend to a depth where undamaged work is encountered.

4.07 Retained Backfill Placement:

As required by the Geotechnical Report and plan notes the retained backfill (i.e. external backfill outside of the reinforced volume) may consist of either soil or "Granular Embankment" meeting the requirements of Section 3.06 herein. The material shall be compacted in accordance with Section 206 of the current Standard Specifications except that the maximum loose lift thickness (prior to compaction) is 12 inches. Type IV Geotextile Fabric shall be placed between the existing embankment material and the proposed "Granular Embankment" in accordance with Sections 214 and 843 of the Standard Specifications.

4.5 MONITORING:

4.51 Monitoring Devices:

The Geotechnical Report may require devices to monitor vertical and horizontal displacement both during and after construction. The Contractor will be responsible for providing labor and materials and for cooperating with, and providing, any required assistance to Department personnel with implementation of monitoring activities. The cost of all labor and materials required to support the monitoring program will be incidental to the cost of the.

The approximate locations of any monitoring devices shall be shown in the Working Drawings prepared by the MSE Wall Designer.

4.52 Monitoring Schedule:

The monitoring schedule for any required monitoring device shall be as agreed upon in the Geotechnical Report for the structure.

5.0 METHOD OF MEASUREMENT:

5.01 MSE Retaining Wall:

Mechanically Stabilized Earth (MSE) retaining walls will be measured by the square foot of Retaining Wall. The vertical height will be taken as the difference in elevation measured from the top of wall to the top of the leveling pad. No field measurement will be made. The final quantity will be the contract plan quantity increased or decreased by authorized changes.

The MSE Wall supplier's design may require additional excavation and MSE Wall materials to satisfy their design. The design MSE earth reinforcement lengths shall be equal to or greater than the length shown on the plans or as required by the AASHTO Specifications for the height of the wall plus live load surcharge. The lengths of the MSE Reinforcement shall be constant from the bottom to the top of the section. Extension of the plan limits to accommodate the wall design, configuration of pre-fabricated concrete units, or lengths of earth reinforcement for MSE Walls shall not be cause for changing the plan pay quantities. Additional quantities of excavation, MSE Reinforcement, MSE volume, excavation for

foundation replacement, granular embankment, and labor necessary to satisfy the MSE Wall supplier's design shall be incidental to the Retaining Wall.

The MSE volume that extends twelve inches, minimum, beyond the ends of the reinforced volume for MSE Walls shall be incidental to the Retaining Wall.

All work associated with providing the design, details and construction for the coping, moment slab, barrier and pre-cast aesthetic panel shall be incidental to the Retaining Wall.

All materials, equipment, and labor necessary to provide and install the geotextile fabric immediately surrounding the reinforced fill volume shall be incidental to the Retaining Wall.

5.02 Embankment:

The quantity of embankment for external retained backfill behind the MSE Walls and, if required, granular foundation beneath the walls shall be measured according to Section 206 of the current Standard Specifications. The final quantities shall be based on field measurements.

5.03 Geotextile Fabric:

All materials, equipment, and labor necessary to provide and install the geotextile fabric placed between existing fill material and Granular Embankment shall be measured according to Section 214 of the current Standard Specifications. The final quantities shall be based on field measurements.

| Appendix:

SPECIAL NOTE

Lane Closures, Traffic Stoppages, and Disincentives

The Maintenance of Traffic phase notes identify the minimum number of lanes that shall be open at a time, traffic may be halted a maximum of 15 minutes per hours. Stoppages will not be allowed on weekdays between the hours of 6:00am and 9:00am or 3:00pm and 6:00pm local time. Stoppages will also not be allowed during the holidays and special events listed in the plans and proposal documents. If closures of the minimum number of lanes occur during days or times when they are not allowed then damages will be assessed at the rate of \$4,750 per lane per day or any portion of a day until the lanes are reopened.

SPECIAL NOTE FOR INTELLIGENT COMPACTION OF ASPHALT MIXTURES

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

1.0 DESCRIPTION. Provide and use Intelligent Compaction (IC) Rollers for compaction of all asphalt mixtures.

2.0 MATERIALS AND EQUIPMENT. In addition to the equipment specified in Subsection 403.02, a minimum of one (1) IC roller is to be used on the project at all times, two (2) IC rollers will be required when the paving train consists of three (3) or more rollers. The Contractor is to only the IC roller(s) for compaction as the breakdown and/or intermediate roller(s). All IC rollers will meet the following minimum characteristics:

- 1) Are self propelled double-drum vibratory rollers equipped with accelerometers mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied compactive effort. The IC rollers must have the approval of the Engineer prior to use. Examples of rollers equipped with IC technology can be found at www.IntelligentCompaction.com.
- 2) Are equipped with non-contact temperature sensors for measuring pavement surface temperatures.
- 3) The output from the roller is designated as the IC-MV which represents the stiffness of the materials based on the vibration of the roller drums and the resulting response from the underlying materials.
- 4) Are equipped with integrated on-board documentation systems that are capable of displaying real-time color-coded maps of IC measurement values including the stiffness response values, location of the roller, number of roller passes, machine settings, together with the material temperature, speed and the frequency and amplitude of roller drums. Ensure the display unit is capable of transferring the data by means of a USB port.
- 5) Are equipped with a mounted Global Positioning System GPS radio and receiver either a Real Time Kinematic (RTK-GPS) or Global Navigational Satellite System (GNSS) units that monitor the location and track the number of passes of the rollers. Accuracy of the positioning system is to be a minimum of 12 inches.

3.0 WORK PLAN. Submit to the Engineer an IC Work Plan at the Preconstruction Conference and at least 2 weeks prior to the beginning construction. Describe in the work plan the following:

1. Compaction equipment to be used including:

- Vendor(s)
- Roller model(s),
- Roller dimensions and weights,
- Description of IC measurement system,
- GPS capabilities,
- Documentation system,
- Temperature measurement system, and
- Software.

2. Roller data collection methods including sampling rates and intervals and data file types.

3. Transfer of data to the Engineer including method, timing, and personnel responsible. Data transfer shall be provided by a real time cloud data collecting and distribution system (ex. Visionlink). The Contractor will provide the Cabinet with any vendor specific software, user id, passwords, etc. needed to access the data through this service, cost of this access is incidental to the IC bid item.

4. Provide the Section Engineer the following new GPS survey equipment; this is a sole source item to ensure compatibility with the Cabinet's existing equipment, **the Cabinet retains possession of the equipment upon completion of the project:**

Item	Part No.	Description	Quantity
1	85985-96	Kit - GNSS, SPS855 & SPS985, 900 MHz USA/CAN	1
2	IS51951-80	Option - Combo GLN/GAL/BeiDou/L5, SPS985/SPS855/SPS555H, Construction	1
3	IS50990-11	Upgrade - Precise Base, SPS985 / SPS985L / SPS855 / SPS585, Construction	1
4	56500-90	Kit - External Radio Antenna, 900MHz, Reverse Polarity	1
5	IS50990-13	Option – Premium Precise Rover, SPS985, Construction	1
6	TAB81-1	Trimble Site Tablet 10 w/SCS900, 2.4GHz radio, US WWAN, Gry/Yel, ext battery, extra radio antenna	1
7	104977-01-HH	Site Tablet 10 Pole Mount Kit	1
8	107727-01-HH	Site Tablet 10 Carry Case	1
9	SCS900-22	SCS900 Roding	1
10	SCS900-23	SCS900 Advanced Measurement	1
11	51658-10	Kit - Radio, SNB900, US/Canada	1
12	55201-00	GPS Kit - 2m Range Pole, Quick Release Bipod, Topo Shoe, Bag	1
13	28959-00-HH	Tripod - Adjustable Height, 2m for GPS	1
14	90553-TR-HH	Tripod - Dual Clamp Tri-Max with Trimble Logos	1

5. Training plan and schedule for roller operators, project foreman, project surveyors, and Cabinet personnel; including both classroom and field training. Training should be conducted at least 1 week before beginning IC construction. The training is to be performed by a qualified representative(s) from the IC Roller manufacture(s) to be used on the project. This training shall include how to access and use the data from the cloud data source.

4.0 CONSTRUCTION. Do not begin work until the Engineer has approved the IC submittals and the IC equipment.

Follow requirements established in Section 400 for production and placement, materials, equipment, acceptance plans and adjustments except as noted or modified in this Specification. Provide the Engineer at least one day’s notice prior to beginning construction or prior to resuming production if operations have been temporarily suspended. Ensure paving equipment complies with all requirements specified in Section 400. The IC roller temperatures will be evaluated by the Department with the data from a Paver Mounted Infrared Temperature Gauge.

A. Pre-Construction Test Section(s) Requirements

1. Prior to the start of production, ensure the proper setup of the GPS, IC roller(s) and the rover(s) by conducting joint GPS correlation and verification testing between the Contractor, GPS representative and IC roller manufacturer using the same datum.

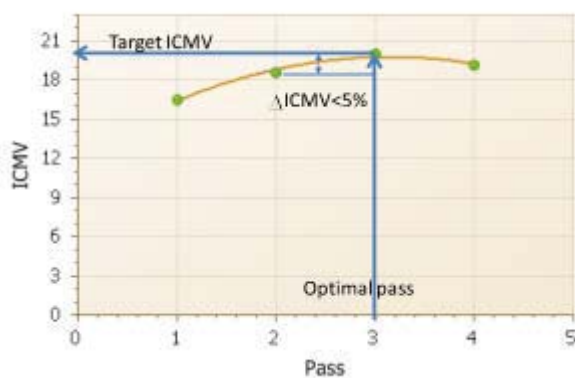
1. Ensure GPS correlation and verification testing includes the following minimum processes:
 - a. Establish the GPS system to be used either one with a base station or one with mobile receivers only. Ensure all components in the system are set to the correct coordinate system; then,
 - b. Verify that the roller and rover are working properly and that there is a connection with the base station; then,
 - c. Record the coordinates of the two edges where the front drum of the roller is in contact with the ground from the on-board, color-coded display; then,
 - d. Mark the locations of the roller drum edges and move the roller, and place the mobile receiver at each mark and record the readings; then,

2. Compare coordinates between the roller and rover receivers. If the coordinates are within 12.0 in. of each other, the comparison is acceptable. If the coordinates are not within 12.0 in., diagnose and perform necessary corrections and repeat the above steps until verification is acceptable.
3. Do not begin work until acceptable GPS correlation and verification has been obtained.
4. The Contractor and the Department should conduct random GPS verification testing during production to ensure data locations are accurate. The recommended rate is once per day with a requirement of at least once per week.
5. All acceptance testing shall be as outlined in Standard Specifications section 400.

B. Construction Test Section(s) Requirements

Construct test section(s) at location(s) agreed on by the Contractor and the Engineer within the project limits. The test section is required to determine a compaction curve of the asphalt mixtures in relationship to number of roller passes and to the stiffness of mixture while meeting the Department in-place compaction requirements. All rollers and the respective number of passes for each is to be determined via control strip each time a material change, equipment change or when the Engineer deems necessary.

Conduct test section(s) on every lift and every asphalt mixture. Ensure test section quantities of 500 to 1,000 tons of mainline mixtures. Operate IC rollers in the low to medium amplitude range and at the same settings (speed, frequency) throughout the section while minimizing overlapping of the roller, **the settings are to be used throughout the project with no changes.** After each roller pass, the qualified technician from the contractor observed by the Department will use a nondestructive nuclear gauge that has been calibrated to the mixture to estimate the density of the asphalt at 10 locations uniformly spaced throughout the test section within the width of a single roller pass. The density readings and the number of roller passes needed to achieve the specified compaction will be recorded. The estimated target density will be the peak of the average of the nondestructive readings within the desired compaction temperature range for the mixture. The IC roller data in conjunction with the Veda software will create an IC compaction curve for the mixture. The target IC-MV is the point when the increase in the IC-MV of the material between passes is less than 5 percent on the compaction curve. The IC compaction curve is defined as the relationship between the IC-MV and the roller passes. A compaction curve example is as follows:



Subsequent to the determination of the target IC-MV, compact an adjoining > 250 < 500 tons section using same roller settings and the number of estimated roller passes and allow the Department to verify the compaction with the same calibrated nondestructive nuclear gauge following the final roller pass. **The Department will obtain cores at 10 locations (No cores for calibration are to be taken in the surface layer, use non-destructive density results only!!)** uniformly spaced throughout the test section within the width of the single roller. Obtain GPS measurement of the core locations with a GPS rover. Use the Veda software to perform least square linear regression between the core data and IC-

MV in order to correlate the production IC-MV values to the Department specified in-place air voids. A sample linear regression curve example is as follows.



C. Construction Requirements

Use the IC roller on all lifts and types of asphalt within the limits of the project.

Ensure the optimal number of roller passes determined from the test sections has been applied to a minimum coverage of 80% of the individual IC Construction area. Ensure a minimum of 75% of the individual IC Construction area meets the target IC-MV values determined from the test sections.

Do not continue paving operations if IC Construction areas not meeting the IC criteria are produced until they have been investigated by the Department. Obtain the Engineer's approval to resume paving operations. Non-IC rollers are allowed to be used as the third roller on the project; one of the breakdown or the finish rollers is to be equipped with IC technology.

IC Construction areas are defined as subsections of the project being worked continuously by the Contractor. The magnitude of the IC Construction areas may vary with production but must be at least 750 tons per mixture for evaluation. Partial IC Construction areas of < 750 tons will be included in the previous area evaluation. IC Construction areas may extend over multiple days depending on the operations.

The IC Construction Operations Criteria does not affect the Department's acceptance processes for the materials or construction operations

5.0 MEASUREMENT. The Department will measure the total tons of asphalt mixtures compacted using the IC roller(s). Compaction is to be performed by a minimum of one (1) IC roller for a two (2) roller operation and a minimum of two (2) IC rollers when three (3) or more rollers are used for compaction. Material compacted by rollers not equipped with properly functioning IC equipment will not be accepted for payment of the bid item asphalt mixtures IC rolled. Use of non-IC rollers can be accepted on small areas due to equipment malfunctions at the written approval of the Engineer. Paving operations should be suspended for equipment malfunctions that will extend over three days of operation.

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

1. Payment is full compensation for all work associated with providing IC equipped rollers, transmission of electronic data files, survey equipment, two copies of IC roller manufacturer software, and training.
2. Delays due to GPS satellite reception of signals to operate the IC equipment or IC roller breakdowns will not be considered justification for contract modifications or contract extensions.

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24781EC	Intelligent Compaction for Asphalt	TON

SPECIAL NOTE FOR INTELLIGENT COMPACTION OF AGGREGATE BASES

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

1.0 DESCRIPTION. Provide and use Intelligent Compaction (IC) Rollers for compaction of Aggregate bases.

2.0 MATERIALS AND EQUIPMENT. The Contractor shall supply sufficient numbers of rollers and other associated equipment necessary to complete the compaction requirements for the specific materials. The Contractor will determine the number of IC rollers to use depending on the scope of the project. The IC roller(s) may be utilized during production with other standard compaction equipment and shall be used for the evaluation of the compaction operations. Provide at least one (1) roller to be used on the project with the following minimum characteristics:

- 1) Are self propelled vibratory rollers equipped with machine drive power and/or accelerometers mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied Compactive effort. www.IntelligentCompaction.com contains a list of acceptable rollers equipped with IC technology.
- 2) IC rollers are to be smooth drums either with dual drums or one drum and back rubber tires.
- 3) The output from the roller is designated as the IC-MV which represents the stiffness of the materials based on the vibration of the roller drums and the resulting response from the underlying materials, or the machine drive power value.
- 4) Are equipped with integrated on-board documentation systems that are capable of displaying real-time color-coded maps of IC measurement values including the stiffness response values, location of the roller, number of roller passes, machine settings, together with the speed, the frequency and amplitude of roller drums. Ensure the display unit is capable of transferring the data by means of a USB port.
- 5) Are equipped with a mounted Global Positioning System GPS radio and receiver either a Real Time Kinematic (RTK-GPS) or Global Navigational Satellite System (GNSS) units that monitor the location and track the number of passes of the rollers. Accuracy of the positioning system must be within 12 inches.

3.0 WORK PLAN. Submit to the Engineer an IC Work Plan at the Preconstruction Conference and/or at least 2 weeks prior to beginning the corresponding construction activities. Describe in the work plan the following:

1. Compaction equipment to be used including:
 - Vendor(s)
 - Roller model(s),

- Roller dimensions and weights,
 - Description of IC measurement system,
 - GPS capabilities,
 - Documentation system,
 - Software.
2. Roller data collection methods including sampling rates and intervals and data file types.
3. Transfer of data to the Engineer including method, timing, and personnel responsible. Data transfer shall be provided by a real time cloud data collecting and distribution system (ex. Visionlink). The Contractor will provide the Cabinet with any vendor specific software, user id, passwords, etc. needed to access the data through this service, cost of this access is incidental to the IC bid item(s).
4. Training plan and schedule for roller operators, project foreman, project surveyors, and Cabinet personnel; including both classroom and field training from the equipment manufacturer. Training should be conducted at least 1 week before beginning IC construction. The training is to be performed by a qualified representative(s) from the IC Roller manufacture(s) to be used on the project.

4.0 CONSTRUCTION. Prior to the start of production, ensure the proper setup of the GPS, IC roller(s) and the rover(s) by conducting joint GPS correlation and verification testing between the Contractor, GPS representative and IC roller manufacturer using the same datum. Use the project datum system (Northing, Easting and Elevation) when applicable.

1. Ensure GPS correlation and verification testing includes the following minimum processes:
 - a. Establish the GPS system to be used either one with a base station or one with mobile receivers only. Ensure all components in the system are set to the correct coordinate system; then,
 - b. Verify that the roller and rover are working properly and that there is a connection with the base station; then,
 - c. Record the coordinates of the two edges where the front drum of the roller is in contact with the ground from the on-board, color-coded display; then,
 - d. Mark the locations of the roller drum edges and move the roller, and place the mobile receiver at each mark and record the readings; then,
2. Compare coordinates between the roller and rover receivers. If the coordinates are within 12.0 in. of each other, the comparison is acceptable. If the coordinates are not within 12.0 in., diagnose and perform necessary corrections and repeat the above steps until verification is acceptable.

3. Do not begin work until acceptable GPS correlation and verification has been obtained. The Contractor and the Department should conduct random GPS verification testing during production to ensure data locations are accurate. The recommended rate is once per day with a requirement of at least once per week.
4. A test strip is to be used for all materials (DGA, CSB) as outlined and sized in section 302.03.04 to determine optimum rolling pattern, for all materials, and the target density for aggregate bases. A new test strip will be required anytime the material changes, equipment changes, or proper compaction has not been obtained for two (2) consecutive test locations.
5. All acceptance testing shall be as outlined in Standard Specifications sections 200 and 300.
6. Any areas a minimum of 50 square feet in area not achieving the 80% of the stiffness value determined by the latest control strip shall be tested by other means approved by the Engineer. If the material doesn't pass the testing is shall be repaired based on current standards to the satisfaction of the Engineer.

5.0 MEASUREMENT. The Department will measure the total tons of aggregate base (DGA and/or CSB) compacted using the IC roller(s). The use of non-IC rollers is allowed on this project, but an IC roller must be used as well.

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

1. All areas with a minimum of 80% pass coverage and 75% required stiffness readings.
2. Payment is full compensation for all work associated with providing IC equipped rollers, transmission of electronic data files, two copies of IC roller manufacturer software, and training.
3. Delays due to GPS satellite reception of signals to operate the IC equipment or IC roller breakdowns will not be considered justification for contract modifications or contract extensions.

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24780EC	Intelligent Compaction for Aggregate	TON

Aug. 25, 2017

SPECIAL NOTE

General Utility Coordination

The Contractor shall communicate, cooperate, and coordinate with the Department, the utility owners, and potentially affected third parties, as necessary for the utility relocation work. The Contractor shall be responsible for all coordination needed to ensure that the road construction and utility relocation work may concurrently and effectively take place.

This item shall include assignment of a Utility Coordinator for the project to coordinate plans, work and schedules directly with the utility companies and KYTC personnel. The Utility Coordinator shall be a licensed professional engineer with project management experience. This item includes responsibility to ensure the project progresses efficiently and in accordance with the proposed contract documents. The Department may consult the Utility Coordinator on matters of utility work design, construction, cost, and/or schedule. Any changes in the proposed scope, design, construction, cost, and/or schedule for the utility work shall be approved by the Department. This item includes conducting monthly coordination meetings with involved utility companies and as needed on project site visits to manage utility relocation activity, resolve conflicts with the road activity, and minimize impact to the project. The department shall be invited to Utility Coordination meetings.

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

Code	Item Description	Unit
24845EC	Utility Coordination	Lump Sum

SPECIAL NOTE

Excavation South of the North Fork of Kentucky River

To minimize impacts to traffic on KY 15, a limit of 200 calendar days has been set for the completion of all earthwork operations south of the river. The time period shall begin at the initiation of earthwork or excavation activities. Any work extending past the 200 calendar days limit will be assessed damages at the rate of \$4,750 per day.

Don Wolfe - Director
 Phone (502) 564-3020
 FAX (502) 564-7759

DIVISION OF TRAFFIC OPERATIONS

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

Item Number: 10-158

County: perry

Description: Ky 550/Sb ramps: KY 550/NB RAMPS: MORTON blvd/FOOD CITY:ky 15/Ky 15 bypass

Cabinets	Master code	
4	T-01-0020	Base Mounted 332 Cabinet
4	T-01-0100	170 Controller
4	T-01-0501	Conflict Monitor, Model 2018
22	T-01-0600	Loop Detector, Model 222
26	T-01-0700	Load Switches

Signals		
29	T-02-0009	Siemens 3 Section Signal
30	T-02-0032	Siemen 3 section backplate
7	T-02-0033	Siemen 4 secton 12" signal (poly)
7	T-02-0043	Siemen 4-sec. straight signal backplate
1	T-02-0300	LED Module 12" red arrow
8	T-02-0310	LED Module 12" yellow arrow
8	T-02-0320	LED Module 12" green arrow
35	T-02-0330	LED Module 12" red ball
35	T-02-0340	LED Module 12" yellow ball
29	T-02-0350	LED Module 12" green ball

Special items		
4	T-02-0504	Router (this includes power supply/antenna/cabling)

Poles		
1	T-04-0010	Steel Strain Pole 28 foot
2	T-04-0020	Steel Strain Pole 30 foot
12	T-04-0030	Steel Strain Pole 32 foot
1	T-04-0054	Steel Strain Pole 38 foot

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

SPECIAL 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 36 inches 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 2012 Standard Specifications for Road and Bridge Construction.

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 (inches)	AASHTO Nominal Diameter (inches)	Max. Deflection Limit (inches)	
		5.0%	10.0%
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:

$$\% \text{ Deflection} = [(AASHTO \text{ Nominal Diameter} - D2) / AASHTO \text{ Nominal Diameter}] \times 100\%$$

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:

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

SPECIAL NOTE

For Tree Removal

**Perry County
KY 15 Improvements
Item No. 10-158**

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 David Waldner,
Director, Division of Environmental Analysis, 200 Mero Street, Frankfort, KY
40601, Phone: (502) 564-7250.**

Special Note for Bridge Demolition, Renovation and Asbestos Abatement

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

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



TRANSPORTATION CABINET

Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Michael W. Hancock, P.E.
Secretary

Memorandum

To: Brandon Baker
CC: Toney Vinegar
From: O'Dail Lawson
Environmental Scientist IV
Division of Environmental Analysis
Date: 9/2/2015
Re: Asbestos Inspection Report for Perry 10-158

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

Project and Structure Information

Project # Perry 10-158

Bridge # 097B00055N

Location: KY-15 over the North Fork of the Kentucky River

Description: The samples collected were point counted below 1%. No abatement necessary.

Inspection Date: August 31, 2015

Results

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



<i>MRS, INC.</i>	<i>MRS, Inc. Analytical Laboratory Division</i>
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332 West Broadway, Suite 613 (502) 495-1212
 Louisville, Kentucky 40202 Fax: (502) 491-7111

BULK SAMPLE ASBESTOS ANALYSIS

Analysis N #	259025 A	Address:	Perry County
Client Name:	KYTC		10-158 097B00055N
Sampled By:	O'Dail Lawson		

Number	Color	% FIBROUS ASBESTOS						% NON-ASBESTOS FIBERS			
		Layered	Fibrous	Chrysotile	Amosite	crocidolite	Others	Cellulose	Fiberglass	Syn. Fiber	Other/Mat.
# P - 1	Gray	Yes	No	2%				2%			96%
# P - 2	Black	Yes	No				None				
# P - 3	Gray	Yes	No	2%				2%			96%

Methodology : EPA Method 600/R-93-116
 Date Analyzed : 2-Sep-15
 Analyst : Winterford Mensah

Reviewed By: *Winterford Mensah*
Signature

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

AIHA # 102459

AJHA #1 02459

<i>MRS, INC.</i>	<i>MRS, Inc. Analytical Laboratory Division</i>
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332 West Broadway, Suite 613
Louisville, Kentucky 40202

(502) 495-1212

Fax: (502) 491-7111

Client: <u>KY Transportation Cabinet</u>	Project No: <u>259025 B</u>
Address: <u>200 Mero Street</u>	Sample ID: <u># P - 1</u>
<u>Frankfort, KY</u>	Sampled: <u>31-Aug-15</u>
<u>40601</u>	Received: <u>1-Sep-15</u>
<u>Attention O'Dail Lawson</u>	Analyzed: <u>2-Sep-15 - Point Count -</u>

Bulk Sample Analysis

Sampled by: O'Dail Lawson

Facility/Location: Perry County / Item # 10 - 158 097 B00055N

Field Description: Guard Rail Mastic

Laboratory Description:

Grsy Material

Asbestos Materials:

Chrysotile = 1/400 = 0.25 % (< 1 %) Sample Is Negative

Non-asbestos Fibrous Materials & Matrix Materials:

<u>Cellulose</u>	<u>0.25 %</u>
<u>Binders</u>	<u>99.50 %</u>

Remarks: The sample was analyzed for asbestos content following the EPA Methodology (600/R-93/116). The test relates only to the items tested. This report does not represent endorsement by NVLAP or any agency of the U.S. Government.

Analyst: Winterford Mensah **Reviewed By:** *Winterford Mensah*
Signature

<i>MRS, INC.</i>	<i>MRS, Inc. Analytical Laboratory Division</i>
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332 West Broadway, Suite 613
Louisville, Kentucky 40202

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

Client: <u>KY Transportation Cabinet</u>	Project No: <u>259025 B</u>
Address: <u>200 Mero Street</u>	Sample ID: <u># P - 3</u>
<u>Frankfort, KY</u>	Sampled: <u>31-Aug-15</u>
<u>40601</u>	Received: <u>1-Sep-15</u>
<u>Attention O'Dail Lawson</u>	Analyzed: <u>2-Sep-15 - Point Count -</u>

Bulk Sample Analysis

Sampled by: O'Dail Lawson

Facility/Location: Perry County / Item # 10 - 158 097 B00055N

Field Description: Sealant

Laboratory Description:

Grsy Material

Asbestos Materials:

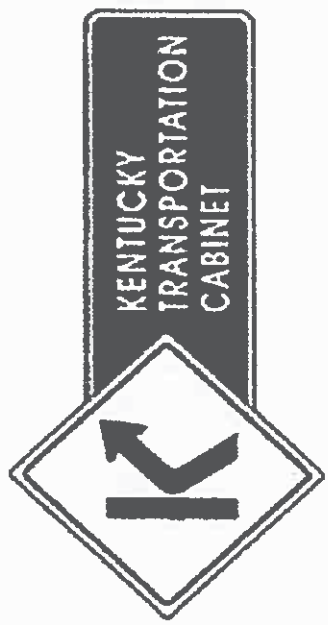
Chrysotile = 1/400 = 0.25 % (< 1 %) Sample Is Negative

Non-asbestos Fibrous Materials & Matrix Materials:

<u>Cellulose</u>	<u>0.25 %</u>
<u>Binders</u>	<u>99.50 %</u>

Remarks: The sample was analyzed for asbestos content following the EPA Methodology (600/R-93/116). The test relates only to the items tested. This report does not represent endorsement by NVLAP or any agency of the U.S. Government.

Analyst: Winterford Mensah **Reviewed By:** 
Signature



Chain of Custody Record

Kentucky Transportation Cabinet

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

**KENTUCKY
TRANSPORTATION
CABINET**

O'Dail Lawson odail.lawson@ky.gov
 KYTC
 Address: 200 Mero Street Frankfort KY
 Phone: 502-564-7250 Fax: 502-564-5655
 PO#:

Client Information **KY TRANS CABINET**
 Results Code: ND = None Detected
 FTD = Filler Tampering or Damaged
 N/A = Not Applicable

Project or Subject Reference **Perry 10-158**
 Samplers (signature): *[Signature]*

Sample ID	Sample Description	Collected		Analysis Requested	Grab/Comp.	No. of Cont.	Cont. Type	Preservative
		Date	Time					
P-1	GUANO RAIL MASTIC	8-21-15	12:45	Asbestos Bulk	Grey	Mastic	N/A	
P-2	Joint Compound				Black	Rubber		
P-3	Sealant (applies on concrete)				Brown	Sealant		

Relinquished By: _____ Date/Time: _____

Received By: *[Signature]* Date/Time: 07/01/15

Relinquished By: _____ Date/Time: _____

Received at Lab By: _____ Date/Time: _____

ENVIRONMENTAL TRAINING CONCEPTS, INC
P.O Box 99603 Louisville, KY 40269
(502)640-2951

Certification Number: ETC-AIR-071415-00276

O'Dail Lawson

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

ASBESTOS INSPECTOR REFRESHER

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



Conducted at: 1220 Kentucky Mills Drive, Louisville, KY


Name - Training Manager

Expiration Date: 07-14-2016


Name - Instructor

	KENTUCKY TRANSPORTATION CABINET Department of Highways DIVISION OF RIGHT OF WAY & UTILITIES	TC 62-226 Rev. 01/2016 Page 1 of 1
RIGHT OF WAY CERTIFICATION		

<input checked="" type="checkbox"/>	Original	<input type="checkbox"/>	Re-Certification	RIGHT OF WAY CERTIFICATION			
ITEM #		COUNTY		PROJECT # (STATE)		PROJECT # (FEDERAL)	
10-158.00		Perry		12FO FD52 097 8658101R		NHPP 0151 (076)	
PROJECT DESCRIPTION							
Improve Safety, Upgrade Geometrics, & Address Capacity Issues / KY 15 / Perry Co. / Morton Boulevard to KY 15 Bypass							
<input type="checkbox"/> 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.							
<input type="checkbox"/> 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.							
<input type="checkbox"/> 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							
<input checked="" type="checkbox"/> 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		32	EXCEPTION (S) Parcel #		ANTICIPATED DATE OF POSSESSION WITH EXPLANATION		
Number of Parcels That Have Been Acquired							
Signed Deed		27					
Condemnation		5					
Signed ROE		5	P102, P106		IOJ has been obtained on P102 and P106. All remaining occupants have had replacement housing made available to them in accordance with 49 CFR 24.204. Anticipated date of relocation of tenants is December 6.		
Notes/ Comments (Use Additional Sheet if necessary)							
IOJ obtained on P101, P102, P106, P120, and P136.							
LPA RW Project Manager				Right of Way Supervisor			
Printed Name				Printed Name		Aric Skaggs	
Signature				Signature			
Date				Date		11/03/2017	
Right of Way Director				FHWA			
Printed Name		DM Loy		Printed Name			
Signature				Signature		03NOV17	

UTILITIES AND RAIL CERTIFICATION NOTE

Perry County, NHPP 0151 (077)
FD52 097 86581 01U
KY 15
Item No. 10-158.00

GENERAL NOTES

Water, Sewer, and Gas relocations will be included with the roadway contract for the City of Hazard and Perry County Sanitation District #1.

Aerial utility relocations have not begun at this time. The highway contractor should not anticipate that any utility relocation work will be completed prior to the award of the contract; consequently, the highway contractor should prepare the construction schedule accordingly.

Overhead crossings will be present at various locations throughout the mainline and approaches. The contractor is to coordinate efforts with the owners of the overhead utilities to maintain a safe working distance between equipment and the overhead lines.

Overhead lines will be present and in close proximity with signal and lighting installations. The contractor will be responsible to install new signal equipment under these existing facilities and coordinate efforts with the owners of these facilities to maintain a safe working distance between equipment and overhead lines.

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

AEP Distribution, Thacker & Grigsby Telecommunication, Windstream Telecommunication, all have facilities within the project limits and running along this KY 15 corridor.

AEP Transmission has facilities that cross KY 15 south of the North Fork of Kentucky River.

Cut Through Hydrocarbon has a gas well located on Parcel 140 and gas lines coming from the well that cross KY 15 south of the North Fork of Kentucky River.

This may not be a complete list of the utility companies/facilities in the project area; however, it is all that have been identified at this time.

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

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

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

- AEP Transmission – Estimated Clearance Date **09/30/18**
 - AEP Transmission has provided relocation plans and will be working to remove and install new facilities to outside of the construction limits on the south end of the project

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at right of approximate Sta. 312+75 to Sta. 320+00. The excavation in this area will not be able to begin until the relocation work is complete.

- The contractor will maintain an undisturbed area extending 30 feet in all directions from the center of poles, supported structures, or towers on said electric power line and will also maintain an undisturbed area of 30 feet in all directions from all anchor guys.
- Any blasting required in the area of AEP Transmission is to be conducted by certified individual meeting requirements as established by local, state, and federal government agencies. AEP's facilities (guys, structures, and conductors) shall not be subjected to seismic vibrations caused by blasting in excess of a maximum total peak particle velocity of 2.0 inches per second in any one of three mutually perpendicular directions identified as transverse, vertical, and longitudinal. A properly calibrated seismograph shall be used to record vibration levels. The geophone of the seismograph shall be located within 10 feet of the structure between the blast and the structure. The geophone shall be properly coupled to provide accurate vibration readings. Blasting shall also be controlled so as to prevent any debris from being blown into the conductors or structures of AEP's facilities. If the contractor elects to use blast blankets, any additional cost is incidental to Roadway Excavation bid item. Air blast shall be controlled to prevent arcing of conductors to one another or to any structure. Air blast shall also be controlled to a limit of 150 dBI at AEP's facilities. A copy of the blasting log shall be provided to J. Kelly Bledsoe of AEP Transmission within 30 days following the blast.
- The contractor shall not increase the present ground elevation in the right of way area so as to reduce the clearance between the conductors and the ground to be less than prescribed by the National Electrical Safety Code.
- The contractor shall provide reasonable access, in AEP's opinion, at all times for the operation, maintenance, repair, alteration, reconstruction and removal, from time to time, of any or all AEP's facilities.
- The construction, use, and maintenance of construction access roads on the right of way will not materially change the surface elevation from that existing prior to the granting of said consent.
- The contractor will exercise extreme care when working under or adjacent to AEP's facilities.
- AEP Distribution – Estimated Clearance Date **12/31/18**
 - AEP Distribution has provided relocation plans and will be relocating facilities in phases. The initial phase will remove facilities outside of the work zone. The estimated clearance date above is for the first phase. For the final phase, AEP will be placing a pole line on the low bench of the embankment from LT Sta. 345+00 to LT Sta. 365+50 and tying back in to facilities across the North Fork of Kentucky River. The contractor shall construct the embankment up to the low bench in this station range and leave an access to the low

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bench for AEP to maintain the facilities in the future. The contractor shall coordinate with AEP on when the final phase can begin.

- Thacker & Grigsby (TVS) - Estimated Clearance Date 03/30/19
 - Thacker & Grigsby has provided relocation plans. They will be jointly using some of AEP’s poles and setting new poles. They will be coordinating their relocation with AEP and Windstream.
- Windstream - Estimated Clearance Date 06/30/19
 - Windstream has provided relocation plans. They will be jointly using some of AEP’s and Thacker & Grigsby’s poles. They will be coordinating their relocation with AEP and Thacker & Grigsby.
- Cut Through Hydrocarbon - Estimated Clearance Date 07/31/18
 - Cut Through Hydrocarbon will be cutting and capping lines and removing facilities that is within disturb limits from right of approximate Sta. 319+00 to Sta. 322+00

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

City of Hazard’s relocation/adjustment of their facilities is included as a part of the Cabinet’s highway construction contract.

Perry County Sanitation District #1’s relocation/adjustment of their facilities is included as a part of the Cabinet’s highway construction contract.

RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED

No Rail Involvement **Rail Involved** **Rail Adjacent**

PROJECT NOTES ON UTILITIES

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

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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.

AREA FACILITY OWNER CONTACT LIST

Facility Owner	Contact Name	Phone
AEP Distribution	Ellis McKnight	(606)436-1329
AEP Transmission	Tom Linkous II	(540)562-7097
City of Hazard	Bobby Holland, Jr. (Water) Darryl Cornett (Gas)	(606)436-3171
Cut Through Hydrocarbon	Patricia Litafik	(606)835-9912
Fields Cablevision	James Fields	P.O. Box 237 Combs, KY 41729
H.A. Spaulding Engineers (Engineer for City of Hazard)	Hank Spaulding	(606)436-2151
Perry County Sanitation District #1	Bobby Brown	(606)439-3766
Nesbitt Engineering (Engineer for PCSD #1)	Jim Sparks	(859)685-4513
Thacker & Grigsby	Freddie Williams	(606)785-2226
Windstream	Richard Sadler	(606)678-5361

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

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

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

PROTECTION OF EXISTING UTILITIES

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

PREQUALIFIED UTILITY CONTRACTORS

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

No contractors are required to be prequalified or preapproved by the utility owner(s) to perform utility relocation work under this contract.

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

Any utility contractor that is not listed as prequalified or preapproved when the project is advertised for bid and wishes to be added must make request through the KYTC Contract Procurement website. The request should be made at least one week prior to the bidding deadline to allow for review and posting on the KYTC Contract Procurement website. A contractor is only considered prequalified or preapproved when

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published on the KYTC Contract Procurement website. Contractors that contact the utility owner directly for preapproval or prequalification without contacting KYTC will not be considered for preapproval or prequalification for this contract. Contractors that are not prequalified or preapproved through KYTC before the bidding deadline will not be considered for prequalification or preapproval after bidding.

CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

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

SUBMITTALS AND CORRESPONDENCE

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

ENGINEER

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

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INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

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

NOTICE TO UTILITY OWNERS OF THE START OF WORK

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

UTILITY SHUTDOWNS

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

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

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

STATIONS AND DISTANCES

All stations and distances, when indicated for utility placement in utility relocation plans or specifications, are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions. Any changes in excess of 6 inches of plan location shall be reviewed and approved jointly by the KYTC Section Engineer or designated representative and utility owner engineer or designated

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representative. Changes in location without prior approval shall be remedied by the contractor at his own expense if the unauthorized change creates an unacceptable conflict or condition.

RESTORATION

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

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

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

MATERIAL

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

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

None

SECURITY OF SUPPLIED MATERIALS

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

Standard 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 programming, 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 ENCASUREMENT STEEL BORED This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, 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 complete 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 where both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public

roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. 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.

Standard Water Bid Item Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

W STRUCTURE ABANDONMENT This item is to be used to pay for abandonment of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this 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 restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W STRUCTURE REMOVAL This item is to be used to pay for removal of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this 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 restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

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

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

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

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

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

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

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

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

Standard Sanitary Sewer Bid Item Descriptions

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

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

S CIPP LATERAL REINSTATEMENT This item is to pay for installing a Cured-In-Place-Pipe liner in service laterals and service/mainline connections to stabilize structural defects and construction inadequacies. This bid item shall include all labor, equipment, materials and incidentals necessary to perform the service lateral reinstatement in accordance with the plans and specifications. Work under this item shall include 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 bid Item is to pay for rehabilitation of existing sanitary sewers using the Cured-In-Place-Pipe method. This bid item description applies to all CIPP sizes included in the contract.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

S FORCE MAIN POINT RELOCATE This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing force main at point locations such as to clear a conflict at a

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

S MANHOLE WITH TRAP Payment under this item is for the installation of a new manhole with

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

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

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

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

be referenced. This item shall be paid LUMP SUM (LS) for each when complete.

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

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

N O T I C E

Department of the Army Corps of Engineers “Letter of Permission” Authorization

&

Kentucky Division of Water 401 Water Quality Certification

PROJECT: Item No. 10-158.00
Improvements to KY 15 from MP 13.27 to 14.51
Perry County, KY

The Section 404 & 401 activities for this project have been permitted under the authority of the Department of the Army Nationwide Letter of Permission (LOP) & 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 these authorizations 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.



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
EASTERN KENTUCKY REGULATORY OFFICE
845 SASSAFRAS CREEK ROAD
SASSAFRAS, KY 41759-8806

June 28, 2017

Regulatory Division
South Branch
ID No. LRL-2016-00967

Mr. John Purdy
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40622

Dear Mr. Purdy:

This is in regard to your application for a Department of the Army (DA) permit dated March 13, 2017 concerning a plan to make improvements to sections of Kentucky Highway 15 between mile-points 13.27 and 14.51 near Boone Ridge Road in Perry County, Kentucky (Item No. 10-158). The project involves the construction of 1 bridge, the re-construction of two intersections and the widening and alignment of the existing road that would result in the discharge of dredged or fill material into "waters of the U.S." We have reviewed your application and submitted information and have made the following determinations: the work is minor in nature, will not have a significant impact on the environment and should encounter no opposition.

Based on these determinations, your proposed work satisfies the Letter of Permission (LOP) criteria, as specified in our regulations and the procedures outlined in the LOP No. 200600259-pgj, issued on October 3, 2007. Therefore, you are authorized, in accordance with Section 404 of the Clean Water Act (CWA), to discharge fill material into 7,055 linear feet of perennial, intermittent, and/or ephemeral stream reaches and 0.107 acre of palustrine emergent wetlands within the Upper Second Creek watershed as part of the proposed project. The impacts would occur in the Upper Second Creek HUC-12 watershed of the North Fork of the Kentucky River. This permission is granted with the following conditions:

- 1) The project shall be constructed in accordance with plans included in the March 13, 2017, application for Kentucky Transportation Cabinet, Item No. 10-158.00 and all subsequent information received June 13 and 20, 2017 regarding changes to the original submittal and/or mitigation plan.
- 2) The permittee must provide proof of purchase from an approved mitigation bank prior to each stream or wetland impact in the amount of 567 EIU stream mitigation credits and 0.3 AMU wetland mitigation credits. The permittee must provide an additional proof of purchase from an approved mitigation bank for 1,302 EIU stream mitigation credits prior to any discharge of dredged or fill material into Waste areas A, B, and C.

- 3) The time limit for completing the work authorized ends on 27 July 2022. If the permittee finds that more time is needed to complete the authorized activity, an application must be submitted for a time extension to this office for consideration at least 1 month before the above date is reached.
- 4) Upon completion of construction you are to notify the District Engineer. The enclosed Completion Report form must be completed and returned to this office.
- 5) The permittee must maintain a minimum 50-foot buffer around any known cemeteries.
- 6) The permittee must comply with the agreement outlined in the letters dated July 14, 2016 and January 23, 2017 from U.S. Fish and Wildlife Service regarding the Biological Opinion on endangered species within the project area.

This authorization will be effective as soon as we receive your signed acceptance of these conditions. Please sign and date a duplicate copy of this letter in the space provided and return the signed copy. Note that we also perform periodic inspections to ensure compliance with our permit conditions and appropriate Federal laws.

This letter contains a proffered permit for your proposed project. If you object to this decision, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this decision, you must submit a completed RFA form to the Lakes and Rivers Division Office at the following address.

Regulatory Appeals Officer
U.S. Army Engineer Division
Great Lakes and Ohio River
550 Main Street - Room 10032
Cincinnati, Ohio 45202-3222

(513) 684-6212

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **August 28, 2017**.

It is not necessary to submit an RFA form to the Division office if you do not object to the decision in this letter.

Copies of this letter will be sent to the appropriate coordinating agencies (see enclosure for addresses).

FOR THE DISTRICT ENGINEER:

BALDRIDGE.
DAVID.E.123
0587490

Digitally signed by
BALDRIDGE.DAVID.E.1230587490
DN: c=US, o=U.S. Government,
ou=DoD, ou=PKI, ou=USA,
cn=BALDRIDGE.DAVID.E.1230587
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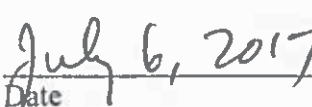
David Baldrige
Chief, South Branch
Regulatory Division

Enclosures

(I accept the conditions of this authorization):



Kentucky Transportation Cabinet



Date

Addresses for Coordinating Agencies

Mr. Duncan Powell
USEPA, Region IV
WCOB c/o SESD (Room A100-13)
980 College Station Road
Athens, Georgia 30605-2720

Mr. Virgil Lee Andrews
U.S. Fish & Wildlife Service
J.C. Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601

Stephanie Hayes
Kentucky Energy & Environment Cabinet
Division of Water
300 Sower Boulevard
Frankfort, KY 40601

Mr. Doug Dawson
Ky. Dept. of Fish and Wildlife Resources
#1 Game Farm Road
Frankfort, KY 40601

Mr. Craig Potts
Executive Director
State Historic Preservation Officer
Kentucky Heritage Council
300 Washington Street
Frankfort, KY 40601

GENERAL CONDITIONS:

1. Discharges of dredged or fill material into "waters of the U.S." must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site). In determining the minimal impact threshold, the Districts will consider the direct, secondary, and cumulative impacts of the fill or work and any mitigation measures.

2. The permittee shall provide a mitigation/monitoring plan for impacts resulting from the placement of fill into "waters of the U.S." in excess of 300 linear feet of intermittent or perennial stream; the filling of greater than 0.10 acre (4,356 sq. feet) of waters of the U.S; or work causing more than minimal effects, to compensate for impacts to the "waters of the U.S." These impact thresholds are applied for each crossing. When mitigation is required, the permittee will develop the mitigation site concurrently with, or in advance of, the site construction unless the Corps determines on a project specific basis that it is not practical to do so. This will ensure that aquatic functions are not lost for long periods of time (e.g. temporal loss) which could adversely affect water quality and wildlife. The requirement for conservation easements or deed restrictions will be determined on a project specific basis.

3. The permittee shall ensure that sedimentation and soil erosion control measures are in place prior to commencement of construction activities. These measures will remain in place and be properly maintained throughout construction. Sedimentation and soil control measures shall include the installation of straw bale barriers, silt fencing and/or other approved methods to control sedimentation and erosion. Sedimentation and erosion controls will not be placed in "waters of the U.S." except if specifically approved by the District.

4. The permittee shall ensure that areas disturbed by any construction activity, including channel and stream banks, are immediately stabilized and revegetated with a combination of non-invasive plants (grasses, legumes and shrubs) which are compatible with the affected area and will not compete with native vegetation.

5. The permittee shall ensure that no in-stream construction activity is performed during periods of high stream flow or during the fish spawning season (April 1 through June 30) without first contacting the Kentucky Department of Fish and Wildlife Resources (KDFWR) for their expertise on impacts to the fishery resource. Additionally, the discharge of dredged and/or fill material in known waterfowl breeding and wintering areas must be avoided to the maximum extent practicable.

6. The permittee will ensure that the activity authorized will not disrupt movement of those aquatic species indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's specific purpose is to impound water.

7. The permittee shall ensure that all construction equipment is refueled and maintained on an

upland site away from existing streams, drainageways and wetland areas. Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.

8. The permittee must comply with any case specific special conditions added by the Corps or by the State Section 401 Water Quality Certification (WQC). The conditions imposed in the State Section 401 WQC are also conditions of this LOP.

9. The permittee shall ensure that no activity authorized by the LOP may cause more than a minimal adverse effect on navigation.

10. The permittee shall ensure proper maintenance of any structure or fill authorized by the LOP, in good condition and in conformance with the terms and conditions of the LOP, including maintenance to ensure public safety. The permittee is not relieved of this requirement if the permitted activity is abandoned, although the permittee may make a good faith transfer to a third party. Should the permittee wish to cease to maintain the authorized activity or desire to abandon it without a good faith transfer, the permittee must obtain a modification to the LOP from the Corps, which may require restoration of the area.

11. The permittee shall not perform any work within any Wild and Scenic Rivers or in any river officially designated as a "study river" for possible inclusion in the system, unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity authorized by the LOP will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal Land Management agency in the area (e.g. U.S. Forest Service, Bureau of Land Management, the National Parks Service, or the U.S. Fish and Wildlife Service).

12. The permittee shall not perform any work under the LOP which is likely to 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, or which is likely to destroy or adversely modify the critical habitat of such species. The permittee shall notify the Corps and coordinate the proposed action with the USFWS to determine if any listed species or critical habitat might be affected and/or adversely modified by the proposed work. No activity is authorized under the LOP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. At the direction of the Corps, the permittee shall complete the necessary consultation with the USFWS, satisfying the requirements of Section 7(a)(2) of the Endangered Species Act. The permittee shall not begin work until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Authorization of an activity under the LOP does not authorize the "take" of a threatened or endangered species as defined

under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act.

Obligations under Section 7 of the Act must be reconsidered by the Corps Districts if (1) new information reveals impacts of the proposed action may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

13. The permittee shall not perform any activity under the LOP which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The permittee must notify the District Engineer if the activity authorized by the LOP may affect any historic properties listed, determined to be eligible or which the permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin construction until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the Kentucky Heritage Council.

If the permittee discovers any previously unknown historic or archaeological remains while accomplishing the activity authorized by the LOP, work must be immediately stopped and this office immediately notified regarding the discovery. The District will initiate the Federal, Tribal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

14. The permittee shall not perform any work under the LOP where the discharge of dredged and/or fill material will occur in the proximity of a public water supply intake.

15. No activity, including structures or work in "waters of the U.S." or discharges of dredged or fill material may consist of unsuitable materials (e.g. trash, debris, car bodies, asphalt, etc.) and that materials used for construction or discharge must be free from toxic pollutants in toxic amounts.

16. The permittee shall, to the maximum extent practicable, design the project to maintain pre-construction downstream flow conditions. Furthermore, the work must not permanently restrict or impede the passage of normal or expected high flows and the structure or discharge of fill must withstand expected high flows. The project must provide, to the maximum extent practicable, for retaining excess flows from the site and for establishing flow rates from the site similar to pre-construction conditions.

17. The permittee shall ensure that all temporary fills, authorized under the LOP, be removed in their entirety and the affected areas returned to pre-construction elevation.
18. Representatives from the Corps of Engineers and/or the State of Kentucky may inspect any authorized activity or mitigation site at any time deemed necessary to ensure compliance with the terms and conditions of the LOP, Section 401 WQC, and applicable laws.
19. All work authorized by this LOP must be completed within five years after the date of the Corps authorization letter. If you find you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least three months before the expiration date.
20. The permittee, after completion of work under the LOP, shall submit a signed certification letter regarding the completed work and required mitigation, if applicable. The certification letter will include a statement that the work was done in accordance with the LOP authorization including compliance with all general and special conditions and completion of mitigation work.
21. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of the LOP.
22. For Section 10 waters, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work authorized, or if, in the opinion of the Secretary of the Army or his 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.



MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

AARON B. KEATLEY
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

November 1, 2016

David Waldner
Kentucky Transportation Cabinet (KYTC)
200 Mero St
Frankfort, KY 40622

Re: Letter of Permission No.: 2016-113-7
AI No.: 11759; Activity ID: APE20160002
KYTC Item No.: 10-158.00
USACE ID No.: LRL-2016-967
North Fork Kentucky River, UTs to North Fork
Kentucky River and adjacent wetlands
Perry County, Kentucky

Dear Mr. Waldner:

This letter transmits to you a copy of our General Water Quality Certification for the Letter of Permission Authorizing Transportation Projects for the Kentucky Transportation Cabinet – KY 15 Improvements Project in Perry County, Kentucky, in accordance with plans included in the “Application for Permit to Construct Across or Along a Stream and/or Water Quality Certification” dated September 13, 2016 and the Addendum received October 24, 2016, including impacts to 7,055 linear feet of ephemeral, intermittent, and perennial stream (0.712 acres of channel fill) and 0.107 acre of wetland.

An individual Water Quality Certification is not necessary for this activity provided that this project has satisfies the Transportation Letter of Permission from the U.S. Army Corps of Engineers (Letter of Permission for Transportation Projects, Corps ID No. LRL-2006-259, issued October 03, 2007 and revised October 28, 2010) and all conditions of the attached General Water Quality Certification - Letter of Permission Authorizing Transportation Projects are met.

Although an Individual WQC is not needed, other permits from the Division of Water may be required. If the project will disturb one acre or more of land, or is part of a larger common plan of development or sale that will ultimately disturb one acre or more of land, a Kentucky Pollution Discharge Elimination System (KPDES) stormwater permit shall be required from the Surface Water Permits Branch. This permit requires the development of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must include erosion prevention and sediment control measures. Contact: Surface Water Permits Branch (SWPB) Support (502-564-3410 or SWPBsupport@ky.gov)

All future correspondence on this project must reference **AI No. 11759**. If you should have any questions concerning this letter, please contact Cody Thayer of my staff, at (502) 782-7090 or Cody.Thayer@ky.gov.



MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

AARON B. KEATLEY
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

**General Certification -- Letter of Permission Authorizing Transportation
Projects (LRL-2006-259-pgj- Date: 28 Oct 2010)**

This general certification is issued February 26, 2016, by the Kentucky Division of Water, 401 Water Quality Certification Program in conformity with the requirements of Sections 301, 302, 304, 306 and 401, as amended (33 U.S.C. §1341), of the Clean Water Act, as well as Kentucky Statute KRS 224.16-050 and Kentucky Administrative Regulations Title 401, Chapter 9 and 10.

For this and all general permits, the definition of surface water is as per 401 KAR 10:001 Chapter 10, Section 1(80): Surface Waters mean 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 surface waters of the commonwealth.

In addition to all the restrictions and conditions of the U.S. Army Corps of Engineers, Louisville District Letter of Permission Issuance (LRL-2006-259-pgj) hereby incorporated into this general certification (included herein), the following 401 Water Quality Certification criteria applies to all transportation projects certified under a Certified Letter of Permission issued by the Kentucky Division of Water, 401 Water Quality Certification Program:

1. The activity will not qualify for this general certification if it is proposed to occur within surface waters of the Commonwealth identified by the Kentucky Division of Water as Outstanding State or National Resource Water, Cold Water Aquatic Habitat, or Exceptional Water.
2. The activity will not qualify for this general certification if it is proposed to occur within surface waters of the Commonwealth identified as perpetually-protected (e.g. deed restriction, conservation easement) stream and/or wetland mitigation sites permitted by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.

Certification of Transportation Letter of Permission

Page 2

3. The Kentucky Division of Water may require an individual certification for any project if the project is likely to have adverse impacts to water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.
4. Activities qualifying for coverage under this General Water Quality Certification are subject to the following conditions:
 - The proposed relocation of an existing stream or channel will be designed and constructed to ensure the stability of the relocated stream or channel. Stream habitat enhancements, such as bioengineering methods and/or best management practices for protecting water quality will be considered, on a case-by-case basis, during the design process. Documentation must be provided if stream habitat enhancements will not be used for the proposed stream relocation.
 - Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed, and maintained in effective operating condition at all times during construction activities so that state water quality are maintained (401 KAR Chapter 10).
 - 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 of the Commonwealth, either temporarily or permanently, without notifying the Kentucky Division of Water. 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.
 - Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
 - Removal of riparian vegetation in the right-of-way shall be limited to that necessary.
 - To the maximum extent practicable, all in-stream work under this certification shall be performed under low-flow conditions.
 - Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., 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 should be performed in low-flow or no-flow instances or in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation.

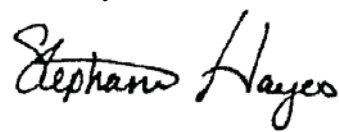
Certification of Transportation Letter of Permission

Page 3

- Fill shall not be of such composition that it will adversely affect the biological, chemical, or physical properties of the receiving waters and associated 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.
- If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the public supply system when such work will be done.
- Should evidence of stream and/or wetland pollution 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 Environmental Response Team (ERT) shall be notified immediately by calling 1-800-928-2380 or 502-564-2380.

This general certification does not have an expiration date, however if the need for changes develop or if the U.S. Army Corps of Engineers, Louisville District makes modifications to the Letter of Permission (LRL-2006-259-pgj- Date: 28 Oct 2010) then a certification modification may be issued. Non-compliance with the conditions of this general certification or failure to maintain Kentucky state water quality standards may result in civil penalties.

Sincerely,

A handwritten signature in black ink that reads "Stephanie Hayes". The signature is written in a cursive style with a large, prominent "S" at the beginning.

Stephanie Hayes, Supervisor
Water Quality Certification Section
Kentucky Division of Water

Attachment

cc: John Purdy, KYTC: Frankfort (via email: JPURDY@ky.gov)
Danny Peake, KYTC: Frankfort (via email: Danny.Peake@ky.gov)
Dave Harmon, KYTC: Frankfort (via email: Dave.Harmon@ky.gov)
Justin Branham, USACE: Louisville (via email: Justin.L.Branham@usace.army.mil)
Lee Andrews, USFWS: Frankfort (via email: Teresa_Hyatt@fws.gov)
Joshua George, KDOW: Hazard Regional Office (via email: Joshua.George@ky.gov)
Malissa McAlister, Kentucky River Basin Coordinator (via email: mlmcal2@uky.edu)

GENERAL CONDITIONS FOR WATER QUALITY CERTIFICATION

1. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
2. All dredged material shall be removed to an upland location and/or graded on adjacent areas (so long as such areas are not regulated wetlands), to obtain original streamside elevations, i.e. overbank flooding shall not be artificially obstructed.
3. In areas not riprapped or otherwise stabilized, revegetation of stream banks and riparian zones shall occur concurrently with project progression. At a minimum, revegetation will approximate pre-disturbance conditions.
4. To the maximum extent practicable, all instream work under this certification shall be performed during low flow.
5. Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances where such instream work is unavoidable, then it shall be performed in such a manner and duration as to minimize resuspension of sediments and disturbance to substrates and bank or riparian vegetation.
6. Any fill or riprap including refuse 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 riprap is utilized, it is to be of such weight and size that bank stress or slump conditions will not be created because of its placement.
7. If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when work will be done.
8. Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.
9. 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.



MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
Department for Environmental Protection

AARON B. KEATLEY
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

ATTENTION APPLICANT

If your project involves one or more of the following activities, you may need more than one permit from the Kentucky Division of Water.

- *building in a floodplain *road culvert in a stream**
- *streambank stabilization *stream cleanout**
- *utility line crossing a stream**
- *construction sites greater than 1 acre**

- **Construction sites greater than 1 acre will require the filing of a Notice of Intent to be covered under the KPDES General Stormwater Permit. This permit requires the creation of an erosion control plan.**

Contact: Surface Water Permits Branch (SWPB) Support at SWPBsupport@ky.gov

- **Projects that involve filling in the floodplain will require a floodplain construction permit from the Water Resources Branch.**

Contact: Ron Dutta at (502) 782-6941

- **Projects that involve work IN a stream, such as bank stabilization, road culverts, utility line crossings, and stream alteration will require a floodplain permit and a Water Quality Certification from the Division of Water.**

Contact: Stephanie Hayes at (502) 782-6970

A complete listing of environmental programs administered by the Kentucky Department for Environmental Protection is available from Pete Goodmann by calling (502) 782-6956.

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



Kentucky Transportation Cabinet

Highway District 10

And

_____ **(2), Construction**

Kentucky Pollutant Discharge Elimination System

Permit KYR10

Best Management Practices (BMP) plan

Groundwater protection plan

For Highway Construction Activities

For

**Reconstruct KY 15 from Morton Boulevard to the
KY 15 Bypass**

Project: PCN ## - #####

Six Year Plan Item No.: 10-158.00

KyTC BMP Plan for Project PCN ## -

Project information

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

1. Owner – Kentucky Transportation Cabinet, District 10
2. Resident Engineer: (2)
3. Contractor name: (2)
Address: (2)

Phone number: (2)
Contact: (2)
Contractors agent responsible for compliance with the KPDES permit requirements (3):
4. Project Control Number (2)
5. Route (Address): KY 15, Hazard, Perry County
6. Latitude/Longitude (project mid-point): 37°16'26"N/83°12'40"W
7. County (project mid-point): Perry
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: Reconstruct KY 15 from Morton Boulevard to the KY 15 Bypass, construct new bridge over Perry Park Road, North Fork of KY River, and KY 550, construct new bridge on Morton Boulevard over KY 15
2. Order of major soil disturbing activities (2) and (3)
3. Projected volume of material to be moved: 1,114,018 cubic yards
4. Estimate of total project area (acres): 91.56
5. Estimate of area to be disturbed (acres): 91.56
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.
7. Data describing existing soil condition: Grass covered soils consisting of clayey sands and gravelly clays with medium to high plasticity. (2)
8. Data describing existing discharge water quality (if any) (2)
9. Receiving water name: North Fork of KY River
10. TMDLs and Pollutants of Concern in Receiving Waters: No TMDLs involved on this project.
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:

KyTC BMP Plan for Project PCN ## -

The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris. (3)

B. Sediment and Erosion Control Measures:

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

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

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

KyTC BMP Plan for Project PCN ## -

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

KyTC BMP Plan for Project PCN ## -

- 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 : Erosion Control Blanket, Permanent Turf Reinforcement Mat or Aggregate Channel Lining to be provided in all ditches.

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

KyTC BMP Plan for Project PCN ## -

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.

KyTC BMP Plan for Project PCN ## -

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

KyTC BMP Plan for Project PCN ## -

- appropriate, brooms, dust pans, mops, rags, gloves, oil absorbents, sand, sawdust, and plastic and metal trash containers.
- All spills will be cleaned up immediately after discovery.
 - The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
 - 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. There are no permanent BMPs that will require post construction storm water management other than routine maintenance.

KyTC BMP Plan for Project PCN ## -

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:

KyTC BMP Plan for Project PCN ## -

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

KyTC BMP Plan for Project PCN ## -

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.

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 ## - #####

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 name¹ 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: PERRY

Route: KY 15

Item No.: 10-158.00

KDOW Submittal ID: 112709

Project Description: Improve safety, upgrade geometrics, and address capacity issues for KY 15 in Perry County from Morton Blvd. to KY 15 Bypass.

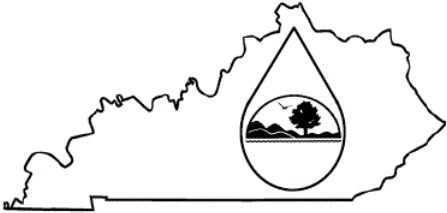
A Notice of Intent for obtaining coverage under the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Stormwater Discharges Associated with Construction Activities (KYR10) has been drafted, copy of which is attached. Upon award, the Contractor will be identified in Section III 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.

Upon award of the project, the appropriate District Project Delivery & Preservation Branch is responsible for providing the Project Development Project Manager (Darren Back) with the Contractor’s name, address, start date, and the CID #. The Project Development Project Manager is responsible for completing and submitting the eNOI document.

The Project Development Project Manager will notify the appropriate Project Delivery & Preservation Branch when the NOI is approved. The approved NOI will be placed in Site Manager. This will need to be accomplished prior to any on-site work.

This note conforms with the Joint Design (05-2017)/Construction (02-2017) Memorandum issued on March 28, 2017.

If there are any questions regarding this note, please contact David Waldner, Director, Division of Environmental Analysis, TCOB, 200 Mero Street, Frankfort, KY 40622, Phone: (502) 564-7250.

	<h2 style="text-align: center;">KENTUCKY POLLUTION DISCHARGE ELIMINATION SYSTEM (KPDES)</h2> <p style="text-align: center;">Notice of Intent (NOI) for coverage of Storm Water Discharge Associated with Construction Activities Under the KPDES Storm Water General Permit KYR100000</p> <p style="text-align: center;"> 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) </p> <p style="text-align: center; font-size: small;">(*) indicates a required field; (✓) indicates a field may be required based on user input or is an optionally required field</p>
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Reason for Submittal:(*) Application for New Permit Coverage ▼	Agency Interest ID: Agency Interest ID	Permit Number:(✓) KPDES Permit Number
If change to existing permit coverage is requested, describe the changes for which modification of coverage is being sought:(✓) <input style="width: 100%;" type="text"/>		
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:(✓) KYTC District 10	First Name:(✓) Corbett	M.I.: R
Last Name:(✓) Caudill		
Mailing Address:(*) P.O. Box 621	City:(*) Jackson	State:(*) Kentucky ▼
Zip:(*) 41339		
eMail Address:(*) corbett.caudill@ky.gov	Business Phone:(*) 606-666-8841	Alternate Phone: Phone
SECTION II -- GENERAL SITE LOCATION INFORMATION		
Project Name:(*) KY 15 Reconstruction from Morton Blvd. to Hazard Bypass	Status of Owner/Operator(*) State Government ▼	SIC Code(*) 1611 Highway and Street I ▼
Company Name:(✓) KYTC District 10	First Name:(✓) Corbett	M.I.: R
Last Name:(✓) Caudill		
Site Physical Address:(*) KY 15 Hazard to Jackson Road		
City:(*) Hazard	State:(*) Kentucky ▼	Zip:(*) 41701
County:(*) Perry ▼	Latitude(decimal degrees)(*)DMS to DD Converter (https://www.fcc.gov/media/radio/dms-decimal) 37.273889	Longitude(decimal degrees)(*) -83.211111
SECTION III -- SPECIFIC SITE ACTIVITY INFORMATION ?		
Project Description:(*) Reconstruction of KY 15 from Morton Blvd. Intersection to Hazard Bypass Intersection		
a. For single projects provide the following information		
Total Number of Acres in Project:(✓)	Total Number of Acres Disturbed:(✓)	

91.56	91.56										
Anticipated Start Date:(✓) <input style="width:95%;" type="text"/>	Anticipated Completion Date:(✓) <input style="width:95%;" type="text"/>										
b. For common plans of development provide the following information											
Total Number of Acres in Project:(✓) # Acre(s) <input style="width:95%;" type="text"/>	Total Number of Acres Disturbed:(✓) # Acre(s) <input style="width:95%;" type="text"/>										
Number of individual lots in development, if applicable:(✓) # lot(s) <input style="width:95%;" type="text"/>	Number of lots in development:(✓) # lot(s) <input style="width:95%;" type="text"/>										
Total acreage of lots intended to be developed:(✓) Project Acres <input style="width:95%;" type="text"/>	Number of acres intended to be disturbed at any one time:(✓) Disturbed Acres <input style="width:95%;" type="text"/>										
Anticipated Start Date:(✓) <input style="width:95%;" type="text"/>	Anticipated Completion Date:(✓) <input style="width:95%;" type="text"/>										
List Building Contractor(s) at the time of Application:(*)											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:5%;">+</th> <th style="width:65%;">Company Name</th> </tr> </thead> <tbody> <tr> <td style="height: 100px;"> </td> <td> </td> </tr> </tbody> </table>		+	Company Name								
+	Company Name										
SECTION IV -- IF THE PERMITTED SITE DISCHARGES TO A WATER BODY THE FOLLOWING INFORMATION IS REQUIRED ?											
Discharge Point(s):											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:5%;">+</th> <th style="width:25%;">Unnamed Tributary?</th> <th style="width:15%;">Latitude</th> <th style="width:15%;">Longitude</th> <th style="width:40%;">Receiving Water Name</th> </tr> </thead> <tbody> <tr> <td style="height: 100px;"> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		+	Unnamed Tributary?	Latitude	Longitude	Receiving Water Name					
+	Unnamed Tributary?	Latitude	Longitude	Receiving Water Name							
SECTION V -- IF THE PERMITTED SITE DISCHARGES TO A MS4 THE FOLLOWING INFORMATION IS REQUIRED ?											
Name of MS4: <input style="width:95%;" type="text"/>											
Date of application/notification to the MS4 for construction site permit coverage: Date <input style="width:95%;" type="text"/>	Discharge Point(s):(*) <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:5%;">+</th> <th style="width:30%;">Latitude</th> <th style="width:30%;">Longitude</th> </tr> </thead> <tbody> <tr> <td style="height: 100px;"> </td> <td> </td> <td> </td> </tr> </tbody> </table>	+	Latitude	Longitude							
+	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?:(*)	<input style="width:95%;" type="text" value="Yes"/>										
If Yes, describe scope of activity: (✓)	<input style="width:95%;" type="text" value="Pier Construction, Temporary Construction Crossing, Culvert Constru"/>										
Is a Clean Water Act 404 permit required?:(*)	<input style="width:95%;" type="text" value="Yes"/>										
Is a Clean Water Act 401 Water Quality Certification required?:(*)	<input style="width:95%;" type="text" value="Yes"/>										
SECTION VII -- NOI PREPARER INFORMATION											

First Name:(*) Darren	M.I.: MI	Last Name:(*) Back	Company Name:(*) KYTC District 10	
Mailing Address:(*) P.O. Box 621		City:(*) Jackson	State:(*) Kentucky	Zip:(*) 41339
eMail Address:(*) darren.back@ky.gov		Business Phone:(*) 606-666-8841	Alternate 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:(*) Corbett R Caudill		Title:(*) Executive Director		
First Name:(*) Corbett	M.I.: R	Last Name:(*) Caudill		
eMail Address:(*) corbett.caudill@ky.gov	Business Phone:(*) 606-666-8841	Alternate Phone: Phone	Signature Date:(*) 10/17/2017	
<div style="display: flex; justify-content: space-around;"> Click to Save Values for Future Retrieval Click to Submit to DEP </div>				

Unnamed Tributary	Latitude	Longitude	Receiving Water Name
1 Yes	37.2662	-83.2025	North Fork of Kentucky River
2 Yes	37.2664	-83.2027	North Fork of Kentucky River
3 Yes	37.2664	-83.2023	North Fork of Kentucky River
4 Yes	37.2666	-83.2025	North Fork of Kentucky River
5 Yes	37.2665	-83.2027	North Fork of Kentucky River
6 Yes	37.2666	-83.2026	North Fork of Kentucky River
7 Yes	37.2667	-83.2027	North Fork of Kentucky River
8 Yes	37.2668	-83.2028	North Fork of Kentucky River
9 Yes	37.2669	-83.2029	North Fork of Kentucky River
10 Yes	37.2677	-83.2041	North Fork of Kentucky River
11 Yes	37.2678	-83.2035	North Fork of Kentucky River
12 Yes	37.2672	-83.2028	North Fork of Kentucky River
13 Yes	37.2676	-83.2023	North Fork of Kentucky River
14 Yes	37.2679	-83.2035	North Fork of Kentucky River
15 Yes	37.2675	-83.2028	North Fork of Kentucky River
16 Yes	37.2670	-83.2032	North Fork of Kentucky River
17 Yes	37.2674	-83.2037	North Fork of Kentucky River
18 Yes	37.2676	-83.2039	North Fork of Kentucky River
19 Yes	37.2678	-83.2044	North Fork of Kentucky River
20 Yes	37.2680	-83.2036	North Fork of Kentucky River
21 Yes	37.2682	-83.2043	North Fork of Kentucky River
22 Yes	37.2680	-83.2043	North Fork of Kentucky River
23 Yes	37.2685	-83.2049	North Fork of Kentucky River
24 Yes	37.2683	-83.2044	North Fork of Kentucky River
25 Yes	37.2685	-83.2043	North Fork of Kentucky River
26 Yes	37.2686	-83.2049	North Fork of Kentucky River
27 Yes	37.2688	-83.2052	North Fork of Kentucky River
28 Yes	37.2689	-83.2054	North Fork of Kentucky River
29 Yes	37.2693	-83.2062	North Fork of Kentucky River
30 Yes	37.2692	-83.2066	North Fork of Kentucky River
31 Yes	37.2696	-83.2062	North Fork of Kentucky River
32 Yes	37.2690	-83.2041	North Fork of Kentucky River
33 Yes	37.2696	-83.2042	North Fork of Kentucky River
34 Yes	37.2702	-83.2062	North Fork of Kentucky River
35 Yes	37.2696	-83.2063	North Fork of Kentucky River
36 Yes	37.2701	-83.2070	North Fork of Kentucky River
37 Yes	37.2691	-83.2075	North Fork of Kentucky River
38 Yes	37.2692	-83.2074	North Fork of Kentucky River
39 Yes	37.2692	-83.2080	North Fork of Kentucky River
40 Yes	37.2693	-83.2079	North Fork of Kentucky River
41 Yes	37.2700	-83.2075	North Fork of Kentucky River
42 Yes	37.2694	-83.2079	North Fork of Kentucky River
43 Yes	37.2698	-83.2078	North Fork of Kentucky River
44 Yes	37.2699	-83.2079	North Fork of Kentucky River
45 Yes	37.2704	-83.2087	North Fork of Kentucky River
46 Yes	37.2709	-83.2088	North Fork of Kentucky River

47 Yes	37.2714	-83.2085 North Fork of Kentucky River
48 Yes	37.2714	-83.2080 North Fork of Kentucky River
49 Yes	37.2705	-83.2077 North Fork of Kentucky River
50 Yes	37.2705	-83.2074 North Fork of Kentucky River
51 Yes	37.2709	-83.2075 North Fork of Kentucky River
52 Yes	37.2712	-83.2075 North Fork of Kentucky River
53 Yes	37.2716	-83.2075 North Fork of Kentucky River
54 Yes	37.2719	-83.2074 North Fork of Kentucky River
55 Yes	37.2720	-83.2074 North Fork of Kentucky River
56 Yes	37.2723	-83.2077 North Fork of Kentucky River
57 Yes	37.2712	-83.2078 North Fork of Kentucky River
58 Yes	37.2717	-83.2080 North Fork of Kentucky River
59 Yes	37.2720	-83.2092 North Fork of Kentucky River
60 Yes	37.2727	-83.2081 North Fork of Kentucky River
61 Yes	37.2725	-83.2078 North Fork of Kentucky River
62 Yes	37.2731	-83.2081 North Fork of Kentucky River
63 Yes	37.2737	-83.2083 North Fork of Kentucky River
64 Yes	37.2737	-83.2084 North Fork of Kentucky River
65 Yes	37.2699	-83.2088 North Fork of Kentucky River
66 Yes	37.2714	-83.2094 North Fork of Kentucky River
67 Yes	37.2721	-83.2114 North Fork of Kentucky River
68 Yes	37.2742	-83.2117 North Fork of Kentucky River
69 Yes	37.2765	-83.2139 North Fork of Kentucky River
70 Yes	37.2778	-83.2154 North Fork of Kentucky River
71 Yes	37.2778	-83.2156 North Fork of Kentucky River
72 Yes	37.2805	-83.2163 North Fork of Kentucky River
73 Yes	37.2815	-83.2145 North Fork of Kentucky River
74 Yes	37.2800	-83.2167 North Fork of Kentucky River
75 Yes	37.2801	-83.2176 North Fork of Kentucky River
76 Yes	37.2798	-83.2177 North Fork of Kentucky River
77 Yes	37.2798	-83.2179 North Fork of Kentucky River
78 Yes	37.2801	-83.2179 North Fork of Kentucky River
79 Yes	37.2798	-83.2178 North Fork of Kentucky River
80 Yes	37.2802	-83.2173 North Fork of Kentucky River
81 Yes	37.2803	-83.2178 North Fork of Kentucky River
82 Yes	37.2805	-83.2173 North Fork of Kentucky River
83 Yes	37.2802	-83.2168 North Fork of Kentucky River
84 Yes	37.2846	-83.2166 North Fork of Kentucky River
85 Yes	37.2845	-83.2158 North Fork of Kentucky River
86 Yes	37.2846	-83.2158 North Fork of Kentucky River
87 Yes	37.2848	-83.2160 North Fork of Kentucky River
88 Yes	37.2850	-83.2161 North Fork of Kentucky River
89 Yes	37.2854	-83.2166 North Fork of Kentucky River
90 Yes	37.2858	-83.2169 North Fork of Kentucky River
91 Yes	37.2860	-83.2171 North Fork of Kentucky River
92 Yes	37.2856	-83.2173 North Fork of Kentucky River
93 Yes	37.2861	83.2178 North Fork of Kentucky River

SPECIAL NOTE FOR EXCESS MATERIAL SITES

PERRY COUNTY RECONSTRUCT KY 15 ITEM 10-158.00

The construction activities of this project may result in a considerable amount of excess material. It is the contractor's responsibility to dispose of any material in compliance with the United States Army Corps of Engineers (USACE) and Kentucky Division of Water (DOW) rules and regulations pertaining to discharges into Waters of the U.S. The contractor is also responsible to ensure material disposal actions are also in compliance with the US Fish and Wildlife Service (USFWS) rules and regulations pertaining to the Endangered Species Act, Section 106 of the National Historic Preservation Act, Floodplains, as well as any other pertinent regulations.

The Kentucky Transportation Cabinet (KYTC) has acquired Section 404 (USACE) & 401 (DOW) permits for three (3) excess material sites (A, B, and C) that the contractor can use for this KYTC project. It is the contractor's responsibility to review the Clean Water Act 404 & 401 permits and maintain compliance with the 401 & 404 permits throughout the duration of the project.

Mitigation requirements resulting from the use of these excess material sites will be in the form of in-lieu fees and will be paid by the KYTC prior to stream/wetland impacts occurring in the excess material sites.

The KYTC has not acquired fee simple ownership or purchased an easement to Excess Material Sites B and C. The contractor is responsible for negotiations/agreements with the property owner(s) of the sites. The KYTC has not secured access rights to these proposed excess material sites. The contractor must secure any haul roads or accesses through other properties by agreements with property owners or other governmental agencies (i.e. County roads, private roads, etc.).

The KYTC has purchased an easement to Excess Material Site A. The only access rights that KYTC has secured is within the temporary easement boundaries. The contractor must secure any haul roads or accesses through other properties by agreements with property owners or other governmental agencies (i.e. County roads, private roads, etc.).

The KYTC is not responsible for damages or repairs to sites or accesses to sites located outside of state right of way. The contractor must notify the KYTC prior to tree clearing in the excess material sites. The location of the excess material sites are identified in the attached map.

Any work associated with the excess material site will be incidental to the excavation cost including but not limited to the following items: Erosion Control Devices, Clearing and Grubbing, Seeding and Protection, Temporary and Permanent Drainage Ditches, and Structures (including pipes, culverts, etc.). Please refer to the CAP Report for agreements made with each respective excess material site owners.

The contractor shall abide by Section 205.04 in the Standard Specifications for Road and Bridge Construction Manual for excess material disposal.

Property Owner Information for Excess Material Sites listed below:

Excess Material Sites B & C:

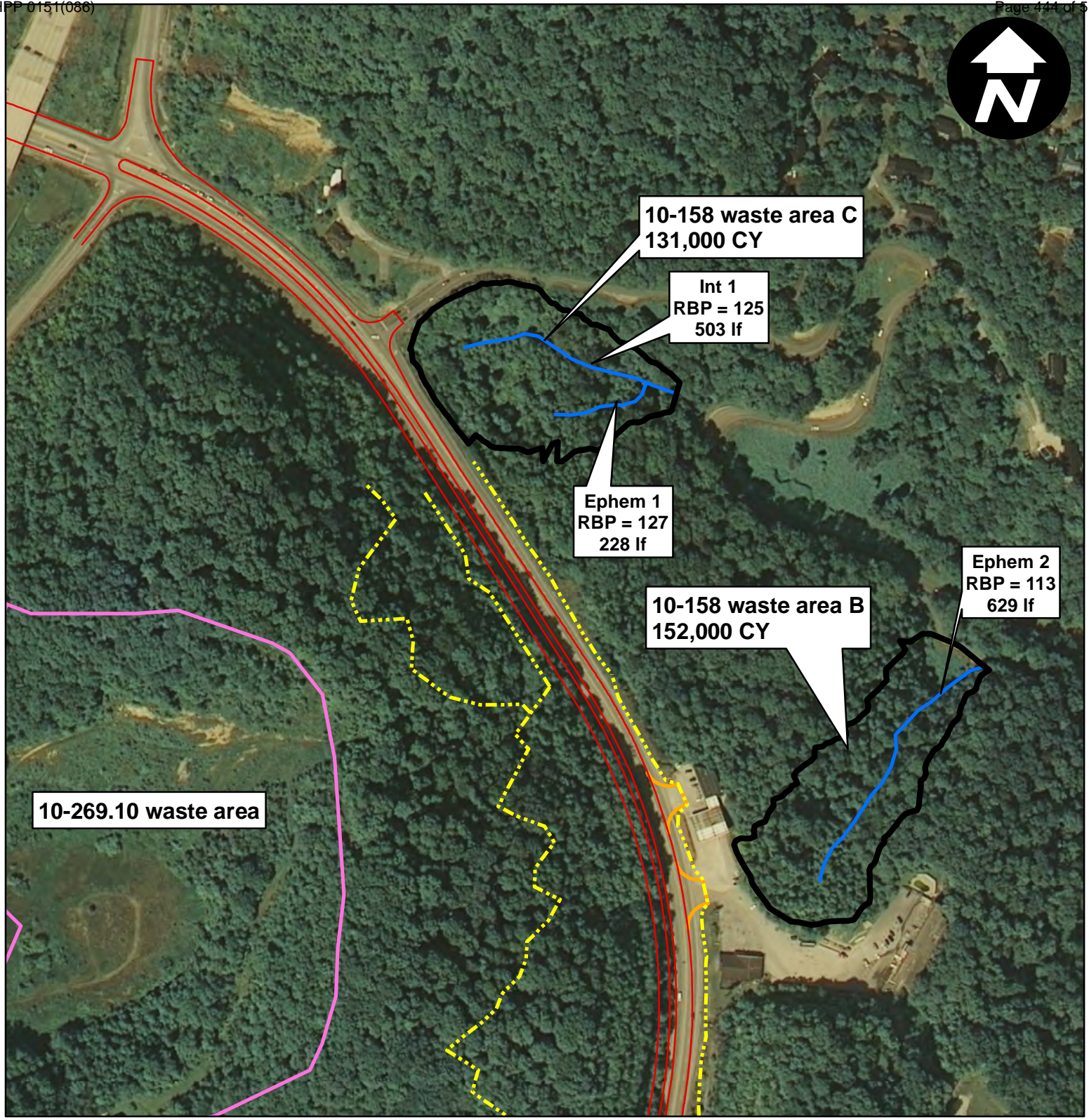
Gene & Margaret Rice
(606)439-1066 (Home)

Excess Material Site A:

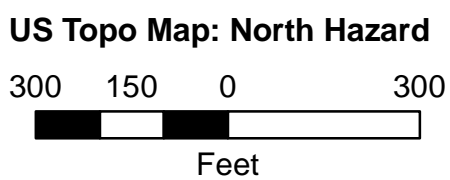
Combs Heirs
Robert Combs 420 Avondale Drive, Sterling, VA
Nancy Combs 1330 Bedford Road, Grosse Pointe Perk, MI
Mindy Barfield and Mark Barfield 917 Albany Circle, Lexington, KY
Francis Gute and Sara Gute Crest Street, Ashland, KY
Rebecca Lyon and James Lyon 778 Glendover Road, Lexington, KY
Molly Toler and Don Toler 333 Kentucky Boulevard, Hazard, KY
Donald Combs and Leslie Combs P.O. Drawer 31, Pikeville, KY
Steven Combs and Terese Combs 114 East Cedar Drive, Pikeville, KY
Robert Combs and Afif Allown-Combs 29 Baynard Park Road, Hilton Head, SC

If the contractor chooses to use other excess material site(s) (rather than or in addition to) the KYTC's identified excess material sites, or modify the identified excess material sites, it will be the responsibility of the contractor to acquire the necessary permits and certifications. The contractor will be responsible for any fees associated with these sites including but not limited to: USFWS fees for tree cutting, in-lieu fees additional to what KYTC has previously agreed to pay .When applying for new or modified permits the Contractor must coordinate with KYTC Central Office Department of Environmental Analysis prior to beginning permitting work. No additional contract time will be allowed for this process.

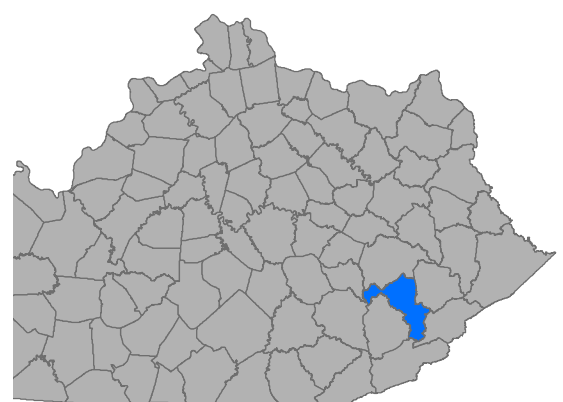
Questions concerning any potential impacts to "Waters of the United States" should be brought to the attention of the appropriate District Office for the Corps of Engineers for determination, prior to disturbance. Any fees associated with obtaining new or modified permit approvals for the disposal of excess material from the USFWS, USACE or other appropriate regulatory agencies are the responsibility of the contractor.

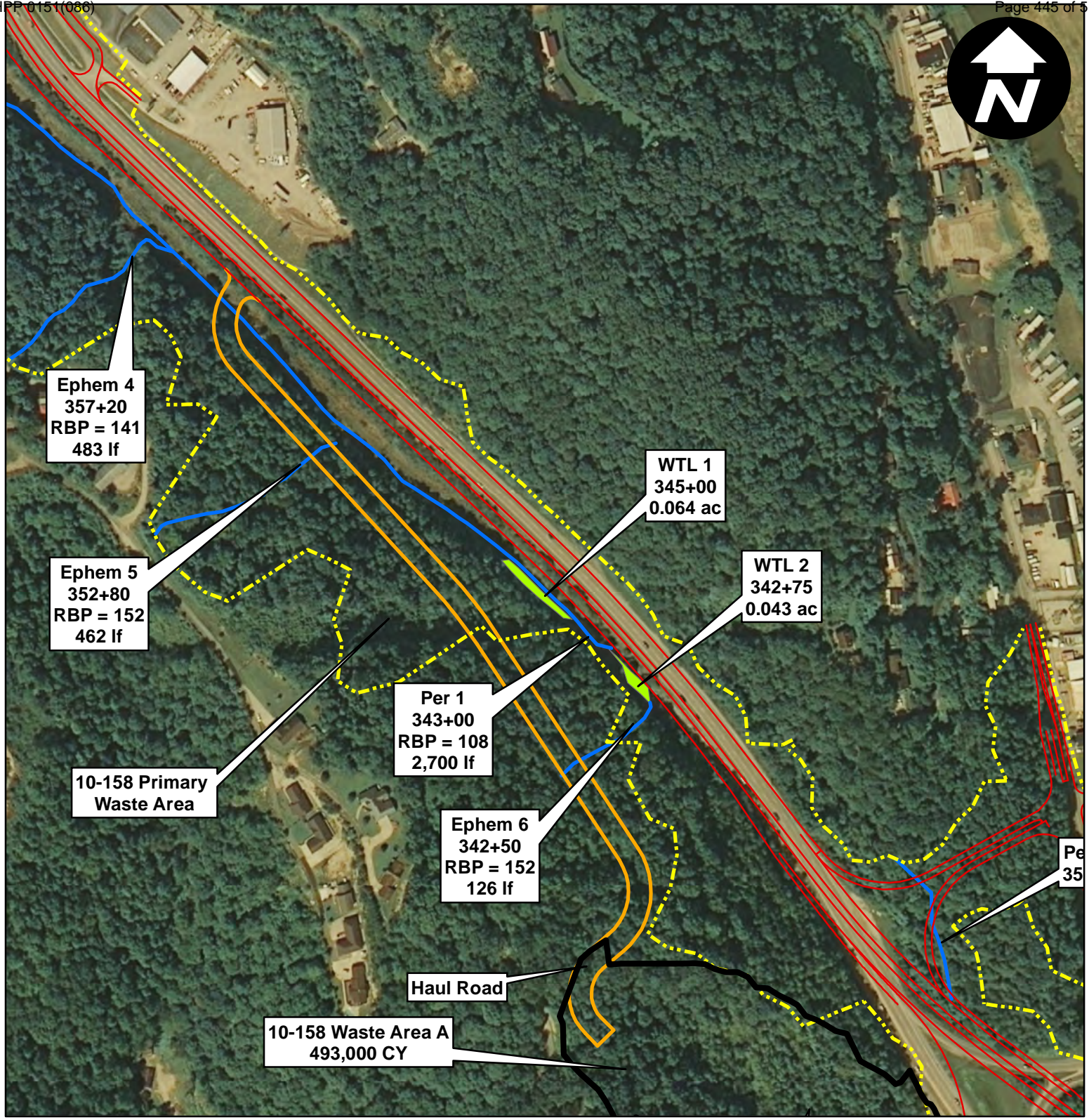


Perry County, Kentucky
Upper Kentucky River Basin
KYTC Item #10-158.00
Improvements to KY 15 from
KY 15 Bypass to Boone
Ridge Road

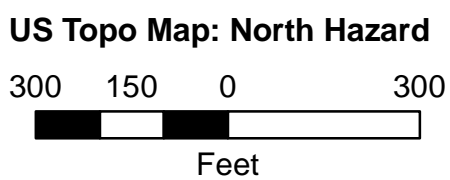


- KY 15 Proposed**
- Bridge
 - Entrance
 - Existing Easement
 - Proposed Waste Area
 - Disturb Limits
 - Edge of Pavement
 - Streams
- Type**
- Crossing
 - WTL

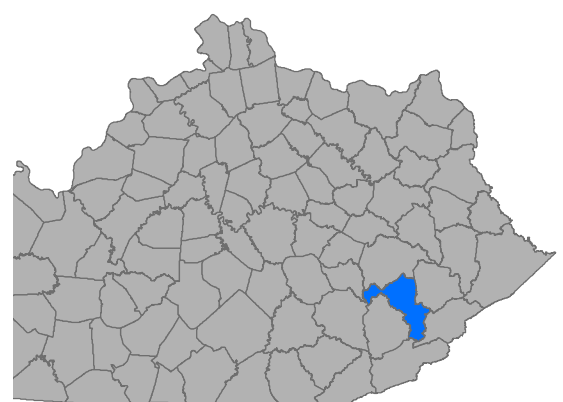


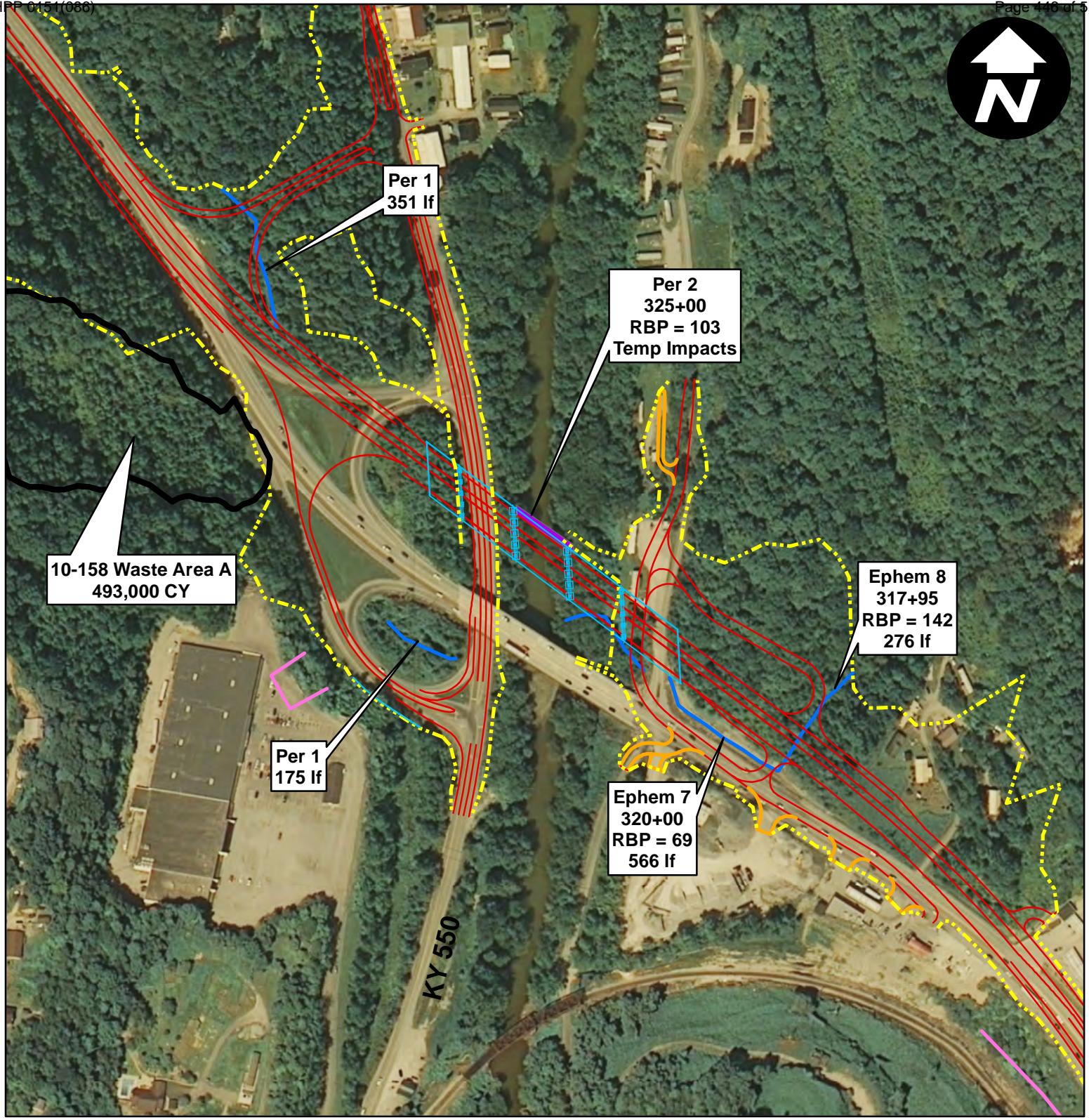


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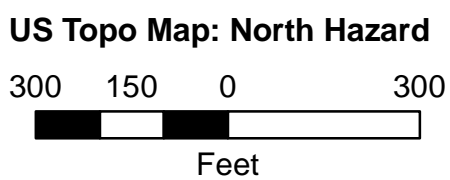


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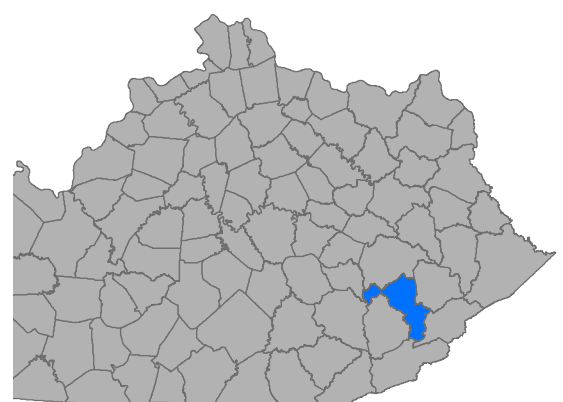


Perry County, Kentucky
Upper Kentucky River Basin
KYTC Item #10-158.00
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KY 15 Proposed

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 -  Streams
- Type**
-  Crossing
 -  WTL



KENTUCKY TRANSPORTATION CABINET COMMUNICATION ALL PROMISES (CAP)

Item Number <i>10-0158.00</i>	County PERRY	Route KY 15	Project Manager kytc\Darren.Back
---	------------------------	-----------------------	--

CAP #	Date of Promise	Requestor	Location of Promise:	CAP Description
1	8/4/14	CO DEA	Throughout Project	<p>The following is a list of environmental commitments and mitigation measures that are to be completed prior to letting:</p> <ul style="list-style-type: none"> * Complete a Biological Assessment for gray bat * Obtain all necessary USACE and KDOW permits * Perform Phase II UST/Hazmat Study for the Exxon station to be acquired * Perform asbestos sampling on bridge over North Fork of the Kentucky River
2	10/15/17	Property Owner of P126	P126	AFTER CONSTRUCTION IS COMPLETED, KYTC WILL ENSURE THAT THE TEMPORARY EASEMENT AREA IS SEEDED AND BLENDED WITH THE EXISTING AREA AND WILL RETURN THE DISTURBED AREAS TO THE CONDITION PRIOR TO CONSTRUCTION.
3	10/15/17	Property Owner of P127	P127	AFTER CONSTRUCTION IS COMPLETED, KYTC WILL ENSURE THAT THE TEMPORARY EASEMENT AREA IS SEEDED AND BLENDED WITH THE EXISTING AREA AND WILL RETURN THE DISTURBED AREAS TO THE CONDITION PRIOR TO CONSTRUCTION.
4	8/17/17	K-VA-T Food Stores	Parcel 121	<ul style="list-style-type: none"> * The Section Engineer, or other authorized designee of the KYTC, shall meet with the owner (K-VA-T Food Stores) to review the traffic control staging plan. In the staging plan, the contractor will be instructed that any disruption to the entrance of the owner's shopping center shall be limited during business hours to no more than 15 minutes and the owner shall be notified at least 48 hours in advance of any overnight closings projected to be longer than 1 hour. * In addition to the above, it is understood that 48 hours prior to and throughout the following holidays, ingress/egress to the owner's shopping center shall not be disturbed in any way by construction activities. The holidays are: New Years, Easter, Memorial Day, Fourth of July, Labor Day, the day before Thanksgiving, Thanksgiving, Christmas Eve, and Christmas. * The owner's sign will not be disturbed. Any damage to the sign will become the liability of the contractor to repair.
5	9/1/16	Vires Enterprises	Parcel 115	The contractor will construct the embankment shown in the excess material site from Sta. 358+40 to Sta. 361+20 as is depicted on the cross sections. The disturb limits for this area is outside of KYTC right of way. Permission to enter property to do this work as shown in the plans was granted by the owner.
6	10/18/17	AEP Distribution	Approximate LT Sta. 345+00 to LT Sta. 365+50	KYTC has agreed to allow AEP to locate their facilities on the low bench of this excess material site. The contractor shall construct the fill up to the first bench as depicted on the cross sections. An access will be provided to the low bench for AEP for relocation work and maintenance.
7	10/18/17	KYTC	Approximate LT Sta. 346+75 to LT Sta. 365+00	Red Bud Trees shall be planted on the excess material site at this location. They will be placed on the top 2:1 slope, spaced at 35' on center and in a zigzag pattern. Bid items for this work have been included in the summary sheet.

**KENTUCKY TRANSPORTATION CABINET
COMMUNICATION ALL PROMISES (CAP)**

CAP #	Date of Promise	Requestor	Location of Promise:	CAP Description
8	10/18/17	AEP Transmission	Near AEP Transmission Facilities	<p>* The contractor will maintain an undisturbed area extending 30 feet in all directions from the center of poles, supported structures, or towers on said electric power line and will also maintain an undisturbed area of 30 feet in all directions from all anchor guys.</p> <p>* Any blasting required in the area of AEP Transmission is to be conducted by certified individual meeting requirements as established by local, state, and federal government agencies. AEP's facilities (guys, structures, and conductors) shall not be subjected to seismic vibrations caused by blasting in excess of a maximum total peak particle velocity of 2.0 inches per second in any one of three mutually perpendicular directions identified as transverse, vertical, and longitudinal. A properly calibrated seismograph shall be used to record vibration levels. The geophone of the seismograph shall be located within 10 feet of the structure between the blast and the structure. The geophone shall be properly coupled to provide accurate vibration readings. Blasting shall also be controlled so as to prevent any debris from being blown into the conductors or structures of AEP's facilities. The contractor may elect to use blast blankets and this would be incidental to the Roadway Excavation bid item. Air blast shall be controlled to prevent arcing of conductors to one another or to any structure. Air blast shall also be controlled to a limit of 150 dBI at AEP's facilities. A copy of the blasting log shall be provided to J. Kelly Bledsoe of AEP Transmission within 30 days following the blast.</p>
9	10/18/17	AEP Transmission	Near AEP Transmission Facilities	<p>* The contractor shall not increase the present ground elevation in the right of way area so as to reduce the clearance between the conductors and the ground to be less than prescribed by the National Electrical Safety Code.</p> <p>* The contractor shall provide reasonable access, in AEP's opinion, at all times for the operation, maintenance, repair, alteration, reconstruction and removal, from time to time, of any or all AEP's facilities.</p> <p>* The construction, use, and maintenance of construction access roads on the right of way will not materially change the surface elevation from that existing prior to the granting of said consent.</p> <p>* The contractor is responsible for any repairs and damages to AEP's facilities resulting from construction activities.</p> <p>* The contractor will exercise extreme care when working under or adjacent to AEP's facilities.</p>
10	10/18/17	Hometown Convenience	Parcel 101	<p>Both entrances to the property will be kept open between the hours of 6:00am and 9:00pm. Any work affecting traffic flow into, out of, or within the property is to be done during nighttime hours between 9:00pm and 6:00am. Coordination is to be made with the business for the access and mobility of fuel delivery trucks. If either entrance is closed or obstructed between the hours of 6:00am and 9:00pm, then damages will be assessed at the rate of \$4,750 per entrance per day or any portion of a day until the entrance(s) is reopened.</p>

KENTUCKY TRANSPORTATION CABINET COMMUNICATION ALL PROMISES (CAP)

CAP #	Date of Promise	Requestor	Location of Promise:	CAP Description
11	10/13/17	Combs Heirs	Parcel 146	<p>The following stipulations were agreed upon concerning the placement of excess material on the parcel.</p> <ul style="list-style-type: none"> * All excess material placed on the site shall conform to Section 206 of the Current Standards for Road and Bridge Construction concerning compaction and thickness requirements. * A design engineer shall be consulted prior to beginning the placement of said materials upon the site. * Any and all sediment control structures will be constructed prior to the placement of spoil on the site. * The fill area(s) shall be grubbed of timber and vegetation prior to the placement of the fill. All material resulting from clearing and grubbing shall be disposed of by burning or removal from the site. * To the extent practicable, top soil shall be removed prior to the placement of the spoil and temporarily stored at designated areas until graded areas are available for redistribution. Said top soil shall be redistributed to the graded areas when they are available. * The slopes of the fill shall not exceed a 2:1 slope. * The top of the fill shall be graded to drain to the perimeter ditches. Perimeter ditches shall be constructed and left in place upon the completion of the fill. * Upon completion of final grading, all outslopes shall be re-vegetated.
12	8/17/17	K-VA-T Food Stores	Parcel 121	<ul style="list-style-type: none"> * The contractor shall contact the representatives of the K-VA-T (Food City) property on a bi-weekly basis to inform them of upcoming construction activities that would affect traffic into or out of their property. Those contacts are listed below, or any others as designated by the Engineer. <p>Stephen Spangler (spanglers@foodcity.com) (276) 608-1711 Tim Kuykendall (timkuykendall@foodcity.com) (423) 323-8017</p> <ul style="list-style-type: none"> * Any impediment, obstruction or halting of traffic into and out of the K-VA-T Food Stores property (Food City Shopping Center) may occur a maximum of 15 minutes per hour. Stoppages will not be allowed on weekdays between the hours of 6:00am and 9:00am or 3:00pm and 6:00pm local time. Stoppages will also not be allowed during the holidays and special events listed in the plans and proposal documents. If any impediments, obstructions, or halting of traffic into and out of the K-VA-T Food Stores property exceed 15 minutes or occur during days and times when they are not allowed, then damages will be assessed at the rate of \$4,750 per day or any portion of a day until the entrance is reopened.
13	11/6/17	Neighborhood Hospitality Inc. / Savannah Hotel Corporation	Parcel 126 / Parcel 127	<p>The contractor will not disturb any trees on the property. If a tree must be removed, the contractor will get a Certified Arborist to remove and relocate the tree. The contractor must coordinate with the property owner on new location of the tree. All costs associated with removing and relocating tree shall be the responsibility of the contractor.</p>

10-158.00
SPECIAL NOTE FOR PRE-BID CONFERENCE

The Department will conduct a Pre-Bid Conference of the subject project on **Monday, November 27th, 2017 at 10:00 AM** at:

Kentucky Department of Highways
District 10
473 Highway 15 South
Jackson, KY 41339
Phone: (606) 666-8841

Any company that is interested in bidding on the subject project or being part of a joint venture must be represented at the Pre-Bid Conference by at least **one person of sufficient authority to bind the company**. No individual can represent more than one company. At the conference a roster will be taken of the representatives present.

ONLY COMPANIES REPRESENTED AT THE CONFERENCE WILL BE ELIGIBLE TO HAVE THEIR BIDS OPENED AT THE DATE OF THE LETTING.

The purpose of the conference is to familiarize prospective bidders with the project and requirements of the contract. There will be representatives from the Department of Highways present at the conference to answer specific questions concerning the project.

PART II
SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2012* and *Standard Drawings, Edition of 2016*.

SUPPLEMENTAL SPECIFICATIONS

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

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

SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

2.0 MATERIALS.

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

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

2.2 Sign and Controls. All signs must:

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

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

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

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

2.3 Power.

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

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

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

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

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

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

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

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

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

Effective June 15, 2012

SPECIAL NOTE FOR ROCK BLASTING

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

1.0 DESCRIPTION. This work consists of fracturing rock and constructing stable final rock cut faces using presplit blasting and production blasting techniques.

2.0 MATERIALS. Deliver, store, and use explosives according to the manufacturer's recommendations and applicable laws. Do not use explosives outside their recommended use date. Verify date of manufacture and provide copies of the technical data sheets (TDS) and material safety data sheets (MSDS) to the Engineer. Explosives and initiating devices include, but are not necessarily limited to, dynamite and other high explosives, slurries, water gels, emulsions, blasting agents, initiating explosives, detonators, blasting caps, and detonating cord.

3.0 CONSTRUCTION. Furnish copies or other proof of all-applicable permits and licenses. Comply with Federal, State, and local regulations on the purchase, transportation, storage, and use of explosive material. Regulations include but are not limited to the following:

- 1) KRS 351.310 through 351.9901.
- 2) 805 KAR 4:005 through 4:165
- 3) Applicable rules and regulations issued by the Office of Mine Safety and Licensing.
- 4) Safety and health. OSHA, 29 CFR Part 1926, Subpart U.
- 5) Storage, security, and accountability. Bureau of Alcohol, Tobacco, and Firearms (BATF), 27 CFR Part 181.
- 6) Shipment. DOT, 49 CFR Parts 171-179, 390-397.

3.1 Blaster-in-Charge. Designate in writing a blaster-in-charge and any proposed alternates for the position. Submit documentation showing the blaster-in-charge, and alternates, have a valid Kentucky blaster's license. Ensure the blaster-in-charge or approved alternate is present at all times during blasting operations.

3.2 Blasting Plans. Blasting plans and reports are for quality control and record keeping purposes. Blasting reports are to be signed by the blaster-in-charge or the alternate blaster-in-charge. The general review and acceptance of blasting plans does not relieve the Contractor of the responsibility whatsoever for conformance to regulations or for obtaining the required results. All blasting plans shall be submitted to the Engineer. The Engineer will be responsible for submitting the plan to the Central Office Division of Construction and the Division of Mine Reclamation and Enforcement, Explosives and Blasting Branch at the following address: 2 Hudson Hollow, Frankfort, Kentucky, 40601.

- A) General Blasting Plan.** Submit a general blasting plan for acceptance at least 15 working days before drilling operations begin. Include, as a minimum, the following safety and procedural details:

- 1) Working procedures and safety precautions for storing, transporting, handling, detonating explosives. Include direction on pre and post blast audible procedures, methods of addressing misfires, and methods of addressing inclement weather, including lightning.
- 2) Proposed product selection for both dry and wet holes. Furnish Manufacturer's TDS and MSDS for all explosives, primers, initiators, and other blasting devices.
- 3) Proposed initiation and delay methods.
- 4) Proposed format for providing all the required information for the site specific blasting shot reports.

B) Preblast Meeting. Prior to drilling operations, conduct a preblast meeting to discuss safety and traffic control issues and any site specific conditions that will need to be addressed. Ensure, at a minimum, that the Engineer or lead inspector, Superintendent, blaster-in-charge, and all personnel involved in the blasting operation are present. Site specific conditions include blast techniques; communication procedures; contingency plans and equipment for dealing with errant blast material. The conditions of the General Blasting plan will be discussed at this meeting. Record all revisions and additions made to the blasting plan and obtain written concurrence by the blaster-in-charge. Provide a copy of the signed blast plan to the Engineer along with the sign in sheet from the preblast meeting.

3.3 Preblast Condition Survey and Vibration Monitoring and Control. Before blasting, arrange for a preblast condition survey of nearby buildings, structures, or utilities, within 500 feet of the blast or that could be at risk from blasting damage. Provide the Engineer a listing of all properties surveyed and any owners denying entry or failing to respond. Notify the Engineer and occupants of buildings at risk at least 24 hours before blasting.

Limit ground vibrations and airblast to levels that will not exceed limits of 805 KAR 4:005 through 4:165. More restrictive levels may be specified in the Contract.

Size all blast designs based on vibration, distance to nearest building or utility, blast site geometry, atmospheric conditions and other factors. Ground vibrations are to be controlled according to the blasting standards and scaled distance formulas in 805 KAR 4:020 or by the use of seismographs as allowed in 805 KAR 4:030. The Department will require seismographs at the nearest allowable location to the protected site when blasting occurs within 500 feet of buildings, structures, or utilities.

3.4 Blasting. Drill and blast at the designated slope lines according to the blasting plan. Perform presplitting to obtain smooth faces in the rock and shale formations. Perform the presplitting before blasting and excavating the interior portion of the specified cross section at any location. The Department may allow blasting for fall benches and haul roads prior to presplitting when blasting is a sufficient distance from the final slope and results are satisfactory to the Engineer. Use the types of explosives and blasting accessories necessary to obtain the required results.

Free blast holes of obstructions for their entire depth. Place charges without caving the blast hole walls. Stem the upper portion of all blast holes with dry sand or other granular material passing the 3/8-inch sieve. Dry drill cuttings are acceptable for stemming when blasts are more than 800 feet from the nearest dwelling.

Stop traffic during blasting operations when blasting near any road and ensure traffic does not pass through the Danger Zone. The blaster-in-charge will define the Danger Zone prior to each blast. Ensure traffic is stopped outside the Danger Zone, and in no case within 800 feet of the blast location.

Following a blast, stop work in the entire blast area, and check for misfires before allowing worker to return to excavate the rock.

Remove or stabilize all cut face rock that is loose, hanging, or potentially dangerous. Leave minor irregularities or surface variations in place if they do not create a hazard. Drill the next lift only after the cleanup work and stabilization work is complete.

When blasting operations cause fracturing of the final rock face, repair or stabilize it in an approved manner at no cost to the Department.

Halt blasting operations in areas where any of the following occur:

- 1) Slopes are unstable;
- 2) Slopes exceed tolerances or overhangs are created;
- 3) Backslope damage occurs;
- 4) Safety of the public is jeopardized;
- 5) Property or natural features are endangered;
- 6) Fly rock is generated; or
- 7) Excessive ground or airblast vibrations occur in an area where damage to buildings, structures, or utilities is possible.
- 8) The Engineer determines that materials have become unsuitable for blasting

Blasting operations may continue at a reasonable distance from the problem area or in areas where the problems do not exist. Make the necessary modifications to the blasting operations and perform a test blast to demonstrate resolution of the problem.

A) Drill Logs. Maintain a layout drawing designating hole numbers with corresponding drill logs and provide a copy of this information to the blaster prior to loading the hole. Ensure the individual hole logs completed by the driller(s) show their name; date drilled; total depth drilled; and depths and descriptions of significant conditions encountered during drilling that may affect loading such as water, voids, changes in rock type.

B) Presplitting. Conduct presplitting operations in conformance with Subsection 204.03.04 of the Standard Specifications for Road and Bridge Construction.

3.5 Shot Report. Maintain all shot reports on site for review by the Department. Within one day after a blast, complete a shot report according to the record keeping requirements of 805 KAR 4:050. Include all results from airblast and seismograph monitoring.

3.6 Unacceptable Blasting. When unacceptable blasting occurs, the Department will halt all blasting operations. Blasting will not resume until the Department completes its investigation and all concerns are addressed. A blast is unacceptable when it results in fragmentation beyond the final rock face, fly rock, excessive vibration or airblast, overbreak, damage to the final rock face or overhang. Assume the cost for all resulting damages to private and public property and hold the Department harmless.

11D

When an errant blast or fly rock causes damage to or blocks a road or conveyance adjacent to the roadway, remove all debris from the roadway as quickly as practicable and perform any necessary repairs. Additionally, when specified in the Contract, the Department will apply a penalty.

Report all blasting accidents to the Division of Mine Reclamation and Enforcement, Explosives and Blasting Branch at 502-564-2340.

4.0 MEASUREMENT AND PAYMENT. The Department will not measure this work for payment and will consider all items contained in this note to be incidental to either Roadway Excavation or Embankment-in-Place, as applicable. However, if the Engineer directs in writing slope changes, then the Department will pay for the second presplitting operation as Extra Work.

The Department will measure for payment material lying outside the typical section due to seams, broken formations, or earth pockets, including any earth overburden removed with this material, only when the work is performed under authorized adjustments.

The Department will not measure for payment any extra material excavated because of the drill holes being offset outside the designated slope lines.

The Department will not measure for payment any material necessary to be removed due to the inefficient or faulty blasting practices.

June 15, 2012

SPECIAL NOTE FOR BARCODE LABEL ON PERMANENT SIGNS

1.0 DESCRIPTION. Install barcode label on sheeting signs. Section references herein are to the Department’s 2012 Standard Specifications for Road and Bridge Construction.

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

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

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

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

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

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

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

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

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

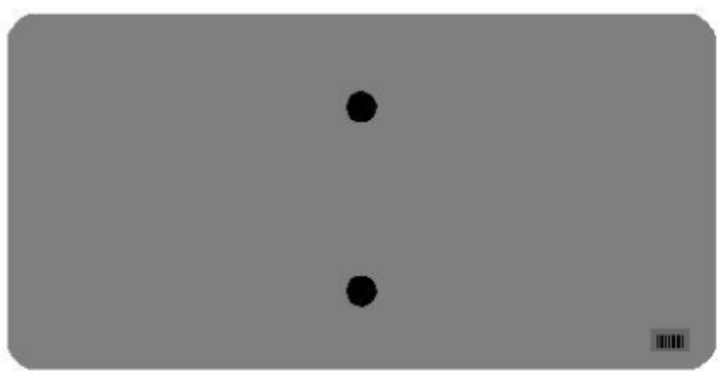
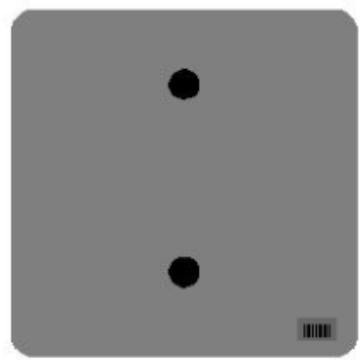
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24631EC	Barcode Sign Inventory	Each

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

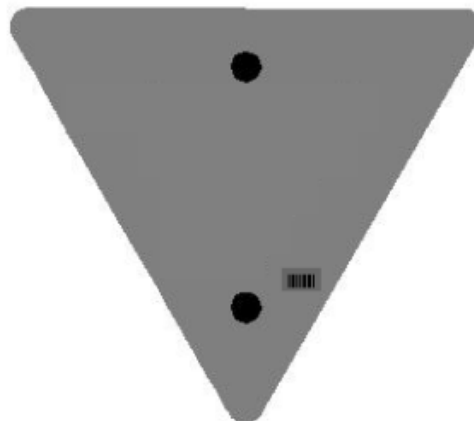
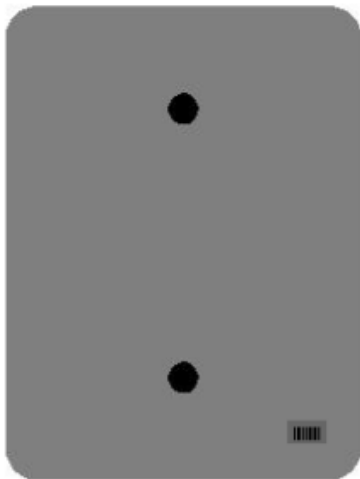
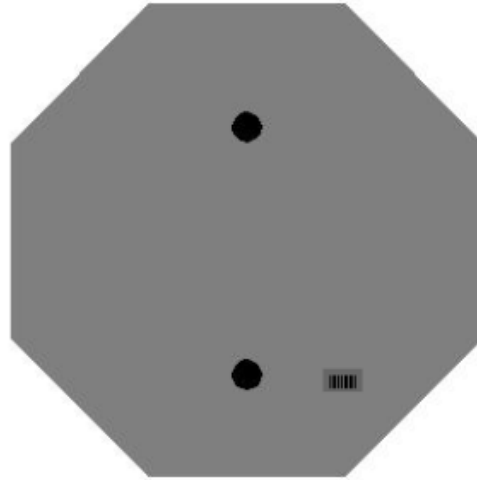
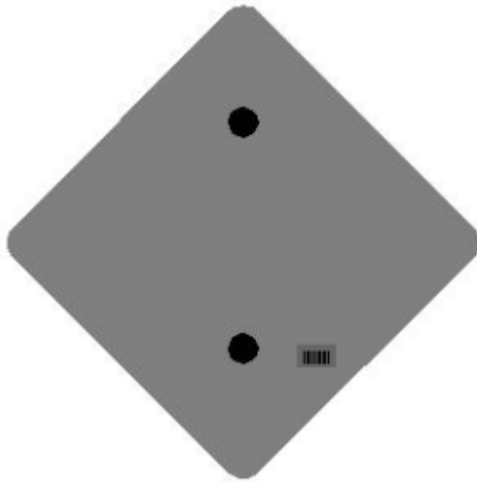
One Sign Post



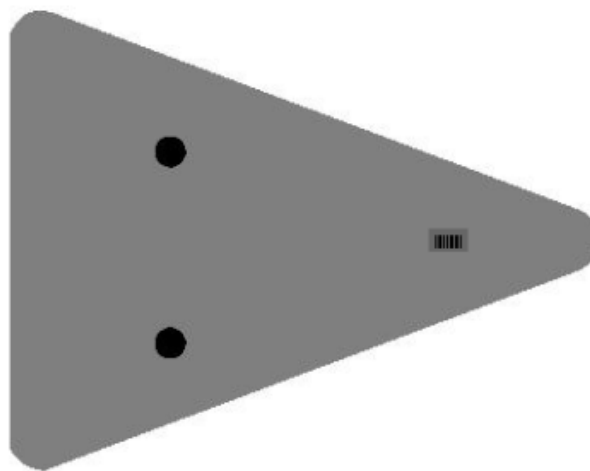
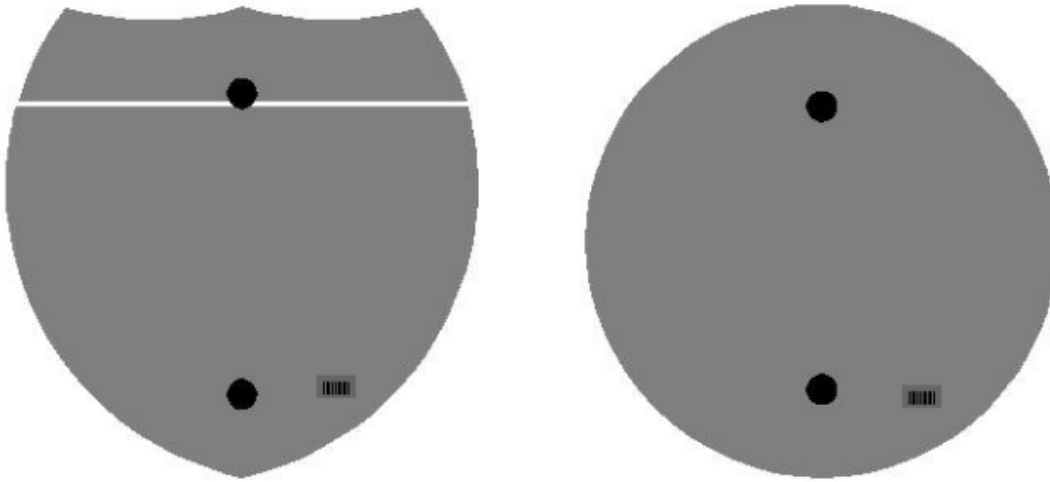
↑
2" Wide Post



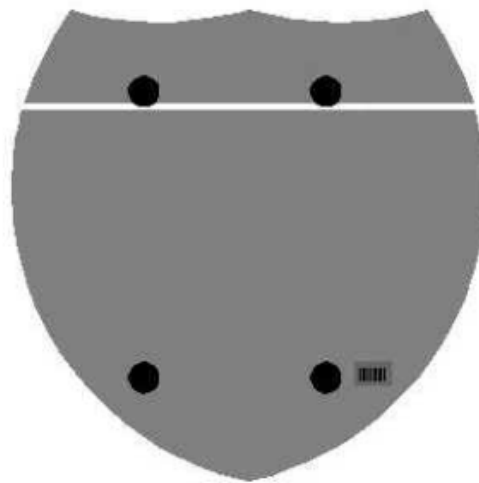
One Sign Post



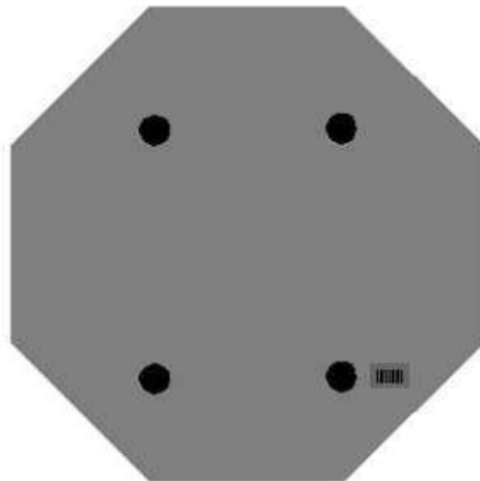
One Sign Post



Double Sign Post



Interstate
Shield

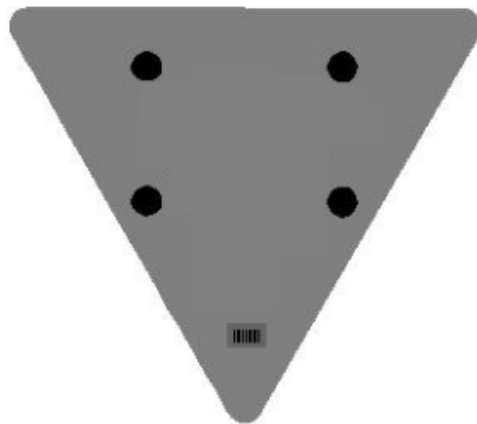


48" Stop

2 Post Signs



↑
2" Wide Post



SPECIAL NOTE FOR LONGITUDINAL PAVEMENT JOINT ADHESIVE

1. DESCRIPTION. This specification covers the requirements and practices for applying an asphalt adhesive material to the longitudinal joint of the surface course of an asphalt pavement. Apply the adhesive to the face of longitudinal joint between driving lanes for the first lane paved. Then, place and compact the adjacent lane against the treated face to produce a strong, durable, waterproof longitudinal joint.
2. MATERIALS, EQUIPMENT, AND PERSONNEL.

2.1 Joint Adhesive. Provide material conforming to Subsection 2.1.1.

2.1.1 Provide an adhesive conforming to the following requirements:

Property	Specification	Test Procedure
Viscosity, 400 ° F (Pa·s)	4.0 – 10.0	ASTM D 4402
Cone Penetration, 77 ° F	60 – 100	ASTM D 5329
Flow, 140 ° F (mm)	5.0 max.	ASTM D 5329
Resilience, 77 ° F (%)	30 min.	ASTM D 5329
Ductility, 77 ° F (cm)	30.0 min.	ASTM D 113
Ductility, 39 ° F (cm)	30.0 min.	ASTM D 113
Tensile Adhesion, 77 ° F (%)	500 min.	ASTM D 5329, Type II
Softening Point, ° F	171 min.	AASHTO T 53
Asphalt Compatibility	Pass	ASTM D 5329

Ensure the temperature of the pavement joint adhesive is between 380 and 410 °F when the material is extruded in a 0.125-inch-thick band over the entire face of the longitudinal joint.

2.2. Equipment.

2.2.1 Melter Kettle. Provide an oil-jacketed, double-boiler, melter kettle equipped with any needed agitation and recirculating systems.

2.2.2 Applicator System. Provide a pressure-feed-wand applicator system with an applicator shoe attached.

2.3 Personnel. Ensure a technical representative from the manufacturer of the pavement joint adhesive is present during the initial construction activities and available upon the request of the Engineer.

3. CONSTRUCTION.

3.1 Surface Preparation. Prior to the application of the pavement joint adhesive, ensure the face of the longitudinal joint is thoroughly dry and free from dust or any other debris that would inhibit adhesion. Clean the joint face by the use of compressed air.

Ensure this preparation process occurs shortly before application to prevent the return of debris on the joint face.

3.2 Pavement Joint Adhesive Application. Ensure the ambient temperature is a minimum of 40 ° F during the application of the pavement joint adhesive. Prior to applying the adhesive, demonstrate competence in applying the adhesive according to this note to the satisfaction of the Engineer. Heat the adhesive in the melter kettle to the specified temperature range. Pump the adhesive from the melter kettle through the wand onto the vertical face of the cold joint. Apply the adhesive in a continuous band over the entire face of the longitudinal joint. Do not use excessive material in either thickness or location. Ensure the edge of the extruded adhesive material is flush with the surface of the pavement. Then, place and compact the adjacent lane against the joint face. Remove any excessive material extruded from the joint after compaction (a small line of material may remain).

3.3 Pavement Joint Adhesive Certification. Furnish the joint adhesive's certification to the Engineer stating the material conforms to all requirements herein prior to use.

3.4 Sampling and Testing. The Department will require a random sample of pavement joint adhesive from each manufacturer's lot of material. Extrude two 5 lb. samples of the heated material and forward the sample to the Division of Materials for testing. Reynolds oven bags, turkey size, placed inside small cardboard boxes or cement cylinder molds have been found suitable. Ensure the product temperature is 400°F or below at the time of sampling.

4. MEASUREMENT. The Department will measure the quantity of Pavement Joint Adhesive in linear feet. The Department will not measure for payment any extra materials, labor, methods, equipment, or construction techniques used to satisfy the requirements of this note. The Department will not measure for payment any trial applications of Pavement Joint Adhesive, the cleaning of the joint face, or furnishing and placing the adhesive. The Department will consider all such items incidental to the Pavement Joint Adhesive.
5. PAYMENT. The Department will pay for the Pavement Joint Adhesive at the Contract unit bid price and apply an adjustment for each manufacturer's lot of material based on the degree of compliance as defined in the following schedule. When a sample fails on two or more tests, the Department may add the deductions, but the total deduction will not exceed 100 percent.

Pavement Joint Adhesive Price Adjustment Schedule						
Test	Specification	100% Pay	90% Pay	80% Pay	50% Pay	0% Pay
Joint Adhesive Referenced in Subsection 2.1.1						
Viscosity, 400 ° F (Pa•s) ASTM D 3236	4.0-10.0	3.5-10.5	3.0-3.4 10.6-11.0	2.5-2.9 11.1-11.5	2.0-2.4 11.6-12.0	≤1.9 ≥ 12.1
Cone Penetration, 77 ° F ASTM D 5329	60-100	57-103	54-56 104-106	51-53 107-109	48-50 110-112	≤ 47 ≥ 113
Flow, 140 ° F (mm) ASTM D 5329	≤ 5.0	≤ 5.5	5.6-6.0	6.1-6.5	6.6-7.0	≥ 7.1
Resilience, 77 ° F (%) ASTM D 5329	≥ 30	≥ 28	26-27	24-25	22-23	≤ 21
Tensile Adhesion, 77 ° F (%) ASTM D 5329	≥ 500	≥ 490	480-489	470-479	460-469	≤ 459
Softening Point, ° F AASHTO T 53	≥ 171	≥ 169	166-168	163-165	160-162	≤ 159
Ductility, 77 ° F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9
Ductility, 39 ° F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9

Code
20071EC

Pay Item
Joint Adhesive

Pay Unit
Linear Foot

May 7, 2014

SPECIAL PROVISION FOR EMBANKMENT AT BRIDGE END BENT STRUCTURES

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

1.0 DESCRIPTION. Construct a soil, granular, or rock embankment with soil, granular or cohesive pile core and place structure granular backfill, as the Plans require. Construct the embankment according to the requirements of this Special Provision, the Plans, Standard Drawing RGX 100 and 105, and the Standard Specifications, Current Edition.

2.0 MATERIALS.

2.1 Granular Embankment. Conform to Subsection 805.10. When Granular Embankment materials are erodible or unstable according to Subsection 805.03.04, use the Special Construction Methods found in 3.2 of the Special Provision.

2.2 Rock Embankment. Provide durable rock from roadway excavation that consists principally of Unweathered Limestone, Durable Shale (SDI equal to or greater than 95 according to KM 64-513), or Durable Sandstone.

2.3 Pile Core. Provide a pile core in the area of the embankments where deep foundations are to be installed unless otherwise specified. The Pile Core is the zone indicated on Standard Drawings RGX 100 and 105 designated as Pile Core. Material control of the pile core area during embankment construction is always required. Proper Pile Core construction is required for installation of foundation elements such as drilled or driven piles or drilled shafts. The type of material used to construct the pile core is as directed in the plans or below. Typically, the pile core area will be constructed from the same material used to construct the surrounding embankment. Pile Core can be classified as one of three types:

A) Pile Core - Conform to Section 206 of the Standard Specifications. Provide pile core material consisting of the same material as the adjacent embankment except the material in the pile core area shall be free of boulders or particle sizes larger than 4 inches in any dimension or any other obstructions that may hinder pile driving operations. If the pile core material hinders pile driving operations, take the appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.

B) Granular Pile Core. Granular pile core is required only when specified in the plans. Select a gradation of durable rock to facilitate pile driving that conforms to Subsection 805.11. If granular pile core material hinders pile driving operations, take appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.

C) Cohesive Pile Core. Cohesive Pile Core is required only when specified in the plans. Conform to Section 206 of the Standard Specifications and use soil with at least 50 percent passing a No. 4 sieve having a minimum Plasticity Index (PI) of 10. In addition, keep the cohesive pile core free of boulders, larger than 4 inches in any dimension, or any other obstructions, which would interfere with drilling operations. If cohesive pile core material interferes with drilling operations, take appropriate means necessary to maintain

excavation stability, at no expense to the Department.

2.4 Structure Granular Backfill. Conform to Subsection 805.11

2.5 Geotextile Fabric. Conform to Type I or Type IV in Section 214 and 843.

3.0 CONSTRUCTION.

3.1 General. Construct roadway embankments at end bents according to Section 206 and in accordance with the Special Provision, the Plans, and Standard Drawings for the full embankment section. In some instances, granular or rock embankment will be required for embankment construction for stability purposes, but this special provision does not prevent the use of soil when appropriate. Refer to the plans for specific details regarding material requirements for embankment construction.

Place and compact the pile core and structure granular backfill according to the applicable density requirements for the project. If the embankment and pile core are dissimilar materials (i.e., a granular pile core is used with a soil embankment or a cohesive pile core is used with a granular embankment), a Geotextile Fabric, Type IV, will be required between the pile core and embankment in accordance with Sections 214 and 843 of the Standard Specifications.

When granular or rock embankment is required for embankment construction, conform to the general requirements of Subsection 206.03.02 B. In addition, place the material in no greater than 2-foot loose lifts and compact with a vibrating smooth wheel roller capable of producing a minimum centrifugal force of 15 tons. Apply these requirements to the full width of the embankment for a distance of half the embankment height or 50 feet, whichever is greater, as shown on Standard Drawing RGX-105.

When using granular pile core, install 8-inch perforated underdrain pipe at or near the elevation of the original ground in the approximate locations depicted on the standard drawing, and as the Engineer directs, to ensure positive drainage of the embankment. Wrap the perforated pipe with a fabric of a type recommended by the pipe manufacturer.

After constructing the embankment, excavate for the end bent cap, drive piling, install shafts or other foundation elements, place the mortar bed, construct the end bent, and complete the embankment to finish grade according to the construction sequence shown on the Plans or Standard Drawings and as specified hereinafter.

Certain projects may require widening of existing embankments and the removal of substructures. Construct embankment according to the plans. Substructure removal shall be completed according to the plans and Section 203. Excavation may be required at the existing embankment in order to place the structure granular backfill as shown in the Standard Drawings.

After piles are driven or shafts installed (see design drawings), slope the bottom of the excavation towards the ends of the trench as noted on the plans for drainage. Using a separate pour, place concrete mortar, or any class concrete, to provide a base for forming and placing the cap. Place side forms for the end bent after the mortar has set sufficiently to support workmen and forms without being disturbed.

Install 4-inch perforated pipe in accordance with the plans and Standard Drawings. In the event slope protection extends above the elevation of the perforated pipe, extend the pipe through the slope protection.

After placing the end bent cap and achieving required concrete cylinder strengths, remove adjacent forms and fill the excavation with compacted structure granular backfill material (maximum 1' loose lifts) to the level of the berm prior to placing beams for the bridge. Place Type IV geotextile fabric between embankment material and structure granular backfill. After completing the end bent backwall, or after completing the span end

wall, place the compacted structure granular backfill (maximum 1' loose lifts) to subgrade elevation. If the original excavation is enlarged, fill the entire volume with compacted structure granular backfill (maximum 1' loose lifts) at no expense to the Department. Do not place backfill before removing adjacent form work. Place structure granular backfill material in trench ditches at the ends of the excavation. Place Geotextile Fabric, Type IV over the surface of the compacted structure granular backfill prior to placing aggregate base course.

Tamp the backfill with hand tampers, pneumatic tampers, or other means approved by the Engineer. Thoroughly compact the backfill under the overhanging portions of the structure to ensure that the backfill is in intimate contact with the sides of the structure.

Do not apply seeding, sodding, or other vegetation to the exposed granular embankment.

3.2 Special Construction Methods. Erodible or unstable materials may erode even when protected by riprap or channel lining; use the special construction method described below when using these materials.

Use fine aggregates or friable sandstone granular embankment at "dry land" structures only. Do not use them at stream crossings or locations subject to flood waters.

For erodible or unstable materials having 50 percent or more passing the No. 4 sieve, protect with geotextile fabric. Extend the fabric from the original ground to the top of slope over the entire area of the embankment slopes on each side of, and in front of, the end bent. Cover the fabric with at least 12 inches of non-erodible material.

For erodible or unstable materials having less than 50 percent passing a No. 4 sieve, cover with at least 12 inches of non-erodible material.

Where erodible or unstable granular embankment will be protected by riprap or channel lining, place Type IV geotextile fabric between the embankment and the specified slope protection.

4.0 MEASUREMENT.

4.1 Granular Embankment. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure for payment any Granular Embankment that is not called for in the plans.

The Department will not measure for payment any special construction caused by using erodible or unstable materials and will consider it incidental to the Granular Embankment regardless of whether the erodible or unstable material was specified or permitted.

4.2 Rock Embankment. The Department will not measure for payment any rock embankment and will consider it incidental to roadway excavation or embankment in place, as applicable. Rock embankments will be constructed using granular embankment on projects where there is no available rock present within the excavation limits of the project.

4.3 Pile Core. Pile core will be measured and paid under roadway excavation or embankment in place, as applicable. The Department will not measure the pile core for separate payment. The Department will not measure for payment the 8-inch perforated underdrain pipe and will consider it incidental to the Pile Core.

4.4 Structure Granular Backfill. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure any additional material required for backfill outside the limits shown on the Plans and Standard Drawings for payment and will

consider it incidental to the work.

The Department will not measure for payment the 4-inch perforated underdrain pipe and will consider it incidental to the Structure Granular Backfill.

4.5 Geotextile Fabric. The Department will not measure the quantity of fabric used for separating dissimilar materials when constructing the embankment and pile core and will consider it incidental to embankment construction.

The Department will not measure for payment the Geotextile Fabric used to separate the Structure Granular Backfill from the embankment and aggregate base course and will consider it incidental to Structure Granular Backfill.

The Department will not measure for payment the Geotextile Fabric required for construction with erodible or unstable materials and will consider it incidental to embankment construction.

4.6 End Bent. The Department will measure the quantities according to the Contract. The Department will not measure furnishing and placing the 2-inch mortar or concrete bed for payment and will consider it incidental to the end bent construction.

4.7 Structure Excavation. The Department will not measure structure excavation on new embankments for payment and will consider it incidental to the Structure Granular Backfill or Concrete as applicable.

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

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02223	Granular Embankment	Cubic Yards
02231	Structure Granular Backfill	Cubic Yards

The Department will consider payment as full compensation for all work required in this provision.

September 16, 2016

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

FHWA-1273 -- Revised May 1, 2012

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (ii) The classification is utilized in the area by the construction industry; and
- (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

**KENTUCKY TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS**

**EMPLOYMENT REQUIREMENTS
RELATING TO
NONDISCRIMINATION OF EMPLOYEES
(APPLICABLE TO FEDERAL-AID SYSTEM CONTRACTS)**

**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 administering 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, 3 Fountain Place, Frankfort, Kentucky 40601; telephone (502) 564-7954.

KENTUCKY TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS
TRAINING SPECIAL PROVISIONS

This Training Special Provision supersedes subparagraph 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," (Attachment 1), and is in implementation of 23 U.S.C. 140(a).

As part of the contractor's equal employment opportunity affirmative action program training shall be provided as follows:

The contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification involved.

The number of trainees to be trained under these special provisions and in this contract is shown in "Special Notes Applicable to Project" in the bid proposal.

In the event that a contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction the contractor shall submit to the Kentucky Transportation Cabinet, Department of Highways for its approval, an acceptable training program on forms provided by the Cabinet indicating the number of trainees to be trained in each selected classification. Failure to provide the Cabinet with the proper documentation evidencing an acceptable training program prior to commencing construction shall cause the Cabinet to suspend the operations of the contractor with (if applicable) working days being charged as usual against the contract time or (if applicable), no additional contract time being granted for the suspension period. The Cabinet will not be liable for the payment of any work performed during the suspension period due to the failure of the contractor to provide an acceptable training program. Said suspension period shall be terminated when an acceptable training program is received by the Cabinet. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeymen status is a primary objective of this Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the findings in each case. The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Kentucky Transportation Cabinet, Department of Highways and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs

registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the contractor will be reimbursed for each hour of training given an employee on this contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The contractor shall furnish the trainee a copy of the program he will follow in providing the training. The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

General Decision Number: KY170187 01/06/2017 KY187

Superseded General Decision Number: KY20160187

State: Kentucky

Construction Type: Highway

Counties: Adair, Barren, Bell, Breathitt, Casey, Clay, Clinton, Cumberland, Estill, Floyd, Garrard, Green, Harlan, Hart, Jackson, Johnson, Knott, Knox, Laurel, Lawrence, Lee, Leslie, Letcher, Lincoln, Magoffin, Martin, McCreary, Menifee, Metcalfe, Monroe, Morgan, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Russell, Taylor, Wayne, Whitley and Wolfe Counties in Kentucky.

HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017

SUKY2015-047 10/20/2015

	Rates	Fringes
BOILERMAKER.....	\$ 24.65	12.94
BRICKLAYER		
Bricklayer.....	\$ 22.90	8.50
Stone Mason.....	\$ 21.50	8.50
CARPENTER		
Carpenter.....	\$ 24.90	14.50

Piledriver.....	\$ 24.55	14.50
CEMENT MASON.....	\$ 21.25	8.50

ELECTRICIAN

Electrician.....	\$ 29.36	10.55
Equipment Operator.....	\$ 26.90	10.31
Groundsman.....	\$ 17.79	8.51
Lineman.....	\$ 30.09	10.94

When workmen are required to work from bosum chairs, trusses, stacks, tanks, scaffolds, catwalks, radio and T.V. towers, structural steel (open, unprotected, unfloored raw steel), and bridges or similar hazardous locations where workmen are subject to fall, except where using JLG's and bucket trucks up to 75 feet: Add 25% to workman's base rate for 50 to 75 feet, and add 50% to workman's base rate for over 75 feet.

IRONWORKER.....	\$ 27.56	20.57
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LABORER

Group 1.....	\$ 21.80	12.36
Group 2.....	\$ 22.05	12.36
Group 3.....	\$ 22.10	12.36
Group 4.....	\$ 22.70	12.36

GROUP 1: Aging and Curing of Concrete (Any Mode or Method), Asbestos Abatement Worker, Asphalt Plant Laborers, Asphalt Laborers, Batch Truck Dumpers, Carpenter Tenders, Cement Mason Tenders, Cleaning of Machines, Concrete Laborers, Demolition Laborers, Dredging Laborers, Drill Tender, Environmental Laborer - Nuclear, Radiation, Toxic and Hazardous Waste - Level D, Flagmen, Grade Checkers, All Hand Digging and Hand Back Filling, Highway Marker Placers, Landscaping Laborers, Mesh Handlers and Placers, Puddler, Railroad Laborers, Rip-rap and Grouters, Right of Way Laborers, Sign, Guard Rail and Fence Installers (All Types), Signalmen, Sound Barrier Installer, Storm and Sanitary Sewer Laborers, Swampers, Truck Spotters and Dumpers, Wrecking of Concrete Forms, General Cleanup

GROUP 2: Batter Board Men (Sanitary and Storm Sewer), Brickmason Tenders, Mortar Mixer Operator, Scaffold Builders, Burner and Welder, Bushammers, Chain Saw Operator, Concrete Saw Operators, Deckhand Scow Man, Dry Cement Handlers, Environmental Laborers - Nuclear, Radiation, Toxic and Hazardous Waste - Level C, Forklift Operators for Masonry, Form Setters, Green Concrete Cutting, Hand Operated Grouter and Grinder Machine Operator, Jack Hammers, Lead Paint Abatement, Pavement Breakers, Paving Joint Machine, Pipe Layers - Laser Operators (Non-metallic), Plastic Pipe Fusion, Power Driven Georgia Buggy and Wheel Barrow, Power Post Hole

Diggers, Precast Manhole Setters, Walk-behind Tampers, Walk-behind Trenchers, Sand Blasters, Concrete Chippers, Surface Grinders, Vibrator Operators, Wagon Drillers

GROUP 3: Air Track Driller (All Types), Asphalt Luteman and Rakers, Gunnite Nozzleman, Gunnite Operators and Mixers, Grout Pump Operator, Powderman and Blaster, Side Rail Setters, Rail Paved Ditches, Screw Operators, Tunnel Laborers (Free Air), Water Blasters

GROUP 4: Caisson Workers (Free Air), Cement Finishers, Environmental Laborer - Nuclear, Radiation, Toxic and Hazardous Waste - Level A and B, miners and Drillers (Free Air), Tunnel Blasters, and Tunnel Mockers (Free Air), Directional and Horizontal Boring, Air Track Drillers (All Types), Powder Man and Blasters, Troxler and Concrete Tester if Laborer is Utilized

PAINTER

All Excluding Bridges.....	\$ 19.92	9.57
Bridges.....	\$ 23.92	10.07

PLUMBER.....	\$ 22.52	7.80
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POWER EQUIPMENT OPERATOR:

Group 1.....	\$ 29.95	14.40
Group 2.....	\$ 29.95	14.40
Group 3.....	\$ 27.26	14.40
Group 4.....	\$ 26.96	14.40

GROUP 1: Auto Patrol, Batcher Plant, Bituminous Paver, Cable-Way, Clamshell, Concrete Mixer (21 cu ft or over), Concrete Pump, Crane, Crusher Plant, Derrick, Derrick Boat, Ditching and Trenching Machine, Dragline, Dredge Engineer, Elevator (regardless of ownership when used for hoisting any building material), Elevating Grader and all types of Loaders, Hoe-type Machine, Hoisting Engine, Locomotive, LeTourneau or Carry-all Scoop, Bulldozer, Mechanic, Orangepeel Bucket, Piledriver, Power Blade, Roller (Bituminous), Roller (Earth), Roller (Rock), Scarifier, Shovel, Tractor Shovel, Truck Crane, Well Point, Winch Truck, Push Dozer, Grout Pump, High Lift, Fork Lift (regardless of lift height), all types of Boom Cats, Multiple Operator, Core Drill, Tow or Push Boat, A-Frame Winch Truck, Concrete Paver, Grade-All, Hoist, Hyster, Material Pump, Pumpcrete, Ross Carrier, Sheepfoot, Sideboom, Throttle-Valve Man, Rotary Drill, Power Generator, Mucking Machine, Rock Spreader attached to Equipment, Scoopmobile, KeCal Loader, Tower Cranes, (French, German and other types), Hydrocrane, Tugger, Backfiller Gurries, Self-propelled Compactor, Self-Contained Hydraulic Percussion Drill

GROUP 2: All Air Compressors (200 cu ft/min or greater), Bituminous Mixer, Concrete Mixer (21 cu. ft. or over), Welding Machine, Form Grader, Tractor (50 hp and over), Bull Float, Finish Machine, Outboard Motor Boat, Brakeman, Mechanic Tender, Whirly Oiler, Tract-air, Road Widening Trencher, Articulating Trucks

GROUP 3: Greaser on Grease Facilities servicing Heavy Equipment

GROUP 4: Bituminous Distributor, Cement Gun, Conveyor, Mud Jack, Paving Joint Machine, Pump, Tamping Machine, Tractor (under 50 hp), Vibrator, Oiler, Air Compressor (under 200 cu ft per minute), Concrete Saw, Burlap and Curing Machine, Hydro Seeder, Power Form Handling Equipment, Deckhand Oiler, Hydraulic Post Driver

SHEET METAL WORKER.....\$ 20.40 7.80

TRUCK DRIVER

Driver (3 Tons and Over),		
Driver (Truck Mounted		
Rotary Drill).....\$ 23.74		14.50
Driver (3 Tons and Under),		
Tire Changer and Truck		
Mechanic Tender.....\$ 23.53		14.50
Driver (Semi-Trailer or		
Pole Trailer), Driver		
(Dump Truck, Tandem Axle),		
Driver of Distributor.....\$ 23.40		14.50
Driver on Mixer Trucks		
(All Types).....\$ 23.45		14.50
Driver on Pavement Breakers.\$ 23.55		14.50
Driver, Euclid and Other		
Heavy Earth Moving		
Equipment and Low Boy.....\$ 24.31		14.50
Driver, Winch Truck and A-		
Frame when used in		
Transporting Materials.....\$ 23.30		14.50
Greaser on Greasing		
Facilities.....\$ 24.40		14.50
Truck Mechanic.....\$ 23.50		14.50
Truck Tender and		
Warehouseman.....\$ 23.20		14.50

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the

most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

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Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

No laborer, workman or mechanic shall be paid at a rate less than that of a Journeyman except those classified as bona fide apprentices.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request from any interested person.

Before using apprentices on the job the contractor shall present to the Contracting Officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U. S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U. S. Bureau of Apprenticeship and Training.

The contractor shall submit to the Contracting Officer, written evidence of the established apprenticeship-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

TO: EMPLOYERS/EMPLOYEES

PREVAILING WAGE SCHEDULE:

The wages indicated on this wage schedule are the least permitted to be paid for the occupations indicated. When an employee works in more than one classification, the employer must record the number of hours worked in each classification at the prescribed hourly base rate.

OVERTIME:

Overtime is to be paid after an employee works eight (8) hours a day or forty (40) hours a week, whichever gives the employee the greater wages. At least time and one-half the base rate is required for all overtime. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. Wage violations or questions should be directed to the designated Engineer or the undersigned.

Director
Division of Construction Procurement
Frankfort, Kentucky 40622
502-564-3500

**NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION
TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY
(Executive Order 11246)**

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

GOALS FOR MINORITY PARTICIPATION IN EACH TRADE	GOALS FOR FEMALE PARTICIPATION IN EACH TRADE
7.0%	6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4, 3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of \$10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed. The notification shall be mailed to:

**Evelyn Teague, Regional Director
Office of Federal Contract Compliance Programs
61 Forsyth Street, SW, Suite 7B75
Atlanta, Georgia 30303-8609**

4. As used in this Notice, and in the contract resulting from this solicitation, the "**covered area**" is Perry County.

PART IV
INSURANCE

INSURANCE

The Contractor shall procure and maintain the following insurance in addition to the insurance required by law:

- 1) Commercial General Liability-Occurrence form – not less than \$2,000,000 General aggregate, \$2,000,000 Products & Completed Aggregate, \$1,000,000 Personal & Advertising, \$1,000,000 each occurrence.
- 2) Automobile Liability- \$1,000,000 per accident
- 3) Employers Liability:
 - a) \$100,000 Each Accident Bodily Injury
 - b) \$500,000 Policy limit Bodily Injury by Disease
 - c) \$100,000 Each Employee Bodily Injury by Disease
- 4) The insurance required above must be evidenced by a Certificate of Insurance and this Certificate of Insurance must contain one of the following statements:
 - a) "policy contains no deductible clauses."
 - b) "policy contains _____ (amount) deductible property damage clause but company will pay claim and collect the deductible from the insured."
- 5) **KENTUCKY WORKMEN'S COMPENSATION INSURANCE.** The contractor shall furnish evidence of coverage of all his employees or give evidence of self-insurance by submitting a copy of a certificate issued by the Workmen's Compensation Board.

The cost of insurance is incidental to all contract items. All subcontractors must meet the same minimum insurance requirements.

PART V
BID ITEMS

PROPOSAL BID ITEMS

171049

Page 1 of 12

Report Date 11/16/17

Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	64,533.00	TON		\$	
0020	00020		TRAFFIC BOUND BASE	30.00	TON		\$	
0030	00100		ASPHALT SEAL AGGREGATE	260.10	TON		\$	
0040	00103		ASPHALT SEAL COAT	31.21	TON		\$	
0050	00190		LEVELING & WEDGING PG64-22	3,221.00	TON		\$	
0060	00194		LEVELING & WEDGING PG76-22	6,368.00	TON		\$	
0070	00212		CL2 ASPH BASE 1.00D PG64-22	17,159.00	TON		\$	
0080	00214		CL3 ASPH BASE 1.00D PG64-22	16,922.00	TON		\$	
0090	00216		CL3 ASPH BASE 1.00D PG76-22	12,061.00	TON		\$	
0100	00301		CL2 ASPH SURF 0.38D PG64-22	1,966.00	TON		\$	
0110	00336		CL3 ASPH SURF 0.38A PG76-22	5,010.00	TON		\$	
0120	02677		ASPHALT PAVE MILLING & TEXTURING	311.00	TON		\$	
0130	24685EC		CL2 ASPH SURF 0.38A PG64-22	2,135.00	TON		\$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0990	00078		CRUSHED AGGREGATE SIZE NO 2	200.00	TON		\$	
1000	01002		PERFORATED PIPE-8 IN	3,240.00	LF		\$	
1010	01012		NON-PERFORATED PIPE-8 IN	150.00	LF		\$	
1020	01022		PERF PIPE HEADWALL TY 1-8 IN	7.00	EACH		\$	
1030	01030		PERF PIPE HEADWALL TY 3-8 IN	1.00	EACH		\$	
1040	01034		PERF PIPE HEADWALL TY 4-8 IN	1.00	EACH		\$	
1050	01310		REMOVE PIPE	119.00	LF		\$	
1060	01585		REMOVE DROP BOX INLET	1.00	EACH		\$	
1070	01691		FLUME INLET TYPE 2	4.00	EACH		\$	
1080	01810		STANDARD CURB AND GUTTER	1,315.00	LF		\$	
1090	01811		STANDARD CURB AND GUTTER MOD	1,286.00	LF		\$	
1100	01825		ISLAND CURB AND GUTTER	460.00	LF		\$	
1110	01875		STANDARD HEADER CURB	689.00	LF		\$	
1120	01891		ISLAND HEADER CURB TYPE 2	130.00	LF		\$	
1130	01917		STANDARD BARRIER MEDIAN TYPE 2	752.00	SQYD		\$	
1140	01923		STANDARD BARRIER MEDIAN TYPE 5	728.00	SQYD		\$	
1150	01982		DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	56.00	EACH		\$	
1160	01986		DELINEATOR FOR BARRIER WALL-B/Y	138.00	EACH		\$	
1170	01987		DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	75.00	EACH		\$	
1180	01990		DELINEATOR FOR BARRIER WALL-B/W	200.00	EACH		\$	
1190	02000		CONCRETE BARRIER WALL MOD TYPE 8C	5,475.00	LF		\$	
1200	02000		CONCRETE BARRIER WALL MOD TYPE 8E	1,373.00	LF		\$	
1210	02003		RELOCATE TEMP CONC BARRIER	8,280.00	LF		\$	
1220	02014		BARRICADE-TYPE III	24.00	EACH		\$	
1230	02015		CEMENT CONCRETE ISLAND	827.00	SQYD		\$	
1240	02091		REMOVE PAVEMENT	8,294.00	SQYD		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1250	02155		PAVED DITCH TYPE 1 MOD	36.00	SQYD		\$	
1260	02157		PAVED DITCH TYPE 1	58.00	SQYD		\$	
1270	02159		TEMP DITCH	4,504.00	LF		\$	
1280	02160		CLEAN TEMP DITCH	2,252.00	LF		\$	
1290	02165		REMOVE PAVED DITCH	55.00	SQYD		\$	
1300	02200		ROADWAY EXCAVATION	1,115,180.00	CUYD		\$	
1310	02223		GRANULAR EMBANKMENT	30,000.00	CUYD		\$	
1320	02242		WATER	272.00	MGAL		\$	
1330	02351		GUARDRAIL-STEEL W BEAM-S FACE	7,962.50	LF		\$	
1340	02360		GUARDRAIL TERMINAL SECTION NO 1	7.00	EACH		\$	
1350	02363		GUARDRAIL CONNECTOR TO BRIDGE END TY A	6.00	EACH		\$	
1360	02367		GUARDRAIL END TREATMENT TYPE 1	15.00	EACH		\$	
1370	02369		GUARDRAIL END TREATMENT TYPE 2A	16.00	EACH		\$	
1380	02371		GUARDRAIL END TREATMENT TYPE 7	3.00	EACH		\$	
1390	02381		REMOVE GUARDRAIL	6,785.00	LF		\$	
1400	02383		REMOVE & RESET GUARDRAIL	865.00	LF		\$	
1410	02387		GUARDRAIL CONNECTOR TO BRIDGE END TY A-1	3.00	EACH		\$	
1420	02397		TEMP GUARDRAIL	200.00	LF		\$	
1430	02429		RIGHT-OF-WAY MONUMENT TYPE 1	76.00	EACH		\$	
1440	02430		RIGHT-OF-WAY MONUMENT TYPE 1A	2.00	EACH		\$	
1450	02432		WITNESS POST	12.00	EACH		\$	
1460	02482		CHANNEL LINING CLASS IA	193.00	TON		\$	
1470	02483		CHANNEL LINING CLASS II	2,746.00	TON		\$	
1480	02488		CHANNEL LINING CLASS IV	3,640.00	CUYD		\$	
1490	02542		CEMENT	29.00	TON		\$	
1500	02545		CLEARING AND GRUBBING 112.5 ACRES	1.00	LS		\$	
1510	02562		TEMPORARY SIGNS	750.00	SQFT		\$	
1520	02585		EDGE KEY	401.00	LF		\$	
1530	02596		FABRIC-GEOTEXTILE TYPE I	7,644.00	SQYD		\$	
1540	02598		FABRIC-GEOTEXTILE TYPE III	7,500.00	SQYD		\$	
1550	02599		FABRIC-GEOTEXTILE TYPE IV	87,000.00	SQYD		\$	
1560	02600		FABRIC GEOTEXTILE TY IV FOR PIPE	26,210.00	SQYD	\$2.00	\$	\$52,420.00
1570	02610		RETAINING WALL-GABION	1,717.00	CUYD		\$	
1580	02625		REMOVE HEADWALL	4.00	EACH		\$	
1590	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	
1600	02671		PORTABLE CHANGEABLE MESSAGE SIGN	7.00	EACH		\$	
1610	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		\$	
1620	02690		SAFELOADING	300.50	CUYD		\$	
1630	02696		SHOULDER RUMBLE STRIPS	41,132.00	LF		\$	
1640	02701		TEMP SILT FENCE	4,504.00	LF		\$	
1650	02703		SILT TRAP TYPE A	113.00	EACH		\$	
1660	02704		SILT TRAP TYPE B	113.00	EACH		\$	
1670	02705		SILT TRAP TYPE C	113.00	EACH		\$	
1680	02706		CLEAN SILT TRAP TYPE A	113.00	EACH		\$	
1690	02707		CLEAN SILT TRAP TYPE B	113.00	EACH		\$	
1700	02708		CLEAN SILT TRAP TYPE C	113.00	EACH		\$	
1710	02726		STAKING	1.00	LS		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1720	02731		REMOVE STRUCTURE CONCRETE MEDIAN BARRIER END	1.00	LS		\$	
1730	02731		REMOVE STRUCTURE EXISTING 3-SPAN STEEL BEAM BRIDGE OVER THE NORTH FORK KENTUCKY RIVER	1.00	LS		\$	
1740	02898		RELOCATE CRASH CUSHION	18.00	EACH		\$	
1750	02929		CRASH CUSHION TYPE IX	1.00	EACH		\$	
1760	03171		CONCRETE BARRIER WALL TYPE 9T	10,000.00	LF		\$	
1770	03262		CLEAN PIPE STRUCTURE	12.00	EACH		\$	
1780	04934		TEMP SIGNAL MULTI PHASE	3.00	EACH		\$	
1790	04940		REMOVE LIGHTING	1.00	LS		\$	
1800	05950		EROSION CONTROL BLANKET	1,375.00	SQYD		\$	
1810	05952		TEMP MULCH	363,117.00	SQYD		\$	
1820	05953		TEMP SEEDING AND PROTECTION	272,338.00	SQYD		\$	
1830	05963		INITIAL FERTILIZER	10.00	TON		\$	
1840	05964		20-10-10 FERTILIZER	17.00	TON		\$	
1850	05985		SEEDING AND PROTECTION	318,218.00	SQYD		\$	
1860	05992		AGRICULTURAL LIMESTONE	198.00	TON		\$	
1870	06401		FLEXIBLE DELINEATOR POST-M/W	174.00	EACH		\$	
1880	06404		FLEXIBLE DELINEATOR POST-M/Y	19.00	EACH		\$	
1890	06510		PAVE STRIPING-TEMP PAINT-4 IN	72,000.00	LF		\$	
1900	06514		PAVE STRIPING-PERM PAINT-4 IN	76,389.00	LF		\$	
1910	06515		PAVE STRIPING-PERM PAINT-6 IN	4,415.00	LF		\$	
1920	06545		PAVE STRIPING-THERMO-8 IN Y	148.00	LF		\$	
1930	06567		PAVE MARKING-THERMO STOP BAR-12IN	136.00	LF		\$	
1940	06568		PAVE MARKING-THERMO STOP BAR-24IN	381.00	LF		\$	
1950	06573		PAVE MARKING-THERMO STR ARROW	3.00	EACH		\$	
1960	06574		PAVE MARKING-THERMO CURV ARROW	55.00	EACH		\$	
1970	06575		PAVE MARKING-THERMO COMB ARROW	4.00	EACH		\$	
1980	06576		PAVE MARKING-THERMO ONLY	11.00	EACH		\$	
1990	06578		PAVE MARKING-THERMO MERGE ARROW	3.00	EACH		\$	
2000	08100		CONCRETE-CLASS A	14.53	CUYD		\$	
2010	08150		STEEL REINFORCEMENT	9.09	LB		\$	
2020	08900		CRASH CUSHION TY VI CLASS B TL2	1.00	EACH		\$	
2030	10020NS		FUEL ADJUSTMENT	327,807.00	DOLL	\$1.00	\$	\$327,807.00
2040	10030NS		ASPHALT ADJUSTMENT	253,506.00	DOLL	\$1.00	\$	\$253,506.00
2050	20000ES724		TREE REDBUD	95.00	EACH		\$	
2060	20071EC		JOINT ADHESIVE	101,304.00	LF		\$	
2070	20411ED		LAW ENFORCEMENT OFFICER	400.00	HOUR		\$	
2080	20432ES112		REMOVE CRASH CUSHION	2.00	EACH		\$	
2090	20465EC		CLEAN CULVERT	1.00	LS		\$	
2100	20550ND		SAWCUT PAVEMENT	10,176.00	LF		\$	
2110	20667ED		PNEUMATIC BACKSTOWING	3,360.00	TON		\$	
2120	20738NS112		TEMP CRASH CUSHION	16.00	EACH		\$	
2130	20911ED		HIGH SLUMP 3000 PSI GROUT	209.00	CUYD		\$	
2140	21289ED		LONGITUDINAL EDGE KEY	2,885.00	LF		\$	
2150	21802EN		G/R STEEL W BEAM-S FACE (7 FT POST)	212.50	LF		\$	
2160	22665EN		REMOVE NON-MOUNTABLE MEDIAN	593.00	SQYD		\$	
2170	22880ED		BARRIER WALL TRANSITION ITEM 20880ED BARRIER WALL TRANSITION (LF)	80.00	LF		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2180	23010EN		PAVE MARK TEMP PAINT STOP BAR-24 IN	300.00	LF		\$	
2190	23791EC		PAVE STRIPING-CHEVRON MARKINGS	105.00	SQFT		\$	
2200	23979EC		CRASH CUSHION TY VI CLASS C TL3	2.00	EACH		\$	
2210	24489EC		INLAID PAVEMENT MARKER	612.00	EACH		\$	
2220	24780EC		INTELLIGENT COMPACTION FOR AGGREGATE	64,533.00	TON		\$	
2230	24781EC		INTELLIGENT COMPACTION FOR ASPHALT	64,842.00	TON		\$	
2240	24814EC		PIPELINE INSPECTION	7,131.00	LF		\$	
2250	24845EC		UTILITY COORDINATION	1.00	LS		\$	
2260	24891EC		PAVE MOUNT INFRARED TEMP EQUIPMENT	2,119,716.00	SF		\$	
2270	24955ED		REMOVE SIGNAL EQUIPMENT	5.00	EACH		\$	

Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2280	00078		CRUSHED AGGREGATE SIZE NO 2	24.00	TON		\$	
2290	00461		CULVERT PIPE-15 IN	159.00	LF		\$	
2300	00462		CULVERT PIPE-18 IN	164.00	LF		\$	
2310	00468		CULVERT PIPE-36 IN	76.00	LF		\$	
2320	00469		CULVERT PIPE-42 IN	153.00	LF		\$	
2330	00473		CULVERT PIPE-66 IN	116.00	LF		\$	
2340	00474		CULVERT PIPE-72 IN	147.00	LF		\$	
2350	00494		CULVERT PIPE-30 IN EQUIV	70.00	LF		\$	
2360	00498		CULVERT PIPE-42 IN EQUIV	62.00	LF		\$	
2370	00499		CULVERT PIPE-48 IN EQUIV	78.00	LF		\$	
2380	00520		STORM SEWER PIPE-12 IN	33.00	LF		\$	
2390	00521		STORM SEWER PIPE-15 IN	2,327.00	LF		\$	
2400	00522		STORM SEWER PIPE-18 IN	1,084.00	LF		\$	
2410	00524		STORM SEWER PIPE-24 IN	1,953.00	LF		\$	
2420	00526		STORM SEWER PIPE-30 IN	31.00	LF		\$	
2430	00528		STORM SEWER PIPE-36 IN	4.00	LF		\$	
2440	00529		STORM SEWER PIPE-42 IN	30.00	LF		\$	
2450	00530		STORM SEWER PIPE-48 IN	661.00	LF		\$	
2460	01000		PERFORATED PIPE-4 IN	1,148.00	LF		\$	
2470	01001		PERFORATED PIPE-6 IN	9,715.00	LF		\$	
2480	01010		NON-PERFORATED PIPE-4 IN	390.00	LF		\$	
2490	01011		NON-PERFORATED PIPE-6 IN	441.00	LF		\$	
2500	01020		PERF PIPE HEADWALL TY 1-4 IN	10.00	EACH		\$	
2510	01021		PERF PIPE HEADWALL TY 1-6 IN	2.00	EACH		\$	
2520	01024		PERF PIPE HEADWALL TY 2-4 IN	1.00	EACH		\$	
2530	01028		PERF PIPE HEADWALL TY 3-4 IN	2.00	EACH		\$	
2540	01029		PERF PIPE HEADWALL TY 3-6 IN	6.00	EACH		\$	
2550	01033		PERF PIPE HEADWALL TY 4-6 IN	3.00	EACH		\$	
2560	01202		PIPE CULVERT HEADWALL-15 IN	2.00	EACH		\$	
2570	01204		PIPE CULVERT HEADWALL-18 IN	7.00	EACH		\$	
2580	01208		PIPE CULVERT HEADWALL-24 IN	1.00	EACH		\$	
2590	01212		PIPE CULVERT HEADWALL-36 IN	1.00	EACH		\$	
2600	01214		PIPE CULVERT HEADWALL-42 IN	1.00	EACH		\$	
2610	01215		PIPE CULVERT HEADWALL-42 IN EQUIV	2.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2620	01216		PIPE CULVERT HEADWALL-48 IN	1.00	EACH		\$	
2630	01217		PIPE CULVERT HEADWALL-48 IN EQUIV	2.00	EACH		\$	
2640	01221		PIPE CULVERT HEADWALL-60 IN EQUIV	1.00	EACH		\$	
2650	01222		PIPE CULVERT HEADWALL-66 IN	2.00	EACH		\$	
2660	01374		METAL END SECTION TY 1-30 IN	1.00	EACH		\$	
2670	01432		SLOPED BOX OUTLET TYPE 1-15 IN	2.00	EACH		\$	
2680	01433		SLOPED BOX OUTLET TYPE 1-18 IN	1.00	EACH		\$	
2690	01434		SLOPED BOX OUTLET TYPE 1-24 IN	2.00	EACH		\$	
2700	01450		S & F BOX INLET-OUTLET-18 IN	5.00	EACH		\$	
2710	01451		S & F BOX INLET-OUTLET-24 IN	2.00	EACH		\$	
2720	01453		S & F BOX INLET-OUTLET-36 IN	4.00	EACH		\$	
2730	01456		CURB BOX INLET TYPE A	5.00	EACH		\$	
2740	01480		CURB BOX INLET TYPE B	7.00	EACH		\$	
2750	01490		DROP BOX INLET TYPE 1	10.00	EACH		\$	
2760	01511		DROP BOX INLET TYPE 5D	2.00	EACH		\$	
2770	01538		DROP BOX INLET TYPE 7	3.00	EACH		\$	
2780	01544		DROP BOX INLET TYPE 11	1.00	EACH		\$	
2790	01550		DROP BOX INLET TYPE 12A	30.00	LF		\$	
2800	01559		DROP BOX INLET TYPE 13G	10.00	EACH		\$	
2810	01641		JUNCTION BOX-15 IN	3.00	EACH		\$	
2820	01642		JUNCTION BOX-18 IN	1.00	EACH		\$	
2830	01643		JUNCTION BOX-24 IN	1.00	EACH		\$	
2840	01644		JUNCTION BOX-30 IN	1.00	EACH		\$	
2850	01645		JUNCTION BOX-36 IN	1.00	EACH		\$	
2860	01720		RECONSTRUCT INLET	4.00	EACH		\$	
2870	01756		MANHOLE TYPE A	2.00	EACH		\$	
2880	01767		MANHOLE TYPE C	1.00	EACH		\$	
2890	02610		RETAINING WALL-GABION	102.00	CUYD		\$	
2900	08100		CONCRETE-CLASS A	11.86	CUYD		\$	
2910	08150		STEEL REINFORCEMENT	256.00	LB		\$	
2920	22628NN		DROP BOX INLET-MOD	1.00	EACH		\$	
2930	24025EC		PIPE CULVERT HEADWALL-72 IN	2.00	EACH		\$	
2940	24944ED		CONC MED BARRIER BOX INLET-TY 8A1	1.00	EACH		\$	
2950	24945ED		CONC MED BARRIER BOX INLET-TY 8B1	24.00	EACH		\$	

Section: 0004 - BRIDGE- 27595

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2960	02231		STRUCTURE GRANULAR BACKFILL	2,689.00	CUYD		\$	
2970	02599		FABRIC-GEOTEXTILE TYPE IV	1,978.00	SQYD		\$	
2980	02998		MASONRY COATING	6,168.00	SQYD		\$	
2990	03299		ARMORED EDGE FOR CONCRETE	245.00	LF		\$	
3000	08001		STRUCTURE EXCAVATION-COMMON	1,727.00	CUYD		\$	
3010	08002		STRUCTURE EXCAV-SOLID ROCK	950.00	CUYD		\$	
3020	08020		CRUSHED AGGREGATE SLOPE PROT	650.00	TON		\$	
3030	08033		TEST PILES	40.00	LF		\$	
3040	08046		PILES-STEEL HP12X53	588.00	LF		\$	
3050	08094		PILE POINTS-12 IN	32.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3060	08100		CONCRETE-CLASS A KY 15 BRIDGE OVER NORTH FORK KENTUCKY RIVER	2,322.00	CUYD		\$	
3070	08104		CONCRETE-CLASS AA	2,746.00	CUYD		\$	
3080	08150		STEEL REINFORCEMENT	448,631.00	LB		\$	
3090	08151		STEEL REINFORCEMENT-EPOXY COATED	843,646.00	LB		\$	
3100	08471		EXPANSION DAM-2.5 IN NEOPRENE	245.00	LF		\$	
3110	20745ED		ROCK SOUNDINGS	534.00	LF		\$	
3120	20746ED		ROCK CORINGS	824.00	LF		\$	
3130	21532ED		RAIL SYSTEM TYPE III	1,463.00	LF		\$	
3140	22861EN		HIGH STRENGTH GEOTEXTILE FABRIC TY V	8,850.00	SQYD		\$	
3150	22885EN		DRILLED SHAFT-72 IN-ROCK	372.00	LF		\$	
3160	24001EC		DRILLED SHAFT-78 IN COMMON	534.00	LF		\$	
3170	24582EN		PRECAST PC I BEAM-HN 72-49	6,140.00	LF		\$	
3180	24595EN		ELASTICIZED EPS 27595	421.00	SQYD		\$	

Section: 0005 - BRIDGE-27596

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3190	02223		GRANULAR EMBANKMENT	874.00	CUYD		\$	
3200	02231		STRUCTURE GRANULAR BACKFILL	434.00	CUYD		\$	
3210	02599		FABRIC-GEOTEXTILE TYPE IV	1,566.00	SQYD		\$	
3220	02998		MASONRY COATING	981.00	SQYD		\$	
3230	03299		ARMORED EDGE FOR CONCRETE	114.00	LF		\$	
3240	08033		TEST PILES	161.00	LF		\$	
3250	08039		PRE-DRILLING FOR PILES	14.00	LF		\$	
3260	08046		PILES-STEEL HP12X53	818.00	LF		\$	
3270	08094		PILE POINTS-12 IN	20.00	EACH		\$	
3280	08100		CONCRETE-CLASS A	123.00	CUYD		\$	
3290	08104		CONCRETE-CLASS AA	442.00	CUYD		\$	
3300	08150		STEEL REINFORCEMENT	31,577.00	LB		\$	
3310	08151		STEEL REINFORCEMENT-EPOXY COATED	101,178.00	LB		\$	
3320	20743ED		DRILLED SHAFT 54 IN-SOLID ROCK	27.00	LF		\$	
3330	20744ED		DRILLED SHAFT 60 IN-COMMON	112.00	LF		\$	
3340	20745ED		ROCK SOUNDINGS	112.00	LF		\$	
3350	20746ED		ROCK CORINGS	68.00	LF		\$	
3360	21532ED		RAIL SYSTEM TYPE III	296.00	LF		\$	
3370	22861EN		HIGH STRENGTH GEOTEXTILE FABRIC TY V	1,412.00	SQYD		\$	
3380	23963EC		PPC I-BEAM TYPE HN 36-49	869.00	LF		\$	
3390	24595EN		ELASTICIZED EPS 27596	88.00	SQYD		\$	

Section: 0006 - BRIDGE-BOX CULVERT

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3400	02403		REMOVE CONCRETE MASONRY	3.00	CUYD		\$	
3410	08001		STRUCTURE EXCAVATION-COMMON	1,541.00	CUYD		\$	
3420	08002		STRUCTURE EXCAV-SOLID ROCK	5.00	CUYD		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3430	08100		CONCRETE-CLASS A	265.00	CUYD		\$	
3440	08150		STEEL REINFORCEMENT	21,950.00	LB		\$	

Section: 0007 - BRIDGE-RETAINING WALL

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3450	08001		STRUCTURE EXCAVATION-COMMON	939.00	CUYD		\$	
3460	08100		CONCRETE-CLASS A	201.00	CUYD		\$	
3470	08150		STEEL REINFORCEMENT	24,316.00	LB		\$	

Section: 0008 - UTILITY- CITY OF HAZARD-WASTEWATER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3480	02555		CONCRETE-CLASS B (DETAIL CONCRETE)	18.00	CUYD		\$	
3490	15010		S CONCRETE PIPE ANCHOR	25.00	EACH		\$	
3500	15016		S ENCASMENT STEEL BORED RANGE 3	220.00	LF		\$	
3510	15017		S ENCASMENT STEEL BORED RANGE 4	505.00	LF		\$	
3520	15021		S ENCASMENT STEEL OPEN CUT RANGE 2	30.00	LF		\$	
3530	15022		S ENCASMENT STEEL OPEN CUT RANGE 3	90.00	LF		\$	
3540	15023		S ENCASMENT STEEL OPEN CUT RANGE 4	650.00	LF		\$	
3550	15026		S FORCE MAIN AIR RLS/VAC VLV 02 IN	2.00	EACH		\$	
3560	15035		S FORCE MAIN DUCTILE IRON 10 INCH	410.00	LF		\$	
3570	15052		S FORCE MAIN PE/PLASTIC 06 INCH	570.00	LF		\$	
3580	15053		S FORCE MAIN PE/PLASTIC 08 INCH	570.00	LF		\$	
3590	15059		S FORCE MAIN PVC 04 INCH	110.00	LF		\$	
3600	15062		S FORCE MAIN PVC 10 INCH	2,230.00	LF		\$	
3610	15070		S FORCE MAIN TAP SLEEVE/VALVE RNG 2	1.00	EACH		\$	
3620	15073		S FORCE MAIN TIE-IN 04 INCH	2.00	EACH		\$	
3630	15074		S FORCE MAIN TIE-IN 06 INCH	1.00	EACH		\$	
3640	15075		S FORCE MAIN TIE-IN 08 INCH	1.00	EACH		\$	
3650	15076		S FORCE MAIN TIE-IN 10 INCH	1.00	EACH		\$	
3660	15084		S FORCE MAIN VALVE GATE	4.00	EACH		\$	
3670	15088		S LATERAL LONG SIDE 06 INCH	4.00	EACH		\$	
3680	15090		S LATERAL SHORT SIDE 06 INCH	2.00	EACH		\$	
3690	15092		S MANHOLE	7.00	EACH		\$	
3700	15092		S MANHOLE (TYPE I & DROP)	2.00	EACH		\$	
3710	15092		S MANHOLE (TYPE I)	1.00	EACH		\$	
3720	15093		S MANHOLE ABANDON/REMOVE	30.00	EACH		\$	
3730	15098		S MANHOLE SPECIAL (5' I.D. MANHOLE)	1.00	EACH		\$	
3740	15098		S MANHOLE SPECIAL (MANHOLE W/LINING ON EX. 10" GRAVITY LINE)	1.00	EACH		\$	
3750	15099		S MANHOLE TAP EXISTING	1.00	EACH		\$	
3760	15102		S MANHOLE WITH LINING	5.00	EACH		\$	

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3770	15102		S MANHOLE WITH LINING (DROP)	2.00	EACH		\$	
3780	15102		S MANHOLE WITH LINING (TYPE A)	7.00	EACH		\$	
3790	15102		S MANHOLE WITH LINING (TYPE B & DROP)	1.00	EACH		\$	
3800	15102		S MANHOLE WITH LINING (TYPE B)	6.00	EACH		\$	
3810	15102		S MANHOLE WITH LINING (TYPE I)	3.00	EACH		\$	
3820	15112		S PIPE PVC 08 INCH	1,560.00	LF		\$	
3830	15112		S PIPE PVC 08 INCH (ACTUALLY 6" PVC)	40.00	LF		\$	
3840	15113		S PIPE PVC 10 INCH	660.00	LF		\$	
3850	15114		S PIPE PVC 12 INCH	4,280.00	LF		\$	
3860	15118		S PIPE SPECIAL (14" DIPS PE HDD)	400.00	LF		\$	
3870	15120		S SPECIAL ITEM (10" FORCE MAIN CAP)	1.00	EACH		\$	
3880	15120		S SPECIAL ITEM (DOUBLE CLEANOUT)	1.00	EACH		\$	
3890	15120		S SPECIAL ITEM (R/R AIR PUMP)	1.00	EACH		\$	
3900	15120		S SPECIAL ITEM (TIE AT EXIS. WETWELL)	1.00	EACH		\$	
3910	15120		S SPECIAL ITEM (TIE NEW 8" GRAVITY TO EXIS. 6" GRAVITY)	1.00	EACH		\$	
3920	15120		S SPECIAL ITEM (TYPE I S.S. BLOWOFF)	1.00	EACH		\$	
3930	15120		S SPECIAL ITEM (VORTEX DROP DEVICE INSTALLED IN MANHOLE)	1.00	EACH		\$	
3940	15123		S LINE MARKER	37.00	EACH		\$	
3950	23300ED		CRUSHED STONE	180.00	TON		\$	
3960	23341EC		GENERAL CONCRETE	40.00	CUYD		\$	

Section: 0009 - UTILITY-CITY OF HAZARD-WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3970	14003		W CAP EXISTING MAIN	10.00	EACH		\$	
3980	14004		W DIRECTIONAL BORE (20" D.I.P.S. PE HDD)	345.00	LF		\$	
3990	14008		W ENCASMENT STEEL BORED RANGE 3	150.00	LF		\$	
4000	14010		W ENCASMENT STEEL BORED RANGE 5	275.00	LF		\$	
4010	14013		W ENCASMENT STEEL OPEN CUT RANGE 2	30.00	LF		\$	
4020	14014		W ENCASMENT STEEL OPEN CUT RANGE 3	305.00	LF		\$	
4030	14016		W ENCASMENT STEEL OPEN CUT RANGE 5	295.00	LF		\$	
4040	14019		W FIRE HYDRANT ASSEMBLY	4.00	EACH		\$	
4050	14023		W FLUSHING ASSEMBLY	7.00	EACH		\$	
4060	14030		W METER RELOCATE	5.00	EACH		\$	
4070	14034		W PIPE DUCTILE IRON 03 INCH	30.00	LF		\$	
4080	14036		W PIPE DUCTILE IRON 06 INCH	2,320.00	LF		\$	
4090	14037		W PIPE DUCTILE IRON 08 INCH	580.00	LF		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
4100	14040		W PIPE DUCTILE IRON 16 INCH	4,080.00	LF		\$	
4110	14072		W PIPE POLYETHYLENE/PLASTIC 12 INCH (2" HEAVY DUTY)	230.00	LF		\$	
4120	14073		W PIPE POLYETHYLENE/PLASTIC SPECIAL (20" D.I.P.S. PE)	60.00	LF		\$	
4130	14082		W SERV PE/PLST SHORT SIDE 1 IN	1.00	EACH		\$	
4140	14085		W SERV PE/PLST SHORT SIDE 3/4 IN	12.00	EACH		\$	
4150	14089		W TAPPING SLEEVE AND VALVE SIZE 1	5.00	EACH		\$	
4160	14090		W TAPPING SLEEVE AND VALVE SIZE 2	5.00	EACH		\$	
4170	14091		W TIE-IN 02 INCH	1.00	EACH		\$	
4180	14102		W VALVE 02 INCH	3.00	EACH		\$	
4190	14103		W VALVE 03 INCH	6.00	EACH		\$	
4200	14105		W VALVE 06 INCH	6.00	EACH		\$	
4210	14106		W VALVE 08 INCH	4.00	EACH		\$	
4220	14109		W VALVE 16 INCH	4.00	EACH		\$	
4230	14125		W VAULT SPECIAL (8" CHECK VALVE)	1.00	EACH		\$	
4240	14144		W LINE MARKER	65.00	EACH		\$	
4250	14153		W LEAK DETECTION METER (RIVER TEST STA.)	1.00	EACH		\$	
4260	14154		W SPECIAL ITEM (TEMP. PIPE SUPPORT)	1.00	EACH		\$	
4270	23300ED		CRUSHED STONE	10.00	TON		\$	
4280	23340EC		PAVEMENT REPLACEMENT	10.00	TON		\$	
4290	23341EC		GENERAL CONCRETE	210.00	CUYD		\$	

Section: 0010 - UTILITY-CITY OF HAZARD-GAS

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0140	02545		CLEARING AND GRUBBING 0.1 ACRES	1.00	LS		\$	
0150	16003		G ENCASMENT STEEL BORED RANGE 2	275.00	LF		\$	
0160	16009		G ENCASMENT STEEL OPEN CUT RANGE 2	120.00	LF		\$	
0170	16015		G PIPE POLYETHYLENE/PLASTIC 02 INCH	20.00	LF		\$	
0180	16017		G PIPE POLYETHYLENE/PLASTIC 04 INCH	7,350.00	LF		\$	
0190	16034		G SERVICE LONG SIDE 3/4 INCH	3.00	EACH		\$	
0200	16041		G TIE-IN POLYETHYLENE/PLASTIC 02 INCH	1.00	EACH		\$	
0210	16043		G TIE-IN POLYETHYLENE/PLASTIC 04 INCH	4.00	EACH		\$	
0220	16049		G VALVE POLYETHYLENE/PLASTIC 02 INCH	1.00	EACH		\$	
0230	16051		G VALVE POLYETHYLENE/PLASTIC 04 INCH	6.00	EACH		\$	
0240	16065		G LINE MARKER	58.00	EACH		\$	
0250	16076		G SPECIAL ITEM (4" PE CAP)	2.00	EACH		\$	
0260	16076		G SPECIAL ITEM (TEMP. PIPE SUPPORT)	1.00	EACH		\$	
0270	23340EC		PAVEMENT REPLACEMENT	20.00	TON		\$	

Section: 0011 - UTILITY-PERRY COUNTY-WATER AND WASTEWATER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0280	01799		SANITARY SEWER MANHOLE 4' DIA. PRE-CAST MANHOLES W/LIDS	7.00	EACH		\$	
0290	14002		W AIR RELEASE VALVE SPECIAL 6" COMBINATION AIR RELEASE VALVE ASSEMBLY	1.00	EACH		\$	
0300	14003		W CAP EXISTING MAIN CAP EXISTING MAIN	4.00	EACH		\$	
0310	14008		W ENCASEMENT STEEL BORED RANGE 3 14" SCH. 40 STEEL CASING PIPE/BORE & JACK	540.00	LF		\$	
0320	14015		W ENCASEMENT STEEL OPEN CUT RANGE 4 16" SCH. 40 STEEL CASING PIPE/OPEN CUT	140.00	LF		\$	
0330	14036		W PIPE DUCTILE IRON 06 INCH 6" DIP J PIPE	1,531.00	LF		\$	
0340	15000		S BYPASS PUMPING BYPASS PUMPING	1.00	EACH		\$	
0350	15051		S FORCE MAIN PE/PLASTIC 04 INCH	285.00	LF		\$	
0360	15112		S PIPE PVC 08 INCH 8" SDR 26 PVC PIPE	1,097.00	LF		\$	
0370	15118		S PIPE SPECIAL 1.5" SDR 26 PVC PIPE	446.00	LF		\$	
0380	15119		S PUMP STATION SEWER PUMPS	6.00	EACH		\$	
0390	15120		S SPECIAL ITEM MYERS PUMPS WGX75H SERIES TWO- STAGE 7.5 HP SUBMERSIBLE GRINDER PUMP OR APPROVED	1.00	EACH		\$	
0400	23126EN		BORE AND JACK PIPE-18 IN 16" SCH. 40 STEEL CASING PIPE/BORE & JACK	80.00	LF		\$	

Section: 0012 - SIGNING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0410	04904		BARRIER MOUNTING BRACKET	6.00	EACH		\$	
0420	06400		GMSS GALV STEEL TYPE A	4,184.00	LB		\$	
0430	06405		SBM ALUMINUM PANEL SIGNS	1,583.00	SQFT		\$	
0440	06406		SBM ALUM SHEET SIGNS .080 IN	1,187.00	SQFT		\$	
0450	06407		SBM ALUM SHEET SIGNS .125 IN	580.00	SQFT		\$	
0460	06410		STEEL POST TYPE 1	3,193.00	LF		\$	
0470	06412		STEEL POST MILE MARKERS	2.00	EACH		\$	
0480	06441		GMSS GALV STEEL TYPE C	4,656.00	LB		\$	
0490	06448		SIGN BRIDGE ATTACHMENT BRACKET	1.00	EACH		\$	
0500	06490		CLASS A CONCRETE FOR SIGNS	21.00	CUYD		\$	
0510	06491		STEEL REINFORCEMENT FOR SIGNS	1,140.00	LB		\$	
0520	20419ND		ROADWAY CROSS SECTION	15.00	EACH		\$	
0530	20912ND		BARRIER WALL POST	6.00	EACH		\$	
0540	21596ND		GMSS TYPE D	4.00	EACH		\$	
0550	24631EC		BARCODE SIGN INVENTORY	347.00	EACH		\$	

Section: 0013 - SIGNALIZATION

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0560	04792		CONDUIT-1 IN	120.00	LF		\$	
0570	04793		CONDUIT-1 1/4 IN	1,390.00	LF		\$	
0580	04795		CONDUIT-2 IN	715.00	LF		\$	
0590	04811		ELECTRICAL JUNCTION BOX TYPE B	24.00	EACH		\$	
0600	04820		TRENCHING AND BACKFILLING	715.00	LF		\$	
0610	04821		OPEN CUT ROADWAY	50.00	LF		\$	
0620	04829		PIEZOELECTRIC SENSOR	5.00	EACH		\$	
0630	04830		LOOP WIRE	8,560.00	LF		\$	
0640	04844		CABLE-NO. 14/5C	3,425.00	LF		\$	
0650	04850		CABLE-NO. 14/1 PAIR	7,935.00	LF		\$	
0660	04885		MESSENGER-10800 LB	1,975.00	LF		\$	
0670	04895		LOOP SAW SLOT AND FILL	2,815.00	LF		\$	
0680	04931		INSTALL CONTROLLER TYPE 170	4.00	EACH		\$	
0690	04932		INSTALL STEEL STRAIN POLE	16.00	EACH		\$	
0700	20094ES835		TEMP RELOCATION OF SIGNAL HEAD	26.00	EACH		\$	
0710	20188NS835		INSTALL LED SIGNAL-3 SECTION	30.00	EACH		\$	
0720	20266ES835		INSTALL LED SIGNAL- 4 SECTION	5.00	EACH		\$	
0730	20275EC		VIDEO DETECTION-INSTALL	1.00	EACH		\$	
0740	20359NN		GALVANIZED STEEL CABINET	1.00	EACH		\$	
0750	20360ES818		WOOD POST	2.00	EACH		\$	
0760	20390NS835		INSTALL COORDINATING UNIT	4.00	EACH		\$	
0770	20391NS835		ELECTRICAL JUNCTION BOX TYPE A	4.00	EACH		\$	
0780	23157EN		TRAFFIC SIGNAL POLE BASE	84.00	CUYD		\$	
0790	24900EC		PVC CONDUIT-1 1/4 IN-SCHEDULE 80	1,390.00	LF		\$	
0800	24901EC		PVC CONDUIT-2 IN-SCHEDULE 80	715.00	LF		\$	
0810	24955ED		REMOVE SIGNAL EQUIPMENT	2.00	EACH		\$	

Section: 0014 - LIGHTING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0820	04712		POLE 100 FT MTG HT HIGH MAST	8.00	EACH		\$	
0830	04714		POLE 120 FT MTG HT HIGH MAST	14.00	EACH		\$	
0840	04761		LIGHTING CONTROL EQUIPMENT	3.00	EACH		\$	
0850	04797		CONDUIT-3 IN	6,711.00	LF		\$	
0860	04800		MARKER	21.00	EACH		\$	
0870	04820		TRENCHING AND BACKFILLING	8,604.00	LF		\$	
0880	04860		CABLE-NO. 8/3C DUCTED	2,597.00	LF		\$	
0890	04940		REMOVE LIGHTING	1.00	LS		\$	
0900	20391NS835		ELECTRICAL JUNCTION BOX TYPE A	26.00	EACH		\$	
0910	20392NS835		ELECTRICAL JUNCTION BOX TYPE C	8.00	EACH		\$	
0920	21543EN		BORE AND JACK CONDUIT	3,292.00	LF		\$	
0930	23161EN		POLE BASE-HIGH MAST	204.60	CUYD		\$	
0940	24749EC		HIGH MAST LED LUMINAIRE	105.00	EACH		\$	
0950	24851EC		CABLE-NO. 10/3C DUCTED	18,522.00	LF		\$	

Section: 0015 - TRAINEE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0960	02742		TRAINEE PAYMENT REIMBURSEMENT (1 GROUP 2, 3, OR 4 OPERATOR)	1,400.00	HOUR		\$	

Section: 0016 - MOBILIZATION AND/OR DEMOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0970	02568		MOBILIZATION	1.00	LS		\$	
0980	02569		DEMOBILIZATION	1.00	LS		\$	