CALL NO. 200

CONTRACT ID. 181001

ROCKCASTLE COUNTY

FED/STATE PROJECT NUMBER 102GR18D001-NHPP IM

DESCRIPTION I-75

WORK TYPE GRADE, DRAIN & SURFACE WITH BRIDGE

PRIMARY COMPLETION DATE 10/1/2020

LETTING DATE: January 26,2018

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN STANDARD TIME January 26,2018. Bids will be publicly announced at 10:00 AM EASTERN STANDARD TIME.

PLANS AVAILABLE FOR THIS PROJECT.

DBE CERTIFICATION REQUIRED - 8%

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

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SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 08

CONTRACT ID - 181001

102GR18D001-NHPP IM

COUNTY - ROCKCASTLE

PCN - DE10200751801
NHPP IM 0752 (098)

I-75 WIDEN I-75 TO 6 LANES FROM 1 MILE NORTH OF SAND HILL ROAD UNDERPASS NORTH TO 1.1 MILES NORTH OF THE US-25 INTERCHANGE AT MT. VERNON, A DISTANCE OF 04.77 MILES.GRADE, DRAIN & SURFACE WITH BRIDGE SYP NO. 08-0006.10.

GEOGRAPHIC COORDINATES LATITUDE 37:20:31.00 LONGITUDE 84:18:28.00

PCN - DE10200751802
NHPP IM 0752 (095)

I-75 (ROCKCASTLE COUNTY) (MP 60.100) TENNESSEE STATE LINE - LEXINGTON; WIDEN I-75 TO 6 LANES FROM 1.1 MILES N US 25 INTERCHANGE AT MT. VERNON N TO 1.85 MILES N GREEN HILL ROAD OVERPASS (MP 64.500), A DISTANCE OF 04.42 MILES.GRADE, DRAIN & SURFACE WITH BRIDGE SYP NO. 08-00006.20.

GEOGRAPHIC COORDINATES LATITUDE 37:20:46.00 LONGITUDE 84:18:28.00

COMPLETION DATE(S):

COMPLETED BY 10/01/2020	APPLIES TO ENTIRE CONTRACT
COMPLETED BY 06/01/2020	APPLIES TO 8-6.20

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 certainly 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 our 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.

PROJECT TRAFFIC COORDINATOR (PTC)

Be advised this project is a significant project pursuant to section 112.03.12.

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.

DGA BASE

Unless otherwise noted, the Department estimates the rate of application for DGA Base to be 115 lbs/sy per inch of depth.

DGA BASE FOR SHOULDERS

Unless otherwise noted, the Department estimates the rate of application for DGA Base for Shoulders to be 115 lbs/sy per inch of depth. The Department will not measure necessary grading and/or shaping of existing shoulders prior to placing of DGA Base, but shall be incidental to the Contract unit price per ton for DGA Base.

Accept payment at the Contract unit price per ton as full compensation for all labor, materials, equipment, and incidentals for grading and/or shaping of existing shoulders and furnishing, placing, and compacting the DGA Base.

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.

COMMONWEALTH OF KENTUCKY

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

Rockcastle
ITEM NUMBER 8-6.10

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PROJECT DESCRIPTION

GENERAL
This project includes furnishing and installing Pole with cabinets, lowering device and Web cameras

This ITS Project complies with the requirements of 23 CFR 940. The ITS work to be performed is referenced in the current Kentucky 2014 Statewide ITS Architecture at Appendix C-4,5 and C-4 (Traffic Incident Management System ATMS08, and Traffic Information Dissemination ATMS06), and in the Updated Section 5 and Appendix B of the 2009 Addendum to the Original Kentucky ITS Business Plan.

EQUIPMENT AND MATERIALS
All equipment and materials shall be new, free of defects and damage.

SPECIFICATIONS AND WORKMANSHIP
Unless otherwise specified, all work shall conform to the following:

- Kentucky Standard Specifications for Road and Bridge Construction, latest edition.
- FHWA, Manual on Uniform Traffic Control Devices, latest edition.
- National Electrical Code, latest edition.
- National Electric Safety Code, latest edition.
- KYTC Department of Highways Standard Drawings, current editions.
- KYTC Department of Highways Sepia Drawings, current editions.
- International Municipal Signal Association (IMSA) Specification No. 51-7, current edition.
- AASHTO, Roadside Design Guide, latest edition.
- AASHTO, Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, latest edition.

All work shall be performed in a neat and professional manner. The Contractor shall remove debris and trash from work areas during construction. The Contractor shall restore areas to original condition and clean up all debris after construction.

DAMAGE TO EXISTING FACILITIES
The Contractor shall be responsible for locating all underground utilities prior to excavation. The contractor shall repair damage caused to any public or private facilities at his expense. Utilities include but are not limited to telephone, power, water, gas, fiber optic cable, underground vaults, roadway lighting wiring, traffic signal wiring, and roadway drainage systems.

EQUIPMENT LIST
The contractor shall provide an equipment list in Microsoft Excel format to the Engineer containing the following information:

- Type of equipment
- Field location
- Make
- Model
- Serial number
- Date of purchase
- Manufacturer contact information
- Equipment vendor contact information (if different)
- Date of Installation
- Date warranty expires

This list shall be provided to the Division of Traffic Operations and TRIMARC Systems Administrator prior to burn-in testing. See below for TRIMARC Info:

Mr. Todd Hood
TRIMARC Systems Administrator
901 W. Main St.
Louisville, KY 40202
Phone: 502-587-6624
Fax: 502-587-6645
Email: Todd.Hood@ngc.com

WARRANTY

The Contractor shall provide a copy of all equipment warranty information to the Division of Traffic Operations. The Contractor shall provide documentation from the manufacturer that ownership of the warranty is transferred to the following:

Kentucky Transportation Cabinet
Division of Traffic Operations
200 Mero Street
Frankfort, KY 40622

TESTING

The contractor shall demonstrate proper functioning of all devices at the field communications demarcation point. After each device can be successfully operated at the field communications demarcation point the devices will be integrated into the TRIMARC Traffic Operations Center. A 30 day equipment burn-in test will begin after each device is integrated and can be remotely controlled from the operations centers. The Contractor is responsible for repairing or replacing defective equipment during the period between the field test and the start of the 30 day burn-in test.
The 30 day burn-in test will be conducted by TRIMARC from the operations center and consist of operational control of PTZ and video of the remote camera location.
If a device fails during the 30 burn-in day test, TRIMARC personnel will test the device at the field cabinet. If the device cannot be operated at the field cabinet the Contractor shall repair or replace the device and a new 30 day burn-in test will begin for that device. The project will be accepted after all devices have completed their 30 day test successfully, acceptable as-built drawings and warranty information have been received.

SYSTEM COMPATIBILITY

The Contractor is responsible for coordinating with TRIMARC to insure equipment compatibility and to complete integration of equipment into the TRIMARC project.

COMMUNICATIONS

Camera shall communicate with the control center over the wireless router connection (coordinated with the TRIMARC). The Contractor shall be responsible for furnishing and installing all conduits, junction boxes and communication cables installed on Kentucky right-of-way as specified in the plans. The Contractor shall be responsible for the installation and correct operation of all communications systems located in the field cabinet to the field devices. Testing of the Contractor's work will be performed both

locally at the cabinet and remotely at the TRIMARC Traffic Operations Center. TRIMARC personnel will assist with any troubleshooting necessary to resolve problems with the communication equipment.

SHOP DRAWINGS
All items that are used on this project shall have shop drawings sent to Engineer, who will contact Division of Traffic Operations for approval. All items shall be approved before purchase of said items.

AS-BUILT DRAWINGS
The Contractor, at the completion of the project, shall submit as-built drawings. As-built drawings shall be submitted in electronic format such as .pdf, .tiff, .dgn or other standard image format acceptable to the Engineer. As-built drawings may be scanned from marked up field plans or drawn in MicroStation. As-built drawings shall be scanned at a resolution that will allow them to be clearly legible on a computer display. As-built drawings shall include the exact location of all above ground equipment, underground conduit, wire, sensors and other equipment. Drawings shall indicate any changes to the design including changes to the numbers of conductors, wire gage, splices, additional conduit, etc. Conduit locations shall be drawn to scale or shall be dimensioned and referenced to permanent roadway features. Turns in conduit shall be referenced so that the conduit paths may be derived from the as-built drawings. Existing underground utilities shall be indicated on the drawings. Two copies of the drawings shall be submitted. One copy of the drawings shall be submitted to the Engineer. One copy of the drawings shall be submitted to the KYTC Division of Traffic Operations Design Services Branch. The Contractor shall correct any drawings that are deemed unacceptable to the Engineer. As-built drawings shall be delivered prior to burn-in testing.
The project will be accepted after all devices have completed their 30 day test successfully, acceptable as-built drawings and warranty information have been received.

SITE PREPARATION

DESCRIPTION

Site Preparation shall be performed in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Site Preparation shall include all materials required to access and protect the work area.

INSTALLATION

The Contractor shall coordinate with the Engineer prior to performing any site preparation work. This item includes excavation, guardrail removal, guardrail replacement, temporary ditch crossings, temporary barriers and clearing of debris and foliage. Salvaged materials may be used at the discretion of the Engineer. Site preparation shall be one per VMS sign location and web camera location. There shall

not be site preparation for locations that have web cameras installed on existing signal poles and existing highmast.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Site Preparation will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

ADVANCED GROUNDING SYSTEM

DESCRIPTION

Furnish and install Advanced Grounding System in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Unless otherwise specified, the grounding system provided will be as shown in plan sheet T12. Minimum ground resistance reading needs to be 10 ohms or less as tested via the 3 point fall of potential test method.

If the installation of the advanced grounding system is not possible due to physical constraints of the location or other extenuating factors, the Engineer or Traffic Engineer may allow for a standard ground installation. The standard installation would be with ground wiring consisting of solid bare copper #4 AWG and securely connected inside enclosures with #4 AWG copper clamp connectors. Nuts and washers securing the wire are not acceptable. All grounding shall meet the National Electric Code. Ground wires shall be exothermically welded to the ground rods. Ground rod clamps are not acceptable. The following devices shall be grounded to an array of two or three, 10' X 1" copper coated steel ground rods:

- Model 334/336 Enclosures (two ground rods required)
- Camera Poles (three ground rods required)
- Side-mounted VMS(two ground rods required)
- Service Locations(two ground rods required)

All ground rods in arrays shall have a minimum of 6' separation.

The resistance to ground shall be less than 10 Ohms as measured with an AEMC clamp on ground resistance meter or equivalent. The Contractor shall leave all exothermic welds exposed for inspection by the Traffic Engineer before backfilling.

INSTALLATION

All grounding shall be according to standards shown on plan sheet T12. If contractor needs help with installation, they can contact Alltec Corporation for further assistance at 800-203-2658.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Advanced Grounding System will be measured for payment per each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

POLE BASE

DESCRIPTION

Furnish and install Pole Base in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Pole Base includes concrete, anchor bolts, reinforcing steel, and conduit within base. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION

The Contractor shall stake all proposed pole base locations and obtain approval before excavation. The Traffic Engineer (District 8) will approve locations for pole bases in their districts. The Contractor shall have utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule the location approval. KYTC approval of field device location does not relieve the contractor from his responsibility to avoid utilities and repair any damage to buried infrastructure. The Contractor shall grade and re-seed all disturbed areas and restore the area to the satisfaction of the Engineer. Poles located behind guardrail shall have a minimum 5' spacing from edge of pole to face of guardrail. Otherwise, poles shall be located as according to the plans sheets or a minimum of 30' from all driving lanes. This item includes all excavation including any special equipment required to install the base in rock. This item shall include a vented rodent barrier furnished and installed by the contractor. See Vented rodent barrier detail.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Pole Base/Pole Base-High Mast will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

POLE WITH LOWERING DEVICE

DESCRIPTION

Pole with lowering device shall be designed to support and lower/raise a CCTV camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The lowering device and the pole are interdependent and thus, must be considered a single unit or system. The lowering device system shall consist of a pole, suspension contact unit, divided support arm, pole adapter for attachment to a pole top tenon, pole top junction box, and camera connection box. The lowering device to be furnished shall be the product of a manufacturer with a minimum of two years of experience in the manufacturing of such systems.

MATERIALS

LOWERING DEVICE
Lowering device shall be [MG]² Model CLDMG2, Camera Lowering Systems CDP series or approved equal.

SUSPENSION CONTACT UNIT
The suspension contact unit shall have a load capacity 200 lbs. with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a latching mechanism with a minimum of two latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.

The prefabricated components of the lift unit support system shall be designed to preclude the lifting cable from contacting the power or video cabling. The only cable permitted to move within the pole or lowering device during lowering/raising shall be the stainless steel lowering cable. All other cables must remain stable and secure during lowering/raising operations.

The female side of the socket contact connector shall be made of thermosetting synthetic polymer. The connector shall be suitable for Ethernet type camera installation.. All wire shall be 18 AWG stranded. Pin contact half of connector shall be made of thermosetting synthetic polymer. All pins and wires shall be molded in place. A complete disconnect unit shall have two identical sets of 10 contacts each (20 contacts total). Male Pin contact halves shall be mounted to lower portion of disconnect unit.

The portable lowering device and pulleys for the lowering device shall have sealed, self lubricated bearings, oil tight bronze bearings, or sintered bronze bushings. The lowering

cable shall be a minimum 1/8 inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds and shall be 19 x 7 or 7 x 19.

All electrical and video connections between the fixed and moveable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits, one volt peak-to-peak video signals, and power requirements for operation of dome environmental controls. A direct coax connection is acceptable but not required.

The interface and locking components shall be made of stainless steel or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder-coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

POLE MATERIALS
All materials and products shall be manufactured in the United States of America, and comply with ASTM or AASHTO specifications. Mill certifications shall be supplied as proof of compliance with the specifications.

POLE DESIGN
Pole design shall be in accordance with loading and allowable stress requirements of 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals",current edition. Loading shall be based on:

- basic wind speed of 90 mph
- 30 percent gust factor using
- design life/recurrence interval of 50 years
- fatigue category I.

The lowering device manufacturer shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum EPA, an EPA equal to or greater than that of the camera system to be attached. All drawings and detail analysis shall be submitted in detail demonstrating compliance with the AASHTO Specification.

To avoid vortex shedding, the steel pole members shall have a taper of 0.14 in/ft. All structures shall be designed to natural wind gust conditions. The yearly mean wind speed for natural wind gusts will be assumed to be 11.2 per hour.

Poles up to 50' in length shall be one-piece construction. Poles greater than 50' in length shall be of two-piece construction. Poles shall conform to ASTM A 595, Grade A minimum yield strength of 55 ksi, ASTM A 572 Grade 65, ASTM A 53. Pole, base plate, and all associated hardware shall be galvanized per ASTM A 123 or A 153. The shaft shall

be round or 16 sided with a four inch corner radius and contain only one longitudinal seam weld. Circumferential welded tube butt splices and laminated tubes are not permitted. Longitudinal seam welds within 6 inches of complete penetration pole to base plate welds shall be complete penetration welds. The shaft shall be hot dip galvanized per the requirements of the contract documents.

The pole top deflection shall not exceed one inch in a 30-mph (non-gust) wind. The calculations shall include a pole, base plate, and anchor bolt analysis. The pole detail analysis shall be analyzed at the pole base, at 5-ft. pole intervals, and at each slip joint splice. Design shall be based on wind loading (EPA) from a CCTV assembly dome enclosure.

A detail analysis of the pole shall be submitted. The detailed analysis shall include, but not be limited to, the following calculations:

1. **Provide Group I, II, III, IV load combinations as listed in Table 3-1 Group Load Combinations in AASTHO.**
2. **Provide dimensions and weights for all attachments. This includes areas used for wind, ice and fatigue loads, drag coefficients, projected areas, velocity pressures and wind force for each segment.**
3. **For Group Loads II, III, and IV, which have wind loads, provide calculations for each controlling "worst case" wind direction that controls any aspect of the design (anchor bolts, pole sizing, ect.)**
4. **Anchor Bolts shall be designed for the orientation that would provide the maximum stress on any individual bolt.**
5. **Provide all structural properties for poles, anchor bolts and base plates. This includes the poles diameter, thickness, section modulus, moment of inertia, and cross sectional area.**
6. **Calculations for each member shall include loads, section properties, member forces (axial, shear and bending), member deflections (angular and linear), member stresses (actual and allowable), and the combined stress ratio (CSR).**
7. **Fatigue calculations should be shown for all fatigue related connections. Provide the corresponding detail, stress category and example from Table 11-2 in AASHTO.**
8. **In fatigue calculations, the effective throat thickness of a complete joint penetration groove weld shall be the thickness of the thinner part joined per AISC J2.1a.**

Provide steel strain poles with a permanently affixed label 6 feet from the bottom of the base plate on the outside with the following information:

manufacturer
height
minimum stringing tension at yield
order number, and
maximum deflection rate.

Provide detailed calculations of the pole. The detailed calculations shall be certified by a Professional Engineer licensed in the Commonwealth of Kentucky.

POLE HAND HOLES

The pole hand hole opening shall be reinforced with a minimum 2-inch wide hot rolled steel rim. The nominal outside dimensions shall be 6.5 inches x 27 inches. The handhole shall have a tapped hole for mounting the portable winch as shown on the drawings.

The handhole cover shall be removable from the handhole frame. On the frame side opposite the hinge, provide a mechanism on the handhole cover/frame to place the Department's standard padlock as specified in Section 834.25. The handhole frame shall have two stainless studs installed opposite the hinge to secure the handhole cover to the frame which includes providing stainless steel wing nuts and washers. The handhole cover shall be manufactured from 0.25 inch thick galvanized steel (ASTM 153) and have a neoprene rubber gasket that is permanently secured to the handhole frame to insure weather-tight protection. The hinge shall be manufactured from 7 gauge stainless steel to provide adjustability to insure a weather-tight fit for the cover. The handhole shall have a 3' L x3' W x4" D concrete pad install beside the opening of the handhole. Concrete for the pad is incidental to this item.

POLE TOP TENON

A tenon shall be welded to the pole top with mounting holes and slot as required for the mounting of the lowering system. The tenon shall be of dimensions required to facilitate camera lowering device component installation. Each slot shall be parallel to the pole centerline for mounting the lowering device.

POLE CABLE SUPPORTS

Electrical Cable Guides and Parking Stand (Eyebolts): Top and bottom electrical cable guides shall be located within the pole and aligned with each other as referenced in the drawings. One cable guide shall be positioned 2 inches below the handhole and the other shall be positioned 1 inch directly below the top of the tenon. A parking stand shall be positioned 2.75 inches below the top of the handhole.

BASE PLATE

Provide base plates that conform to ASTM A36 for grade 36 or ASTM 572 for grade 50. Ensure transverse plates have a thickness $\geq$ 2 inches. Provide a base plate for the vertical pole that fits inside a 48 in diameter concrete base. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration butt weld with backup bar. Plates shall be hot dip galvanized per the requirements of the contract documents.

POLE ANCHOR BOLTS

The anchor bolt design shall follow the NCHRP Report 494 Section 2.4 and NCHRP 469 Appendix A Specifications. Use anchor bolts that conform to the requirement of ASTM F 1554 grade 55 for hooked smooth bars or grade 105 for headed. Anchor bolts shall conform to AASHTO M 314 grade 55. Anchor bolts and all associated hardware shall

be fully galvanized per ASTM A 153. . Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts. For anchor bolt design, pole forces shall be positioned in such a manner to maximize the force on any individual anchor bolt regardless of the actual anchor bolt orientation with the pole. There shall be two steel templates (one can be used for the headed part of the anchor bolt when designed in this manner) provided per pole. Templates shall be contained within a 26.5 inch diameter. All templates shall be fully galvanized (ASTM A 153). Anchor bolt lengths should be based on NCHRP Report 494 Section 2.4.5.5 using #8 bars for the foundation reinforcing steel. The headed anchor bolt assembly shall be contained within 26.5 inch diameter. Minimum edge distance for bolt holes shall follow Table J3.4 of AISC Steel Construction Manual. NCHRP Report 494:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_494.pdf

NCHRP Report 469:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_469-a.pdf

POLE WELDING
All welding shall be in accordance with Sections 1 through 8 of the AWS D1.1 Structural Welding Code. Tackers and welders shall be qualified in accordance with the code. Tube longitudinal seam welds shall be free of cracks and excessive undercut, performed with automatic processes, and shall be visually inspected. Tube shall contain only one longitudinal seam weld. Longitudinal welds suspected to contain defects shall be magnetic-particle inspected by the manufacturer. All circumferential butt-welded pole and arm splices shall be ultrasonically or radiographically inspected by the manufacturer.

This item includes all assembly, mounting hardware, wiring, grounding, and mechanical and electrical adjustments. Due to the electrical connections involved, the CCTV Assembly must be installed to properly test the lowering device. The contractor shall demonstrate to the Engineer the proper and repeated operation of the lowering device. Proper camera operation and electrical connections shall be verified after each lowering/raising cycle.

INSTALLATION

POLE
Pole shall be installed in the correct orientation and plumb. Pole shall be grounded in accordance with the plans and specifications. Damaged galvanizing shall be repaired with a paint approved by the Engineer.

CAMERA BALANCING
The Camera shall be weighted and balanced to assure that the alignment of pins and connectors are proper for the camera support to be raised into position without binding. The lowering unit shall have sufficient weight to disengage the camera and its control components in order that it can be lowered properly.

CAMERA CONNECTIONS
The Contractor shall be responsible for meeting the Ethernet and power requirements and camera (120 volt, 18 AWG minimum).

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Pole with Lowering Device will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

PORTABLE WINCH LOWERING TOOL

DESCRIPTION

Furnish Portable Winch Lowering Tool in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Portable winch lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment. The tool shall consist of a lightweight metal frame and winch assembly with cable as described herein, a quick release cable connector, an adjustable safety clutch and a variable-speed, industrial-duty, battery powered drill motor. The tool shall be compatible with the winch accessible through the hand hole of the pole. When attached to the winch, the tool shall support itself and the load assuring raising/lowering operations and provide a means to prevent freewheeling when loaded. The tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise/lower a capacity load. The tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The tool shall be equipped with a positive locking mechanism to secure the cable reel during raising/lowering operations.

INSTALLATION

No installation is required. Portable winch lowering tools shall be delivered to a location determined by the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Portable Winch Lowering Tool will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

WEB CAMERA ASSEMBLY

DESCRIPTION

Furnish and install Web Camera Assembly in accordance with the plans, specifications and Standard Drawings.

MATERIALS

The Web Camera Assembly shall be an Axis Network Dome Model P5635-E or approved equivalent. This item shall include the color camera, zoom lenses, environmental enclosure, pan/tilt unit, housing, dome, parapet mount, and all mounting hardware, POE power cable, connections, and incidentals necessary to complete the work.

Proposed alternates shall be commercially available. The Contractor shall identify an installed site where the proposed alternate Web Camera Assembly has been operating for a period of at least one year in a similar climate region. The contractor shall supply a spare camera/POE and deliver it to Trimarc.

INSTALLATION

Web Camera Assembly shall be installed on a wood pole or steel strain pole as specified in the plans and in accordance with the manufacturer's instructions. Installation shall comply with all warranty provisions and warranty contract maintenance services. Installation shall comply with all local, state, and federal building, electrical and construction codes, and Motorola R-56 requirements. All wiring access to the Web Camera Assembly shall be through watertight fittings. Wiring access points shall be on the side or underneath components; no exposed top access is permitted. The Web Camera Assembly shall be installed so that the assembly is located on the side of the pole closest to the roadway when the camera is in its fixed position at the top of the pole. The contractor is responsible to verified all functions of the web camera through a laptop interface.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Web Camera Assembly will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

UNINTERRUPTIBLE POWER SUPPLY (RACK MOUNTED UPS)

DESCRIPTION

Furnish and install Uninterruptible Power Supply in accordance with the plans, specifications and Standard Drawings.

MATERIALS

The Uninterruptible Power Supply shall be provided emergency power to the load when the input power sources fails. The Uninterruptible Power Supply shall be APC UPS 1500VA LCD RM 2U (networkable card AP9630) or approved equal. The Uninterruptible Power Supply shall be networkable and have the following technical specifications:

Output Power Capacity: 980 Watts/ 1440 VA
Nominal Output/Input voltage: 120 Volts
Efficiency at Full Load: 95%
Waveform Type: Sine Wave
Output/Input Connections: (6) NEMA 5-15R
Battery Type: Maintenance-free sealed Lead-Acid Battery with suspended electrolyte:leakproof

Interface Ports: DB-9 Rs 232, USB
Surge Energy Rating: 459 Joules
Filtering: Meets UL 1449
Mounting: shall be able to mount in 19" rack
Operating Environment: 0-40 degrees Celsius
Regulatory Approvals: CSA, FCC Part 15 Class A, UL 1778
Warranty: At least 3 year for repair or replace

Network card shall have the following:

Protocols: HTTP, HTTPS, IPv4, SMTP, SNMP v1, SNMP v3, SSH V1, SSH V2, SSL, TCP/IP, Telnet
Network Interface Connections: RJ-45 10/100 Base-T
Regulatory Approvals: AS/NZS 3548 (C-Tick) Class A, EN 55022 Class A, En 55024, FCC Part 15 Class A, GOST, ICES-003, VCCI Class A
Warranty: At least 3 year for repair or replace

INSTALLATION

Uninterruptible Power Supply shall be installed in 334/336 Cabinet as specified in the plans sheets. It shall be securely mounted the 19" frame which is included in supplied 334/336 cabinet. All cables, rack Mounting Brackets, Rack Mounting support rails shall be incidental to the item.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Uninterruptible Power Supply will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

COMMUNICATIONS CABLE

DESCRIPTION

Furnish and install Communications Cable in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Communications cable shall be General Cable GenSpeed 5000 CAT 5e Outside Plant Cable 8 wire PN: 5136100 or approved equal. The cable shall meet or exceed the following specifications:

Performance:

- ANSI/TIA/EIA 568B (Category 5e)
- MIL-C-24640A Water Penetration
- Propagation Delay: 583 ns @ 100 MHz
- Return Loss @ 100 MHz: 20.1 DB
- Frequency Range: 1-350 MHz

Physical characteristics:

- Nominal Outside Diameter: 0.230 in
- Insulation Type: Polyolefin
- Maximum Pulling Tension: 25 lbs
- Maximum DC Resistance: 9.38 Ohms/100m
- Mutual Capacitance @ 1kHz: 17 pF/100m
- Operating Temperature: -45° C to 80° C

All connectors, terminators, fittings, etc. shall be incidental to the cost of installing the Communications Cable and no separate payment will be made. Wireless router shall be Sierra Wireless Airlink GX450 with ethernet add-on shall support ATT 3G/4G/LTE services at each location. The antenna should be Laird Lp-800-2500-9NF sku393969. All antennas for the wireless router shall be installed on the outside of the 334 cabinet shall be waterproof.

The Contractor shall deliver the wireless router (GX450) to Central Office Traffic Operations for provisioning on the KYTC APN. The cabinet will provision the router within 4 weeks of receipt and return via mail to the contractor. The cabinet will pay the monthly data plan charges. The cabinet will allow temporary access to the router until the close of the contract for configuring of the adaptive system.

All system components shall arrive at the job site completely factory pre-wired and ready for field installation. All connections shall be clearly and permanently labeled to facilitate correct and easy termination of equipment.

INSTALLATION

The Contractor shall install all cable and wire splice-free from the controller/service location to each cabinet, VMS sign, or CCTV camera the cable or wire is feeding. The Contractor shall not use excessive force when pulling wire through duct. The Contractor

shall replace all wire damaged during installation. The Contractor shall submit to material testing at the discretion of the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Communications Cable will be measured for payment per unit linear foot The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

CONDUIT

DESCRIPTION

Furnish and install Conduit in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Conduit shall be rigid steel, schedule 40 PVC, flexible, non-metallic, and ducted conduit as specified. This item includes fittings, connectors, clamps, caps and other materials necessary for proper installation. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION

All conduit installed above ground or below ground under pavement shall be rigid steel. All conduits installed below ground, not under pavement shall be PVC or ducted cable. Flexible, non-metallic conduit shall be used as required and shall be incidental to the project. Unused conduits shall be capped on both ends. Conduit containing wire or cable shall be sealed with a piece of steel wool and capped off with duct seal putty. All conduits shall be accessible inside junction boxes. All conduits shall have bushings included. If rigid steel conduit, the bushings shall be bonded together with other similar types of conduits.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Rigid Steel and PVC, flexible, non-metallic, and ducted conduit will be measured for payment per unit linear foot. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section. A direct measurement will not be made for flexible, non-metallic conduit. All flexible, non-metallic conduits shall be incidental to the project.

MODEL 334 AND 336 ENCLOSURES

DESCRIPTION

Furnish and install Enclosure in accordance with the plans, specifications and Standard Drawings.

MATERIALS

The two types of enclosures are Model 336 (36" H x 24" W x 22" D) and Model 334 (66" H x 24" W x 30" D). All enclosures shall be NEMA 3R rated. The enclosures shall include: all mounting accessories, access doors (minimum of two doors), ventilation, locking system, handles, door stops, rack assembly, light(s), shelves, drawer, and all required peripherals per the requirements of the contract documents and per the equipment submitted by the Contractor. **The contractor shall provide a cabinet, wiring, and all components that are approved as an assembly. This approved assembly shall be incidental to this item. Verification that the cabinet, wiring, and all components are an approved assembly shall be submitted to Central Office Traffic Operations.**

This item includes all excavation and any special equipment required to install the enclosure on a pole for a Model 336 enclosure or construct the concrete base for a Model 334 enclosure.

The Contractor shall provide a terminal facility harness by means of mating "MS" type connectors for interconnections of the field equipment specified. All cabinets of the same type shall be identical in size, shape and quality. In addition, the cabinets shall be equipped internally as specified herein and as required to suit the specific equipment specified on the plans.

Cabinets shall be of welded construction, using 0.125" minimum thickness 5052H32 or equivalent sheet aluminum. The equipment design shall utilize the latest available techniques, minimum number of different parts, subassemblies, circuits, cards and/or modules to maximize standardization and commonality.

Cabinets shall be provided with fully wired back and side panels with all necessary terminal boards, wiring harnesses, connectors and attachment hardware. All equipment shall be shelf or 19" rack mounted. Terminals and panel facilities shall be installed on the lower portion of the cabinet walls below all shelves.

Each field cabinet shall, at a minimum, be supplied with the following:

- Fan and Thermostat
- Left Side Power Distribution Panel
- Air Filter
- Adjustable Shelves (1-4 as needed for equipment submitted by the Contractor)
- Back Panel
- Right Side Panel
- Locking System
- Ground Bus (2)
- Terminal Blocks

- Duplex power outlet
- Drawer that slides out for supporting a laptop computer
- All necessary installation and mounting hardware

All external screws, nuts and locking washers shall be stainless steel; no self-tapping screws are permitted unless specifically approved by the Engineer. All screws, nuts and locking washers used internally shall be manufactured from corrosion resistant materials.

All parts of the cabinet shall be cleaned, smoothed and free from flaws, cracks, dents and other imperfections. The cabinet shall be rigidly constructed to provide vibration free operation of the field equipment when installed. The cabinets shall be dust and rain tight and capable of maintaining a dry internal condition when subject to rain and wind gusts.

All components shall be made of corrosion resistant materials such as plastic, stainless steel, aluminum or brass; or shall be treated with corrosion resistance such as cadmium plating or galvanizing. All materials shall be resistant to fungus growth and moisture deterioration.

Individual cabinet components shall be pre-assembled upon installation in the cabinet such that the components can be easily replaced in the field. Modules of unlike function shall be mechanically keyed to prevent insertion into the wrong socket or connector.

Panels shall be designed to mount in the cabinet on mounting studs. It shall not be necessary to remove the panel to replace any panel-mounted equipment. The panels shall be capable of supporting specified equipment mounted on the panel. A lower input termination panel shall be provided to terminate all input field wires.

Electronic components shall meet the requirements contained herein and shall, at a minimum, comply with EIA Specifications. No component shall be of such design, fabrication, nomenclature or other identification as to preclude the purchase of said component from a wholesale electronics distributor or from the component manufacturer.

Components shall be down-rated by 50 percent with regard to ambient temperature, applied voltage, and power dissipation. All circuits shall be designed for reliability and maximum performance.

The design life of all components, under continuous operating conditions in their circuit application, shall be a minimum of ten years.

Each component shall meet all of its specified performance requirements when the input power is AC, 60 Hz, single phase, 120 volts +/- 20 volts. The equipment shall be designed such that the failure of a particular piece of equipment will not cause the failure of any other.

The cabinets shall be furnished with a power distribution panel mounted on the lower left hand inside wall when facing the front of the cabinet. This panel shall include a 115 VAC, convenience, dual outlet with integral ground fault interrupt protected by a circuit breaker. The left panel shall have:

- Circuit Breaker(s)

- Radio Interference Suppressor
- Power Cable Input and Junction Terminals

Circuit breakers shall be approved and listed by UL. Each cabinet shall have, at a minimum, a circuit breaker to protect the lamp, vent fan, and dual outlet. In addition, a properly rated equipment circuit breaker(s) shall be provided for the equipment shown on the plans. At each cabinet that houses VMS control equipment, a 220 VAC circuit breaker, sized to suit the cables that provide power to the VMS pixels shall be furnished and installed. Breakers shall have a minimum interrupt capacity of 50 amperes.

Each cabinet shall be equipped with a radio interference suppressor installed at the circuit breaker. The suppressor shall provide a minimum attenuation of 50 dB over a frequency range of 200 kHz to 75 MHz. The suppressor shall be hermetically sealed in a case filled with a suitable insulation compound.

The suppressor terminals shall be nickel-plated, with brass studs of sufficient external length to provide space for connection of two appropriately sized conductors and shall be mounted such that the terminals cannot be turned in the case. The suppressors shall be designed for operation at the proper current ampere rating as determined by the Contractor per the equipment specified on the plans and shall be approved by UL and EIA.

Power distribution blocks suitable for use as a power feed and junction points shall be furnished and installed for two and three wire circuits. The line side of each circuit shall be capable of handling the specified number of and size of all wires.

Each cabinet shall include a fully wired equipment panel mounted on the lower rear inside of the wall of the cabinet. The back panel shall be utilized to distribute and properly interconnect all cabinet wiring related to the specific equipment. Each piece of equipment specified shall have its cable harness properly connected at terminal boards on the back panel. All functions available at the equipment connector shall be carried in the connector cable harness to a terminal board point on the back panel.

Wiring shall be provided for the equipment specified. All cabinet wiring, where connected to terminal strips, switches, radio interference suppressor, etc., shall be identified by the use of insulated pre-printed sleeving (wire markers) slipped over the wire before attachment of the lug or terminating the connection. The wire markers shall have a text label with sufficient detail so that a translating sheet is not required.

All wires shall be cut to the proper length before assembly. No wires shall be doubled back to take up slack. Wires shall be neatly secured with nylon lacing or cable ties. Cables shall be secured with nylon cable clamps.

The grounded side of the electric service shall be carried throughout the cabinet to the ground bus without a break.

All electrical connections in the cabinet shall have sufficient clearance between each terminal and the cabinet to prevent a leakage path or physical contact under stress. Where these

distances cannot be maintained, barriers must be provided. All equipment grounds shall run directly and independently to the ground bus. The lay of the interconnect cable between the components must be such that when the door is closed, it does not press against the cables or force the cables against the various components inside the cabinet. Sufficient length of cable harnesses shall be provided to easily reach the electronic equipment placed anywhere on the shelves.

All wiring containing line voltage AC shall be routed and bundled separately and/or shielded from all low voltage (i.e. control) circuits. All conductors and live terminals or parts, which could be hazardous to maintenance personnel, shall be covered with suitable insulating materials.

All conductors used in the cabinet wiring shall be 22 AWG or larger with a minimum of 19 strands. The insulation shall have a minimum thickness of 10 MILS. All wiring containing line voltage shall be 14 AWG or larger.

The AC+, AC-, and equipment ground wiring shall be electrically isolated from the other by an insulation resistance of at least 10 Megohms when measured at 250 VAC. Return and equipment grounding wiring shall be color-coded white and green respectively.

Terminal blocks located on the panels shall be accessible such that it shall not be necessary to remove the electronic equipment from the cabinet to make a connection or perform an inspection.

Terminal blocks shall be two-position, multiple-pole, and barrier type. Shorting bars, along with integral marking strip, shall be provided. Terminal blocks shall be arranged such that they do not impede the entrance, training, or connection of incoming field conductors. All terminals shall be identified by legends permanently attached to the terminal blocks. Not more than three conductors shall be brought to any one terminal screw. No electrically live parts shall extend beyond the protection afforded by the barriers. All terminal blocks shall be located below the shelves.

AC terminal blocks shall be Underwriter's Laboratory approved for 600 volts AC minimum and shall be suitable for outdoor use. Terminals used for field connections or interwiring connections shall secure conductors by means of a nickel or cadmium plated brass binder head screw.

All connections to and from the electronic equipment shall terminate at an interwiring block. These blocks shall act as intermediate connection points for all electronic equipment inputs and outputs.

A varistor shall be installed across the thermostat used to control the fan to act as a surge and transient noise suppressor. The varistor shall be GE VI5OLAIOA, Stetron 250NRO7-1, Siemens SIOK150, or approved equal.

MOUNTING

Model 336 cabinets shall be pole mounted or mounted to an existing concrete wall as specified. Model 334 cabinets shall be mounted on a poured concrete base or on existing concrete surfaces as specified. All holes drilled into existing concrete surfaces shall penetrate the concrete no more than 4 inches unless otherwise approved by the Engineer. Bolts inserted into any concrete surface shall be properly secured and epoxied, per manufacturer's recommendations. Prefabricated fiberglass bases used in lieu of poured concrete bases must be approved by the Engineer. Cabinet installation shall conform to the details shown. All cabinets shall be furnished with stainless steel mounting plates, nuts, bolts, washers and all other necessary hardware to mount the cabinet as shown or described.

DOORS

All cabinets shall be provided with doors in the front and back. Doors shall have secure gaskets to prevent the entrance of dust and moisture. Doors shall be sized to encompass the full area of the cabinet opening. Doors shall be provided with two stop positions to hold the door open at 90 degrees and 135 degrees. The stops shall hold the door securely open until released manually. The front door shall be hinged on the right-hand side by means of three butt hinges with 1/4" minimum stainless steel hinge pins.

VENTILATION

Cabinets shall be furnished with louvers properly designed to provide natural ventilation to the interior. The louver area shall be of sufficient size to permit the free flow of air corresponding to the rated capacity of the associated cabinet fan. A pleated media fiber filter shall be provided and shall cover all louvers.

Cabinets shall be furnished with an electric, thermostatically-controlled ventilation fan or fans mounted in the cabinet. The fan(s) shall have a rated capacity of at least 200 cubic feet per minute. The fan and cabinet ventilation louvers shall be located with respect to each other so as to direct the bulk of the air flow throughout the entire cabinet and, in particular, over the field equipment units. The thermostat shall be adjustable to turn on between 90 degrees and 120 degrees Fahrenheit.

LOCKING SYSTEM

Each door shall be furnished with a 3-point positive locking system. The lock for the door shall be a self-locking, heavy-duty, five-pin tumbler cylinder rim type. The handles shall be made of stainless steel and shall be provided with a padlock feature. Locks shall be keyed identically to Corbin #2. Two keys shall be provided for each cabinet.

LIGHT

A fluorescent light shall be provided in front for all cabinets and also in the back for Model 334 cabinets. A panel mounted 40-Watt weatherproof incandescent lamp with an on-off switch shall be positioned to provide light to the face of the equipment installed in the cabinet.

SHELF/DRAWER/RACK

A removable 19" EIA rack shall be provided for mounting sub-assemblies in Model 334 cabinet. Adjustable shelves shall be provided to hold the equipment. Vertical shelf

adjustment intervals shall be 2" maximum. The shelves shall be positioned from the top of the cabinet in accordance with the actual equipment configuration of the particular cabinet. All devices/sub-assemblies shall be mounted on the rack if possible. Otherwise, they shall be placed on the shelves.

A sliding drawer shall be provided in each cabinet. The drawer shall be installed below the shelves in a suitable position for placement of a laptop computer. The drawer shall have a nominal depth of 1" and a hinged lid.

LABELING

The letters "KYTC ITS" shall be permanently displayed along the top of each door on the outside of each cabinet. The letters shall be a minimum of 1" tall. The letters shall be die-cut or engraved into the metal before galvanizing and shall be readable after galvanizing. All excess galvanizing shall be brushed off. The location and description of the label must be shown on the shop plan submittal for the cabinets. Stenciling with paint or other markers is not permitted. If required information is placed on a steel plate, the plate must match the surface profile of the cabinet. The plate must then be welded completely around the plate before galvanizing.

QUALITY ASSURANCE PROVISIONS

The following water spray test shall be performed on each empty cabinet: Water shall be sprayed from a point directly overhead at an angle of 60° from the vertical axis of the cabinet. This procedure shall be repeated for each of eight equally spaced positions around the cabinet for a period of not less than five minutes in each position. The water shall be sprayed using a domestic type-sprinkling nozzle at a rate of not less than one gallon per minute per square foot of the cabinet's surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

A manufacturer's certification of successful completion of the water spray test and that the cabinet conforms to these specifications shall be the basis of acceptance of the cabinet. Separate submission of test cabinets shall not be required.

MAINTENANCE

All components and assemblies shall be clearly identified with name, model number, serial number and any other pertinent information required to facilitate equipment maintenance.

All equipment shall be designed for ease of installation and maintenance. Location, accessibility, serviceability and features that will lead to simplified maintenance shall be a prime consideration. All component parts shall be readily accessible for inspection and maintenance. The only tools and test instruments required by maintenance personnel shall be simple hand tools and basic meters.

After the wiring is complete, all conduit penetrations into the cabinets shall be sealed in such a manner as to prevent rodents and insects from entering the cabinet. The conduit sealants and insect traps used shall be approved by the Engineer prior to installation.

DOCUMENTATION

Each field cabinet shall be supplied with three copies of the final cabinet wiring diagram. One copy shall be placed in a clear plastic envelope and left in the cabinet drawer. Two sets of Mylar plans shall be delivered to the Engineer.

INSTALLATION

Model 334/336 enclosure shall be installed in accordance with the plans and specifications. The Contractor shall stake all proposed enclosure locations and shall obtain approval of staked locations before excavation. A representative from the KYTC Division of Traffic Operations, Design Services Branch or the Traffic Engineer, District 4/6, TRIMARC representatives (for Jefferson/Oldham only) will approve locations for all field devices. The Contractor shall have all utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule this location approval with KYTC. KYTC approval of field device locations does not relieve the contractor from his responsibility to repair any damage incurred during construction. Enclosures located behind guardrail shall have minimum 5 foot spacing from edge of pole to face of guardrail. Otherwise, enclosures shall be located as specified on the plan sheets or a minimum of 30' from all driving lanes. All materials shall be installed in a neat and professional manner. All pole mount cabinets shall be mounted approximately 42" from the ground. All 336 pole mounted cabinets shall a 3' L x3' W x4" D concrete pad install for each door. Concrete for the pad is incidental to the cabinets. The Contractor shall grade and re-seed all disturbed areas to the satisfaction of the Engineer. This item includes the furnishing and installing of Fastrac bait bag in each cabinet for rodent control.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Model 334/336 Enclosure will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

SURGE DEVICES

DESCRIPTION

Furnish and install video surge device, data surge device, power surge device, and RF surge device in accordance with the plans, specifications and Standard Drawings.

MATERIALS

GENERAL

Each surge device shall be compatible with the equipment it is protecting. Each surge device shall include cables, connectors, power supplies, and all incidentals required for operation.

VIDEO SIGNAL COAX CONDUCTOR SURGE DEVICE

Video Signal Coax Conductor Surge Device shall be EDCO CX12-BNC-Y or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 12 volts when subjected to a 3 kA, 8x20 microsecond wave
- Have a peak surge current of 20kA with 8x20 microsecond wave
- Have BNC connectors
- Pass signals from DC to 80 MHz with less than 3 dB insertion losses
- Be UL 497B listed

DATA SIGNAL CONDUCTOR SURGE DEVICE

Data Signal Conductor Surge Device shall be for RS 422 and RS 485 Communication conductors shall be EDCO PC642C-015 or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 12 volts when subjected to a 1 kA 8x20 microsecond wave
- Have a peak surge current per wire of 10 kA with 8x20 microsecond wave
- Have a maximum inline resistance of 6 ohms
- Have a maximum attenuation of -3db at 50MHz

RS 232 COMMUNICATION DATA SIGNAL CONDUCTOR SURGE DEVICE

Data Signal Conductor Surge Device for RS 232 Communication conductors shall be EDCO PC642C-015 or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 30 volts when subjected to a 1 kA 8x20 microsecond wave
- Have a peak surge current per wire of 3kA with 8x20 microsecond wave
- Have a maximum inline resistance of 6 ohms
- Have a maximum attenuation of -3 db at 0.5 MHz

100 BASE-T AND 10 BASE-T COMMUNICATION DATA SIGNAL CONDUCTOR SURGE DEVICE

Data Signal Conductor Surge Device for 100BaseT and 10BaseT Communication conductors shall be EDCO LCDP-30 or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 30 volts when subjected to a 0.5 kA 8x20 microsecond wave
- Have a peak surge current per wire shall be 1kA with 8x20 microsecond wave
- Have a maximum attenuation shall be -3db at 100 MHz
- Have a N.E.X.T. worst pair of better than -40 db at 100 MHz
- Have a maximum attenuation of -3db at 0.5 MHz

POWER CONDUCTOR SURGE DEVICE

Conductor Surge Device for power carrying conductors shall be EDCO SHA-1210 or approved equal. This surge protector shall meet or exceed the following specifications:

- Nominal Line Voltage 120 V
- Peak Current 20,000 Amps
- Clamp Voltage 280 volt typical @ 20kA
- Response time <5ns
- Continuous Service Current 10 Amps max. 120 VAC, 60 Hz

RF ANTENNA COAX CONDUCTOR SURGE DEVICE

RF Antenna Coax Conductor Surge Devices shall meet all manufacturer recommendations for the particular use of the radio antenna coax conductors.

INSTALLATION

The Contractor shall supply surge devices in model 334/336 enclosures, VMS signs, on poles, and on sign trusses as specified on layout sheets. Surge devices shall be located in said equipment such that they are easily accessible for maintenance activities.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Surge Device will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

TRENCHING AND BACKFILLING

DESCRIPTION

Trenching and Backfilling shall be performed in accordance with the plans, specifications and Standard Drawings.

MATERIALS

All trenches shall be marked with underground utility warning tape.

INSTALLATION

The Contractor shall be responsible for locating all underground utilities prior to excavation. The Contractor shall excavate the trench, place warning tape above the conduit, backfill the trench and restore all disturbed areas to the satisfaction of the Engineer. Backfill material shall be placed and compacted in lifts of 9 inches or less.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Trenching and Backfilling will be measured for payment per unit linear foot. The Department will make payment for complete, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

WIRE, CABLE, DUCTED CABLE

DESCRIPTION

Furnish and install Wire and Cable in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Unless otherwise specified, wire shall be stranded copper type USE and conform to section 834.06. This item shall include all connectors, splicing and insulating hardware, ties, tape, labels and incidentals required for electrical connections. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION

The Contractor shall install all cable or wire runs splice-free from the controller/service location to each cabinet, VMS sign, or CCTV camera the cable or wire is feeding. All wire shall be labeled inside cabinets and junction boxes. The contractor shall not use excessive force when pulling wire through duct. The contractor shall replace all wire damaged during installation. The Engineer may require testing of wiring for damaged insulation. Wire that does not pass an insulation resistance test of a minimum of 100 hundred megohms to ground shall be replaced by the Contractor at his cost.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Wire and cable will be measured for payment per unit linear foot. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

Vented Rodent Barrier Detail

Vented rodent barrier – Prior to erecting tubular structures and poles on concrete foundations formed with conduit sweeps, a double lapped ring barrier of standard commercial grade 27 gauge hot dipped galvanized 1/8 inch woven wire mesh shall be placed inside the foundations bolt circle. The height of the wire mesh ring barrier shall be from the concrete foundation to the top of the leveling nuts and washers plus 1/4 inch. The Contractor shall take all necessary steps to assure the wire mesh ring will remain in place to eliminate any access through the base plate opening of the tubular structure or pole when erected and plumbed. The Contractor shall not weld or drill to the base plate of the pole. Optional vented rodent barrier designs and materials may be used when approved by the Engineer and at no additional cost to the Department.

Vented Rodent Barrier

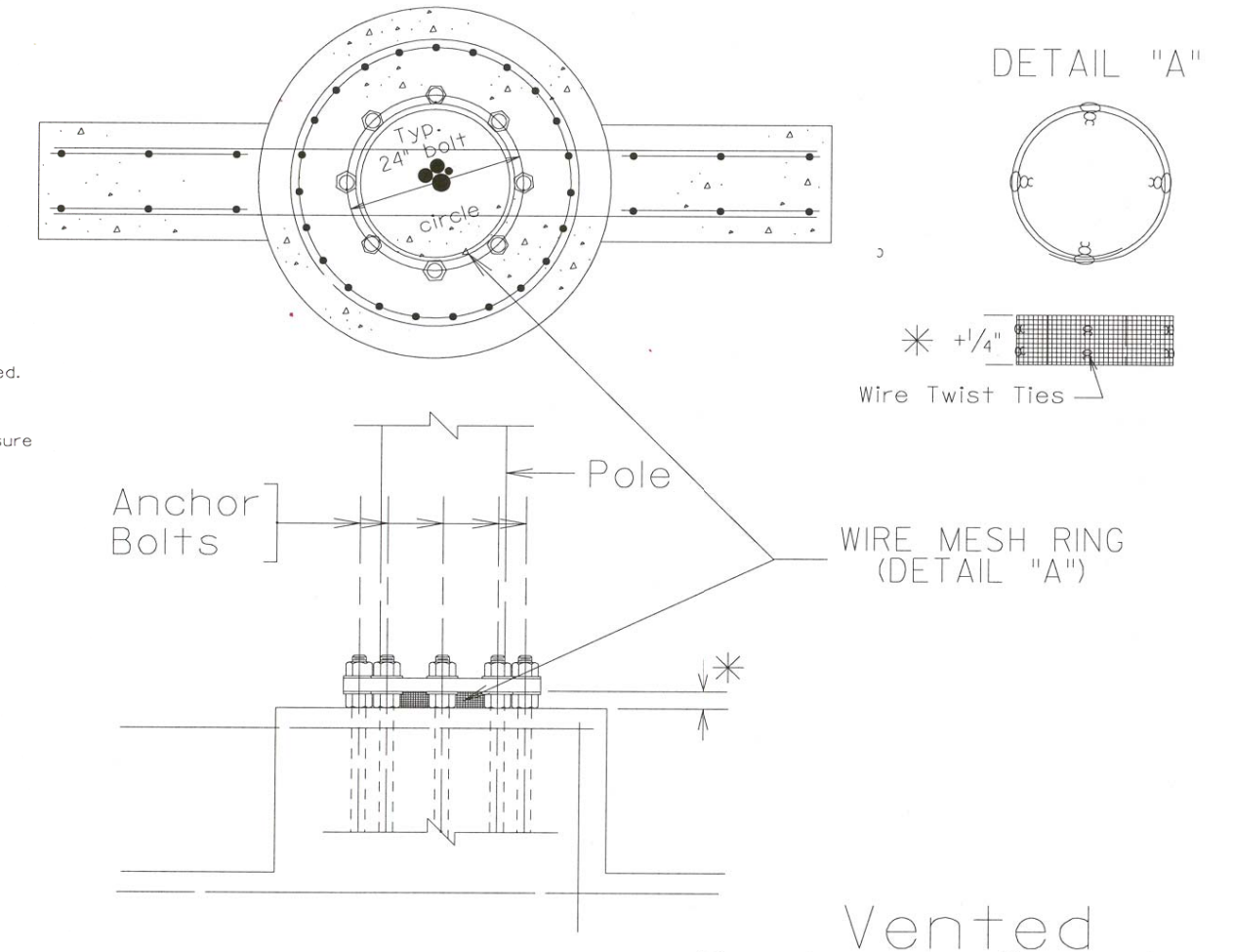
Notes:

1) Wire Mesh Ring
   - 1/8" Woven Hardware Cloth
   - 27 Gauge (Commerical Grade)
   - Hot dipped galvanized
   - Doubled Lapped
   - Length & Height determined by field measurements
   - Secured with Wire Twist Ties

2) Wire mesh ring shall be placed inside the bolt circle before pole is erected and plumbed.

3) Wire mesh ring shall be compressed between pole base plate, concrete foundation and bolt circle. Take all necessary steps to assure the wire mesh ring will remain in place and any access through the pole base plate opening is eliminated.

4) Welding or drilling is not permitted on base plate of pole.



SCALE: NONE

Vented Rodent Barrier

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GLOSSARY

The following acronyms, abbreviations, and definitions shall govern this specification:

- AASHTO – American Association of State Highway and Transportation Officials
- ABS - Acrylonitrile Butadiene Styrene
- AC – Alternating Current
- AlInGaP – Aluminum Indium Gallium Phosphide (refers to the chemical composition of an LED).
- ANSI – American National Standards Institute
- ASCII – American Standard Code for Information Interchange
- ASN.1 – Abstract Syntax Notation 1
- ASTM – American Society for Testing and Materials
- AWG - American Wire Gauge
- AWS – American Welding Society
- BCD – Binary Coded Decimal
- B frames – Bi-directional Predicted Frames
- BGP – Border Gateway Protocol
- Bin – Group of LEDs categorized and sorted by intensity or color. Each bin has upper and lower intensity or color specifications and contains only LEDs that are measured to be within that range. LED manufacturers sort LEDs into bins to ensure consistent intensity and color properties.
- BOOTP – Bootstrap Protocol
- CALTRANS – California Department of Transportation
- CAN – Control Area Network
- CCTV – Closed Circuit Television
- CDPD – Cellular Digital Packet Data
- CLI – Command Line Interface
- CNC – Computer Network Control
- Control Computer – A desktop or laptop computer used in conjunction with VMS control software to communicate with VMS sign controllers. The control computer can instruct a VMS sign controller to program and control the VMS, monitor VMS status, and run VMS diagnostic tests. A control computer can be used for remote control of one of more VMS, as well as for local control of a single VMS
- DC – Direct Current
- DHCP – Dynamic Host Configuration Protocol
- DMS – Dynamic Message Sign. An industry term that applies to various types of changeable sign technology
- DVI-D – Digital Visual Interface - Digital
- EIA – Electronic Industries Association
- ELFEXT – Equal Level Far End Crosstalk
- EPA – Effective Projected Area
- FCC – Federal Communications Commission
- FDA – Food and Drug Administration

- Font – The style and shape of alphanumeric characters that are displayed on the VMS matrix to create messages viewed by motorists and travelers
- Frame – see *Page*
- FSORS – Full, Standardized Object Range Support – an NTCIP term. See the NTCIP standards for additional information.
- GUI – Graphical User Interface
- HDPE – High Density Polyethylene
- HHR – Half Horizontal Resolution
- HTTP – Hypertext Transfer Protocol
- IEEE – Institute of Electrical and Electronic Engineers
- I frames – Intra-frames
- IC – Integrated Circuit
- IGMP
- InGaAlP – Indium Gallium Aluminum Phosphide
- I/O – Input/Output
- IP – Internet Protocol – in transceivers
- IRE – Institute of Radio Engineers
- ISO – International Organization for Standardization
- ITE – Institute of Transportation Engineers
- ITS – Intelligent Transportation System
- Kbps – Kilobits per second
- KYTC – Kentucky Transportation Cabinet
- LAN – Local Area Network
- LCD – Liquid Crystal Display
- LED – Light Emitting Diode
- MDPE – Medium Density Polyethylene
- Message – Information displayed on the VMS for the purpose of visually communicating with motorists. A VMS message can consist of one or more pages of data that are displayed consecutively
- MIB – Management Information Base
- Module – Assembly consisting of a two-dimensional LED pixel array, pixel drive circuitry, and mounting hardware. Modules are installed in the display adjacent to each other to form the display matrix.
- MTBF – Mean Time Between Failures
- MPEG – Moving Picture Experts Group
- NEC – National Electrical Code
- NEMA – National Electrical Manufacturers Association
- NESC – National Electrical Safety Code
- NEXT – Near End Crosstalk
- NCHRP – National Cooperative Highway Research Program
- NRZ – Non Return to Zero
- NRZI – Non Return to Zero Inverted
- NTCIP – National Transportation Communications for ITS Protocol

- NTSC - National Transmission Standards Committee
- Object – An NTCIP term referring to an element of data in an NTCIP-compatible device that can be manipulated to control or monitor the device.
- OER – Octet Encoding Rules
- OSHA – Occupational Safety and Health Administration
- OTDR – Optical Time Domain Reflectometer
- Page – An NTCIP term referring to the data that is displayed on the VMS display matrix at a given moment in time. Also referred to as a frame.
- P frames – Forward Predicted Frames
- PCB – Printed Circuit Board
- Pixel – Picture element. The smallest changeable (programmable) portion of a VMS display matrix
- PMPP – Point to Multi-Point Protocol
- PPP – Point to Point Protocol
- PSELFEXT – Power Sum Equal Level Far End Cross Talk
- PSNEXT – Power Sum Near End Crosstalk
- PTZ – Pan/Tilt/Zoom
- PVC – Polyvinyl Chloride
- PWM – Pulse Width Modulation
- QSIF – Quarter Source Input Format
- RAM – Random Access Memory
- RARP – Reverse Address Resolution Protocol
- RGB – Red-Green-Blue
- Schedule – A set of data that determines the time and date when a VMS sign controller will cause a stored message to be displayed on the VMS
- SDRAM – Synchronous Dynamic Random Access Memory
- SIF – Source Input Format
- SNMP – Simple Network Management Protocol
- STMP – Simple Transportation Management Framework
- Stroke – Refers to the vertical and horizontal width of the lines and curves of a display font. Single stroke denotes character segments that are one pixel wide. Double stroke denotes character segments that are two pixels wide.
- TFTP – Trivial File Transfer Protocol
- TIA - Telecommunications Industry Association
- TMA – Truck Mounted Attenuator
- TOC – Traffic Operations Center
- UL – Underwriters Laboratories
- UPS – Uninterruptible Power Supply
- USB – Universal Serial Bus
- VLAN – Virtual Local Area Network
- VMS – Variable Message Sign. A type of VMS that is fully programmable such that the content of its messages are fully changeable remotely and electronically.
- VMS Controller – A stand-alone computer that is located at a VMS site, which

controls a single VMS. A sign controller receives commands from and sends information to a control computer

- WAN – Wide Area Network
- WYSIWYG – What You See Is What You Get. More specifically, what you see on the VMS control computer monitor is a scaled representation of how a message will appear when it is being displayed on the VMS. Similarly, after a pixel diagnostic test routine has been run, what you see on the control computer monitor is a scaled representation of the functional status of each pixel in the VMS display matrix.

Route	I-75 MP 56 NB, Left Lane
AC Depth	16.75”
DGA Layer	11.75”
Rock/ Soil Mix	
Compacted Shale	8.5”
Depth of Investigation	37”

Notes:

Located adjacent to shale cut.
Approx. 30’ north of location, observed CL stripe with rust colored cracking.
Core broke in 2 pieces at 8.25” from the surface.
5.25” to 8.25” from surface, observed large number of voids, bitumen oxidizing and flaky.

Route	I-75 MP 58 NB, Left Lane
AC Depth	14.875”
DGA Layer	8.875”
Rock/ Soil Mix	
Compacted Shale	14”
Depth of Investigation	37.75”

Notes:

Located adjacent to shallow shale cut.
Core broke in 2 pieces at 5’ from surface.
Moderate amount of stripping observed 1” to 8” from surface, with some stripping noted in 1” surface layer.

Route	I-75 MP 60 NB, Left Lane
AC Depth	14.75”
DGA Layer	10.75”
Rock/ Soil Mix	2”
Compacted Shale	
Depth of Investigation	27.5”

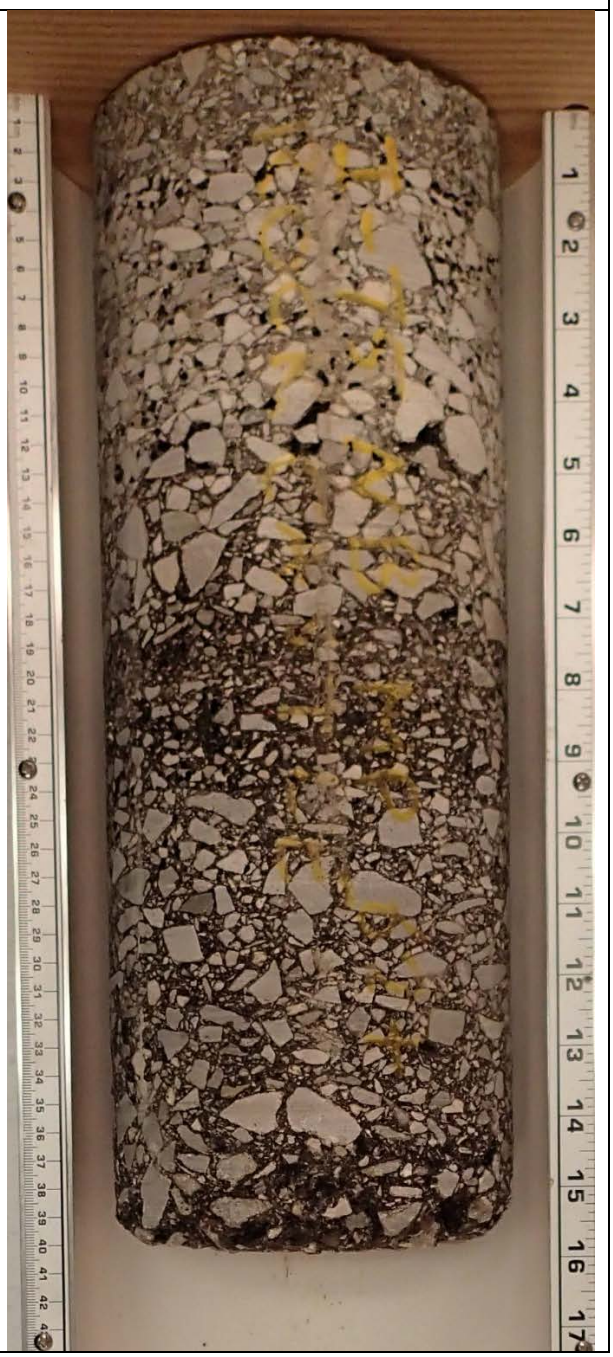
Notes:

Located at grade.
Moderate amount stripping noted below surface layer, 1.25” to 8.125”. Minor air voids noted in surface layer.

Route	I-75 MP 62.11 NB, Left Lane
AC Depth	15.75”
DGA Layer	9.5”
Rock/ Soil Mix	
Compacted Shale	8.75”
Depth of Investigation	34”

Notes:

Located at grade.
Large amount of air voids/stripping noted 1.375” to 7.5” from surface.



Route	I-75 MP 64 NB, Left Lane
AC Depth	15.875”
DGA Layer	10.875”
Rock/ Soil Mix	
Compacted Shale	5”
Depth of Investigation	31.75”

Notes:

Located adjacent to cut.
Core broke in 2 pieces, 7.875” from surface.
1.125” to 7.875” from surface, observed many air voids, moderate stripping, and oxidized binder.

Route	I-75 MP 56 SB, Left Lane
AC Depth	16.5”
DGA Layer	13”
Rock/ Soil Mix	
Compacted Shale	
Depth of Investigation	29.5”

Notes:

Located adjacent to shale cut.
Core broke in 2 pieces, 9.875” from surface.
Moderate amount of stripping from 1.125” to 9.875”. Material from 9.875” to approx. 11” appears rotten.

Route	I-75 MP 58 SB, Left Lane
AC Depth	15.5”
DGA Layer	16”
Rock/ Soil Mix	
Compacted Shale	
Depth of Investigation	31.5”

Notes:

Located adjacent to shale cut.
Core broke in 2 pieces, 5” from surface. From 1.125” to 5”, voids observed.
DGA observed with clay fines mixed in.

Route	I-75 MP 60 SB, Left Lane
AC Depth	15”
DGA Layer	17”
Rock/ Soil Mix	
Compacted Shale	
Depth of Investigation	32”

Notes:

Located at grade.
5.25” to 8.25” from surface, moderate stripping observed.

Route	I-75 MP 62.11 SB, Left Lane
AC Depth	14.75”
DGA Layer	10.75”
Rock/ Soil Mix	2.5”
Compacted Shale	
Depth of Investigation	28”

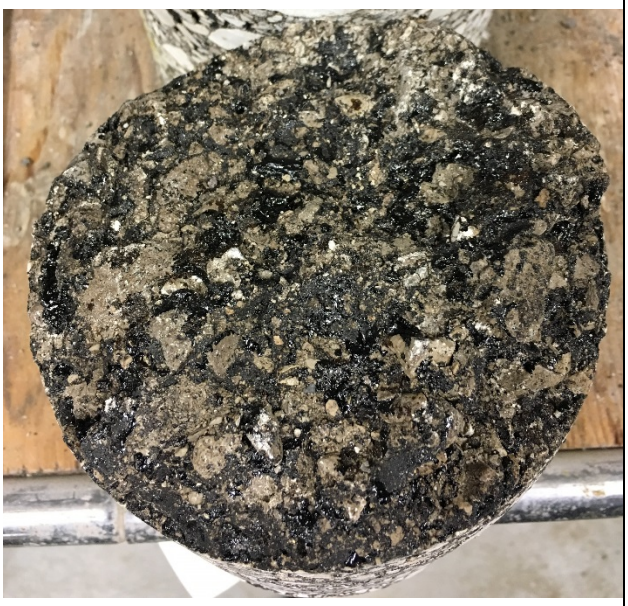
Notes:

Located adjacent to rock cut.
Core broke in 2 pieces, 7.5” from surface.
Moderate stripping 4.5” to 7.5” from surface.

Route	I-75 MP 64 SB, Left Lane
AC Depth	15.75”
DGA Layer	12”
Rock/ Soil Mix	1.25”
Compacted Shale	
Depth of Investigation	29”

Notes:

Located at grade.
Core broke in 2 pieces, at 10.5” to 11” from surface. Surface layer (1”), observed air voids. From 1” to 7.25”, observed moderate stripping in all layers. At 10.5” to 11”, observed aggregate not well-coated with binder (see photo below).

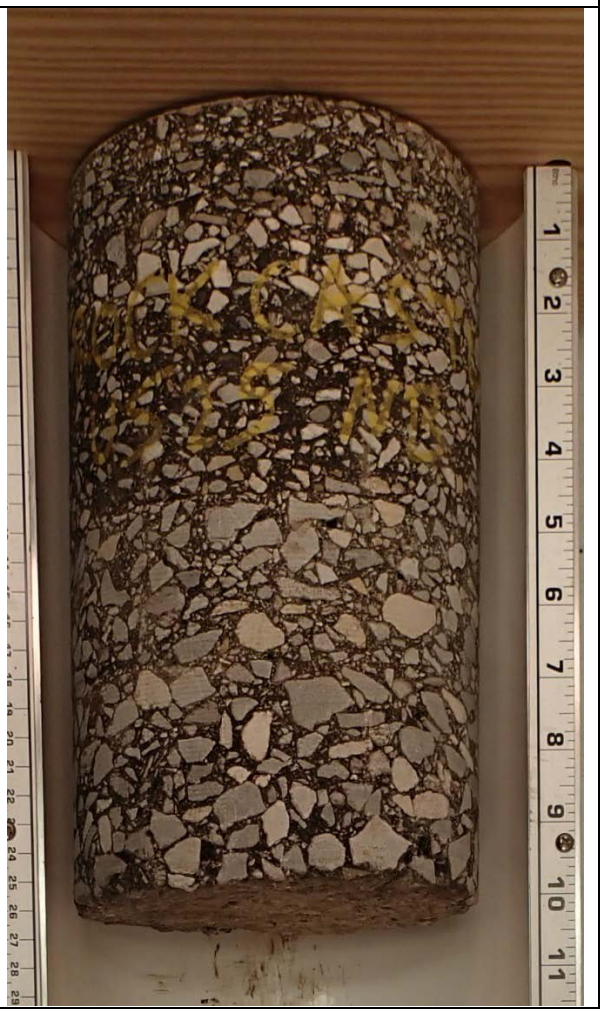


Route	US 25 SB MP 11.86, Right Lane
AC Depth	10.125”
DGA Layer	15.125”
Rock/ Soil Mix	1.5”
Compacted Shale	
Depth of Investigation	26.75”

Notes:

Located adjacent to fill.
From 1.375” to 3.25” from surface, observed major stripping and air voids. From approx. 6” to bottom of core, observed minor stripping.

Route	US 25 NB MP 11.92, Right Lane
AC Depth	10”
DGA Layer	14.25”
Rock/ Soil Mix	3.25”
Compacted Shale	
Depth of Investigation	27.5”
Notes:	
Located at grade. 1.25” to 2.75” from surface, observed minor stripping. From approx. 5” to bottom of core, observed minor stripping.	



ROCKCASTLE CO. I-75 ~m.p. 59.65
~LAT/LONG N 37.351527, W 84.307813
STATION 068

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 TWO (2) TYPE A JUNCTION BOXES (JB A1 AND A2).

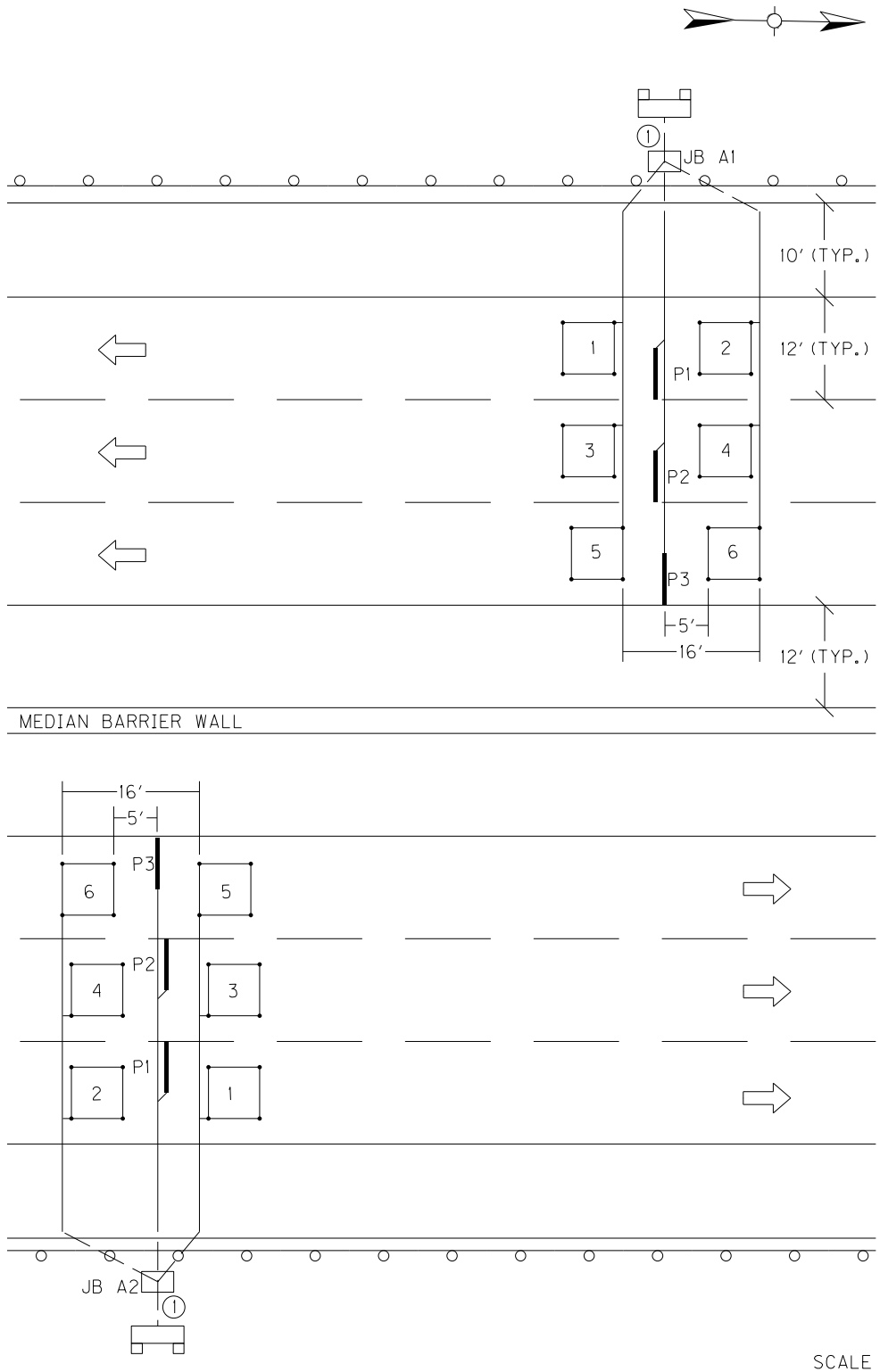
INSTALL ONE (1) 1¼" CONDUIT FROM EACH SAW SLOT TO NEAREST JUNCTION BOX.

INSTALL TWO (2) 20"x20"x8" CABINETS MOUNTED TO TWO (2) WOOD POSTS (EACH).

REMOVE EXISTING 20"X20"X8" CABINETS, JUNCTION BOXES, CONDUITS, AND POSTS, AND DISPOSE OF OFF THE PROJECT.

CODED NOTE:

① INSTALL ONE (1) 2" CONDUIT.



SCALE 1"=20'

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	20
4811	ELECTRICAL JUNCTION BOX TYPE B	EACH	
4820	TRENCHING AND BACKFILLING	LIN FT	70
4821	OPEN CUT ROADWAY	LIN FT	
4829	PIEZOELECTRIC SENSOR	EACH	6
4830	LOOP WIRE	LIN FT	2900
4850	CABLE NO. 14/1 PAIR	LIN FT	
4871	POLE – 35’ WOODEN	EACH	
4895	LOOP SAW SLOT AND FILL	LIN FT	560
4899	ELECTRICAL SERVICE	EACH	
20213EC	INSTALL PAD MOUNT ENCLOSURE	EACH	
20359NN	GALVANIZED STEEL CABINET	EACH	2
20360ES818	WOOD POST	EACH	4
20391NS835	ELECTRICAL JUNCTION BOX TYPE A	EACH	2
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.

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 ¾ 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. Strandvise for Guy Wire

Strandvise 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 ½ 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 $2^1/_8$ 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 ¼ inch wood screws.

2.14.2. Mounting Strap for Pole Mount Cabinet

Mounting strap for pole mount cabinet shall be ¾ 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 38ºF.

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 ¾ inch conduit with three 8 AWG service conductors from the cabinet, through the service disconnect to the meter base and a 1¼" 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 1-¾" 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 "3/4 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 form 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 "3/4 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 45º 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 ½ 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 (±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 45º 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 ±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 ±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 **s**igns 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:

Enclosure Type	Additional length of each wire
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.

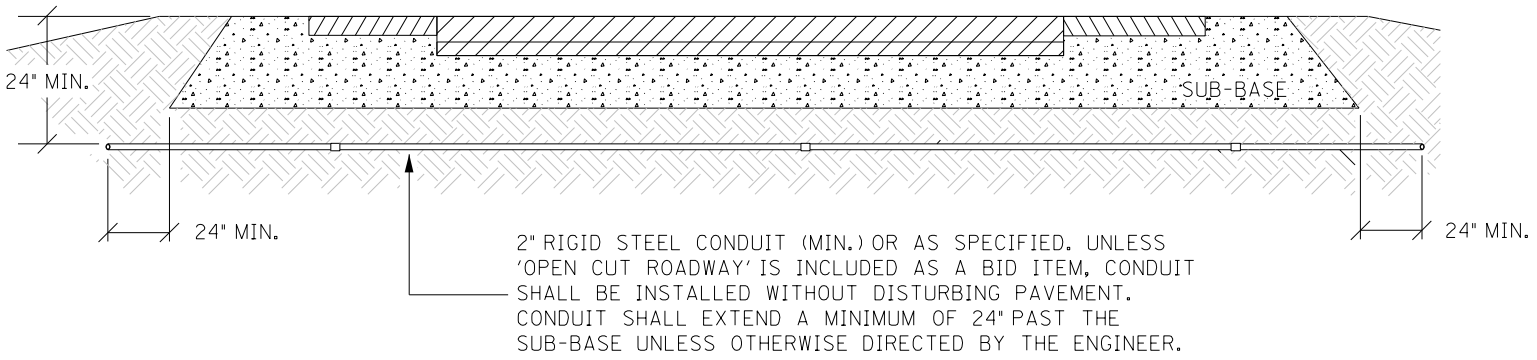
4.17. Wire or Cable

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.

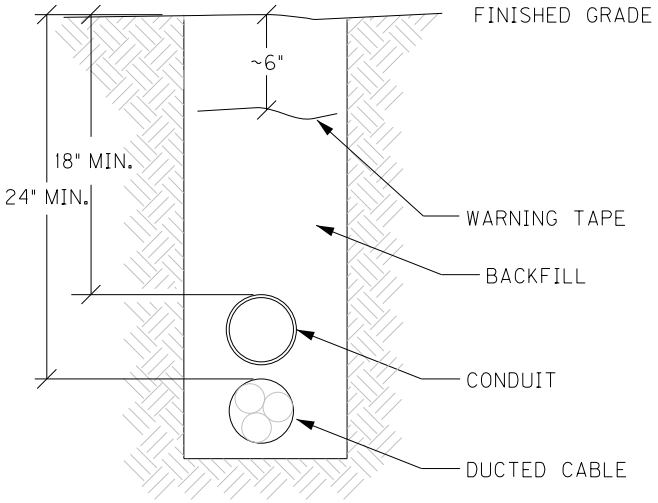


CONDUIT UNDER PAVEMENT

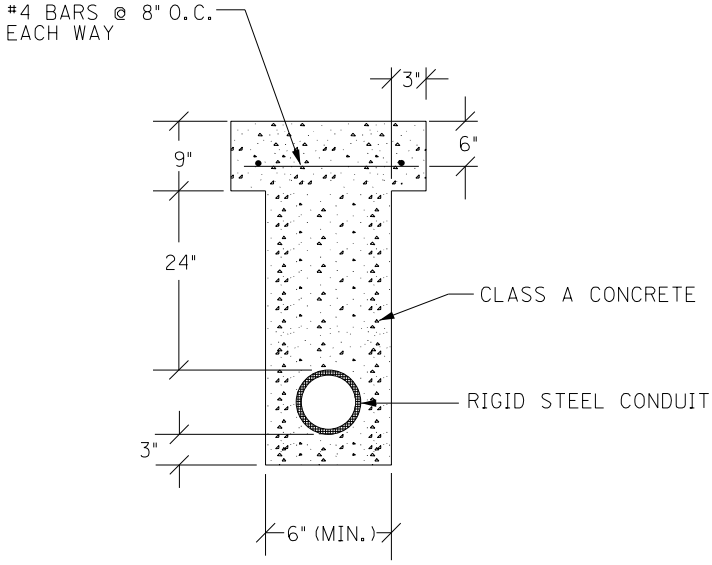
TOTAL TRENCH WIDTH SHALL BE 3" (NOM.) WIDER THAN THE SUM OF THE OUTSIDE DIAMETER(S) OF THE CONDUIT(S) INSTALLED. CONDUIT(S) SHALL BE CENTERED IN TRENCH.

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.



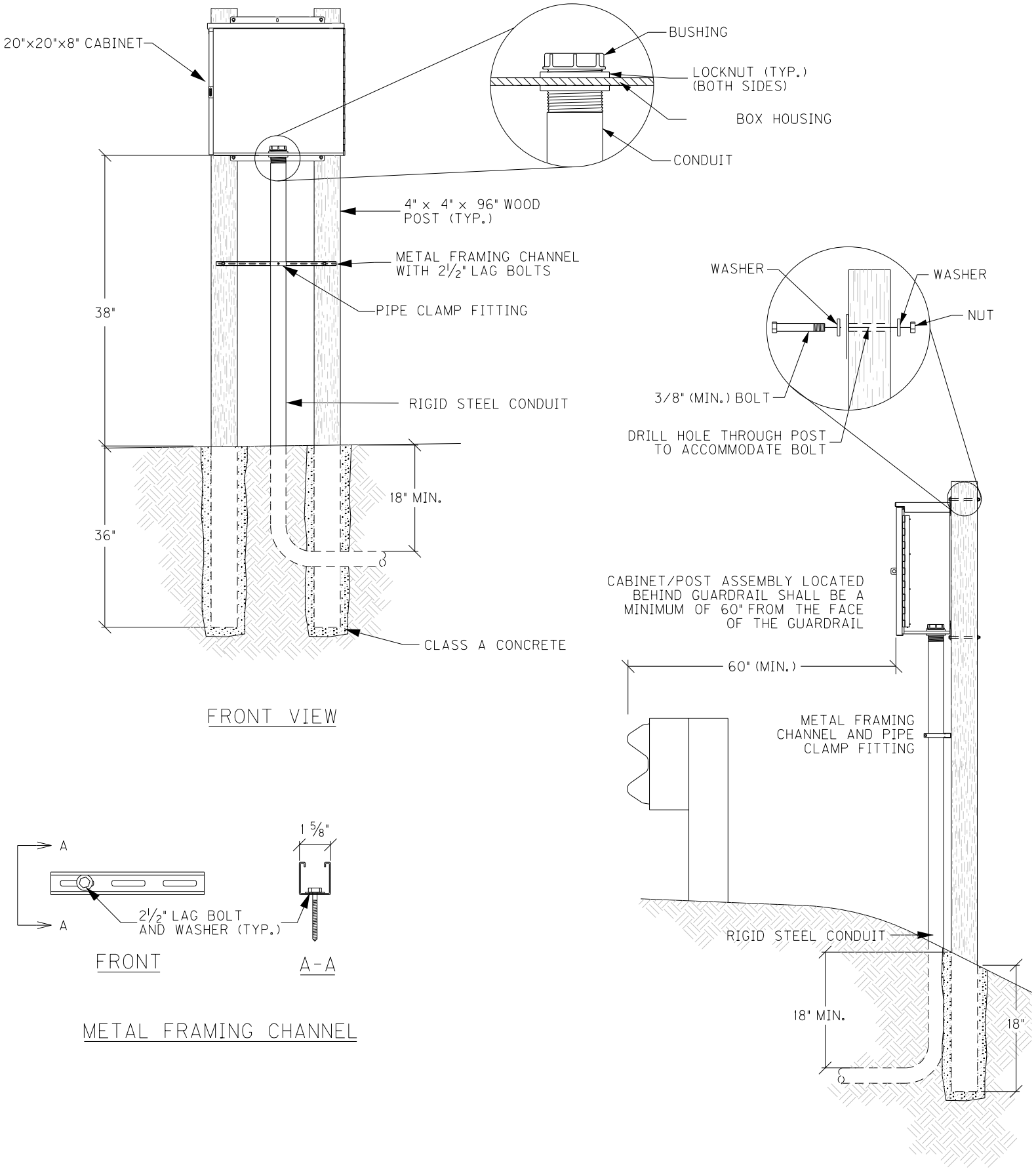
CONDUIT TRENCH



OPEN CUT PAVEMENT DETAIL

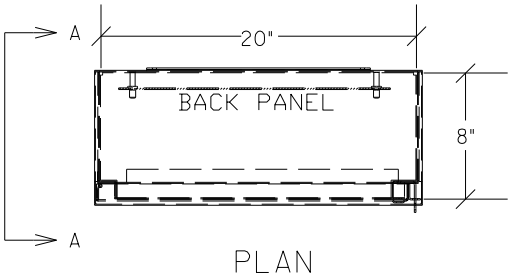
CONDUIT INSTALLATION

NOT TO SCALE

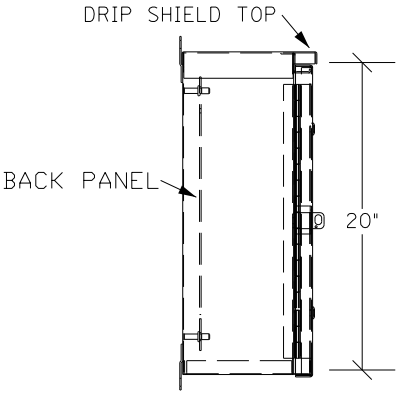


GALVANIZED STEEL CABINET
DOUBLE POST ASSEMBLY

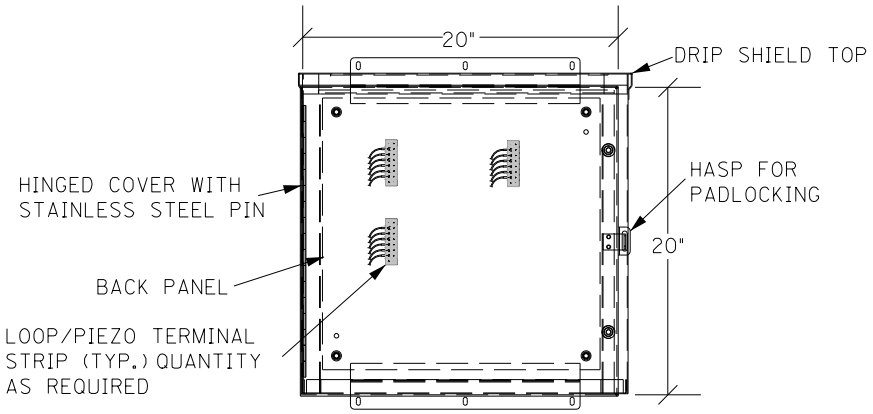
NOT TO SCALE



PLAN

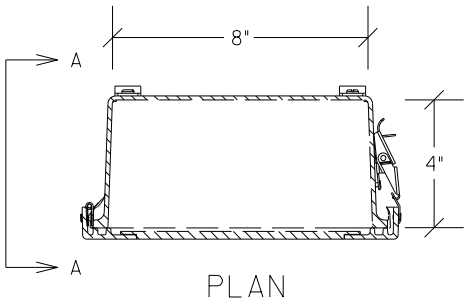


SECTION A-A

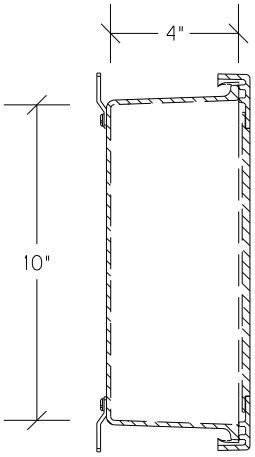


ELEVATION

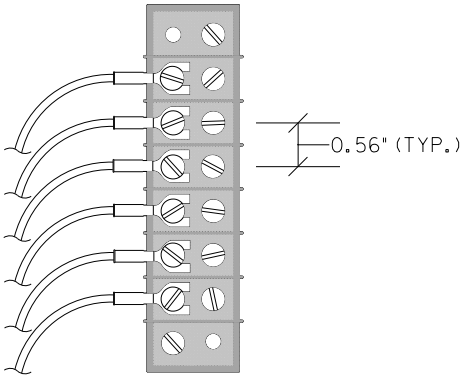
GALVANIZED STEEL CABINET



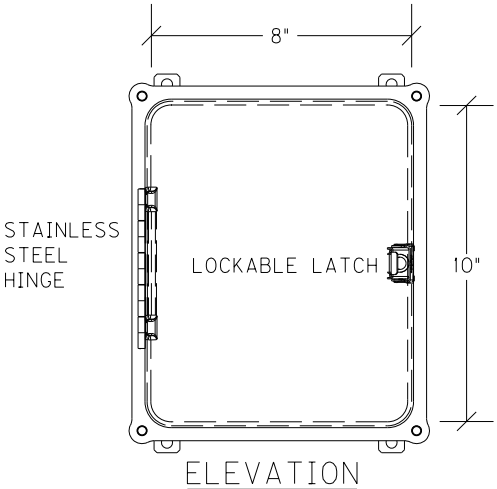
PLAN



SECTION A-A



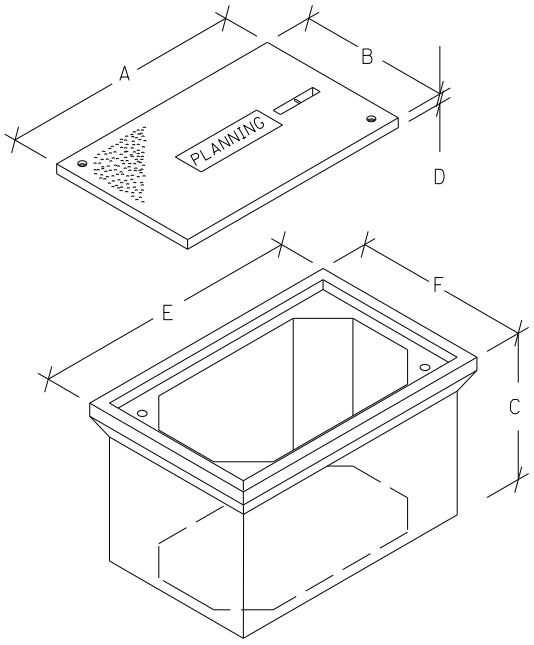
TERMINAL STRIP (TYP.)



ELEVATION

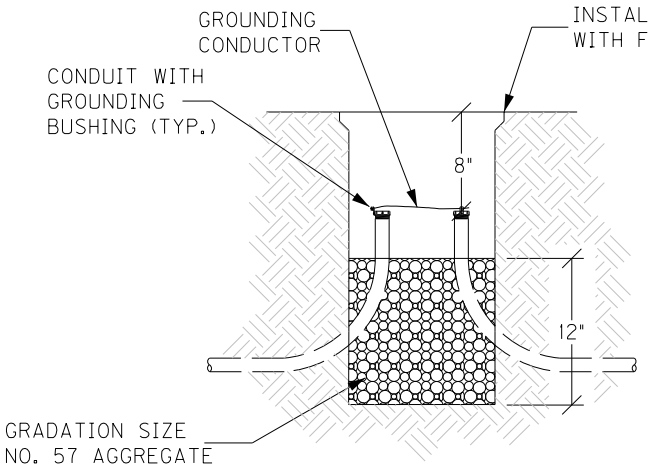
JUNCTION BOX 10"x8"X4"

NOT TO SCALE



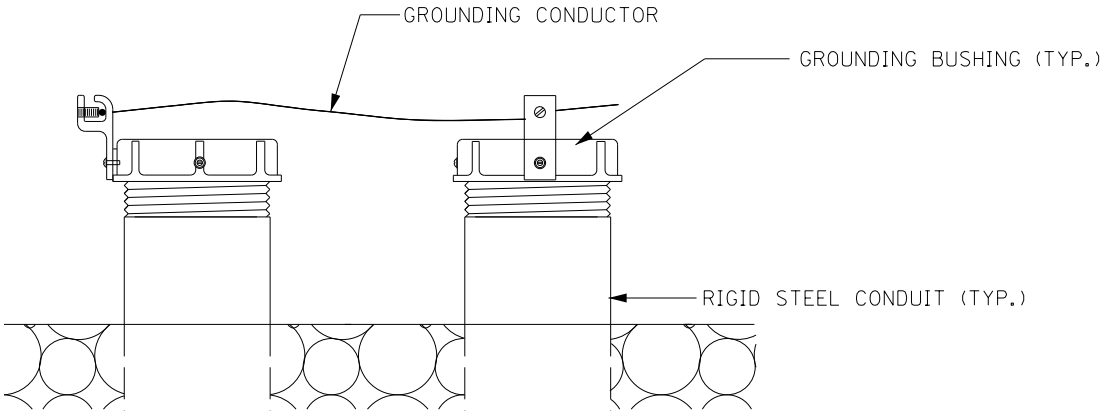
JUNCTION BOX DIMENSIONS (NOMINAL)						
	A	B	C	D*	E	F
TYPE A	23"	14"	18"	2"	25"	16"
TYPE B	18"	11"	12"	1¾"	20"	13"
TYPE C	36"	24"	30"	3"	38"	26"

* MINIMUM
STACKABLE BOXES ARE PERMITTED



WHERE REQUIRED, JUNCTION BOX SHALL BE ORIENTED SUCH THAT THE DIMENSIONS COMPLY WITH THE NATIONAL ELECTRICAL CODE.

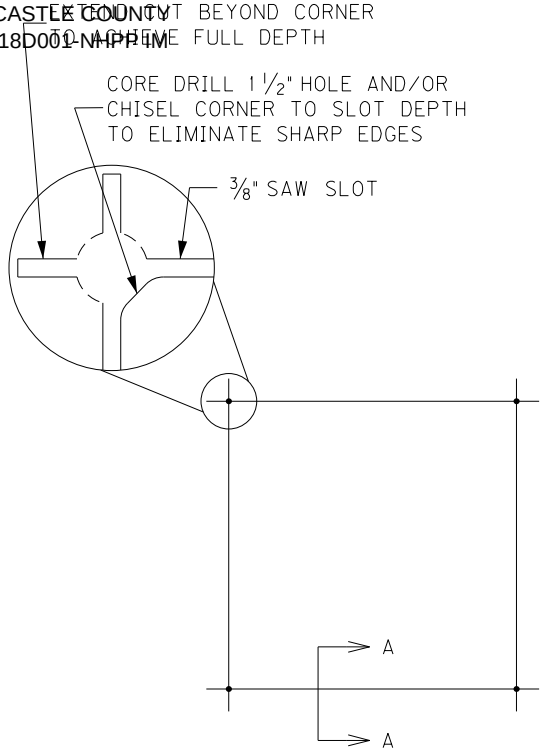
ELEVATION



GROUNDING DETAIL

JUNCTION BOX - TYPE A, TYPE B, TYPE C

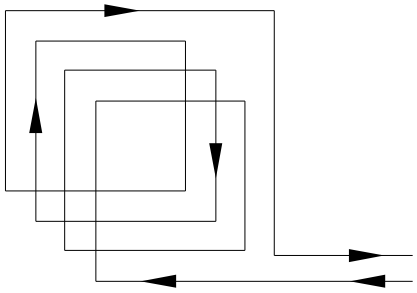
NOT TO SCALE



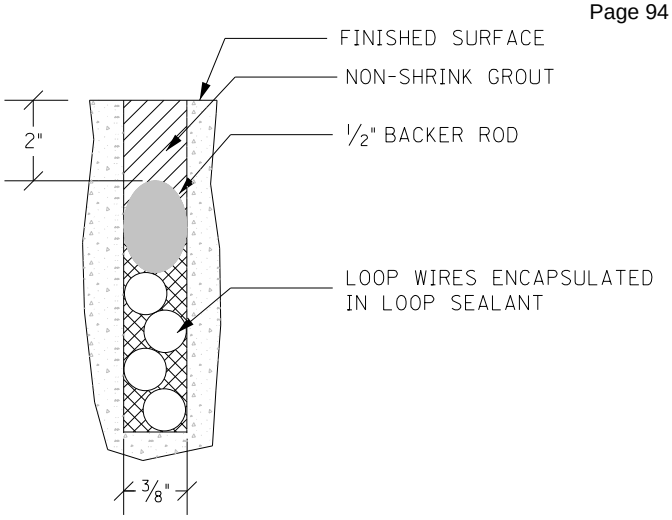
SAW CUT PLAN

UNLESS SPECIFIED OTHERWISE, ALL LOOPS SHALL BE 6' x 6' SQUARE, CENTERED IN EACH LANE, WITH FOUR TURNS OF 14 AWG LOOP WIRE.

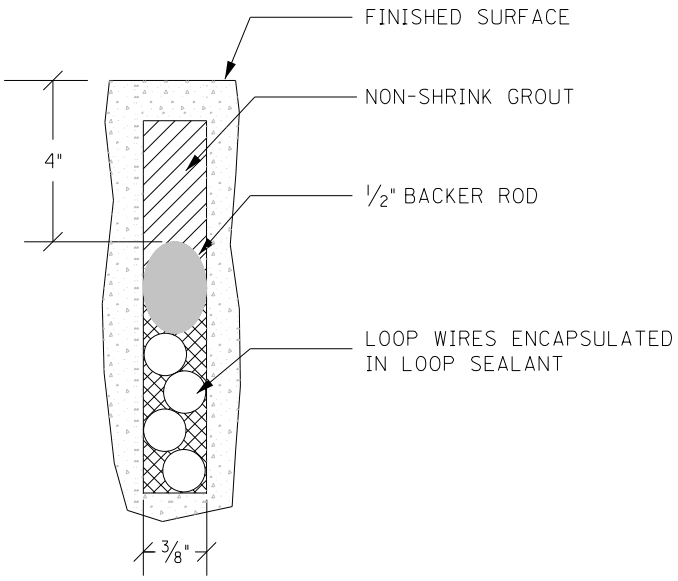
ADJACENT SAW SLOTS SHALL BE A MINIMUM OF 12" APART.



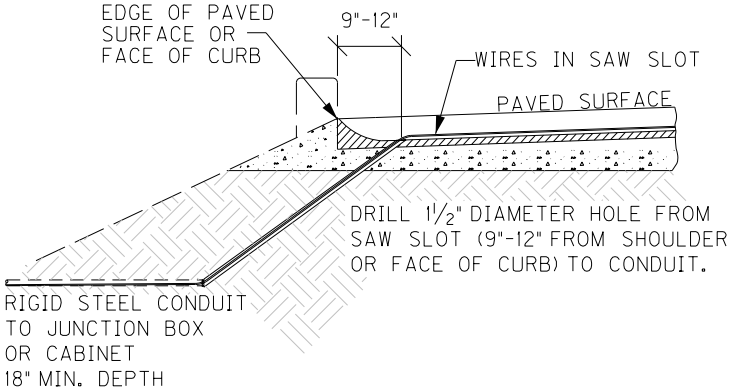
WIRING PLAN



SECTION A-A (CONCRETE)



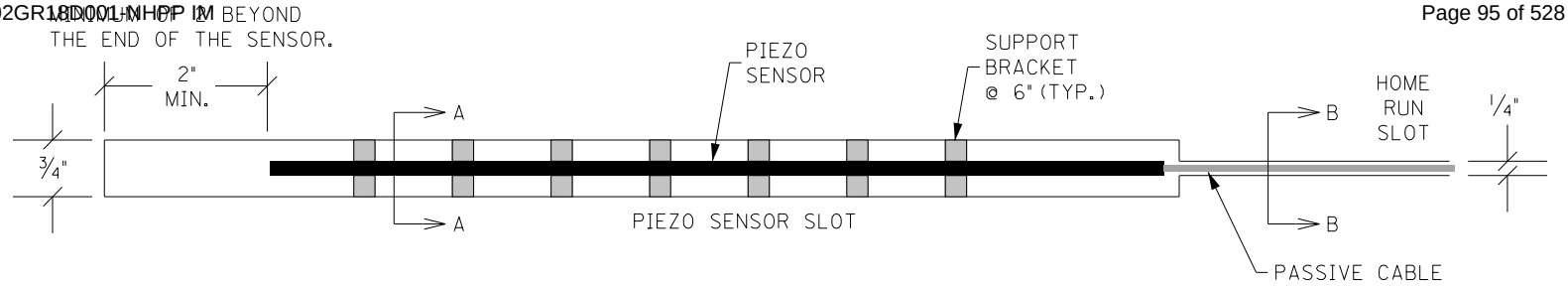
SECTION A-A (ASPHALT)



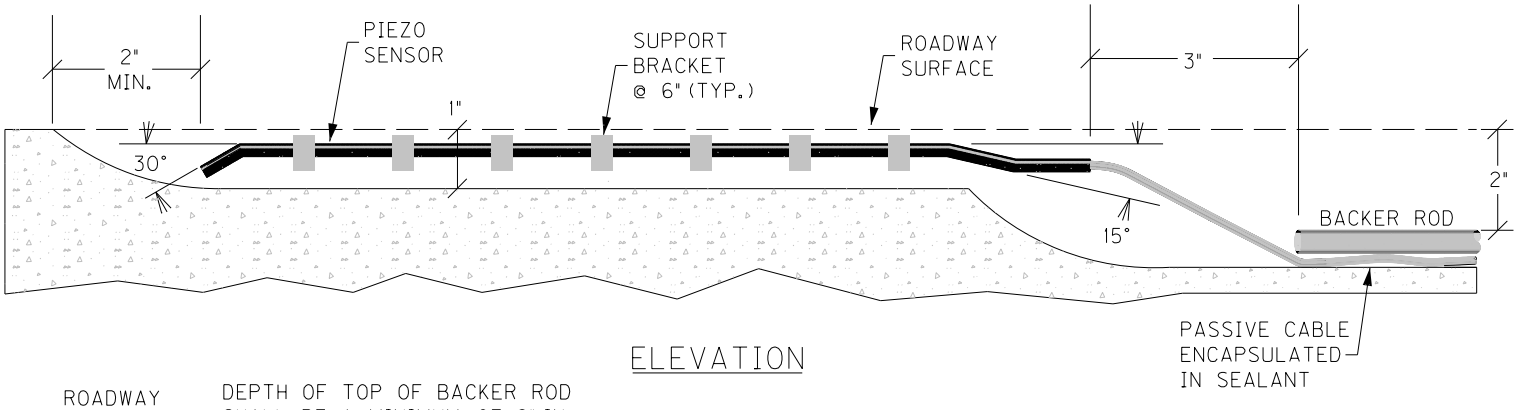
SAW SLOT EDGE OF PAVEMENT TRANSITION

INDUCTIVE LOOP DETECTOR

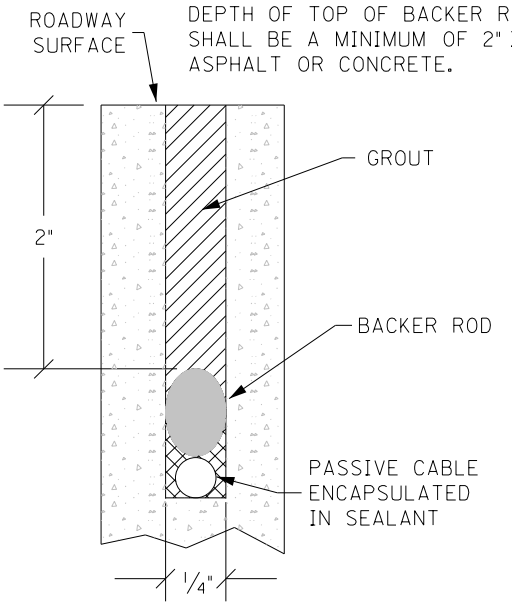
NOT TO SCALE



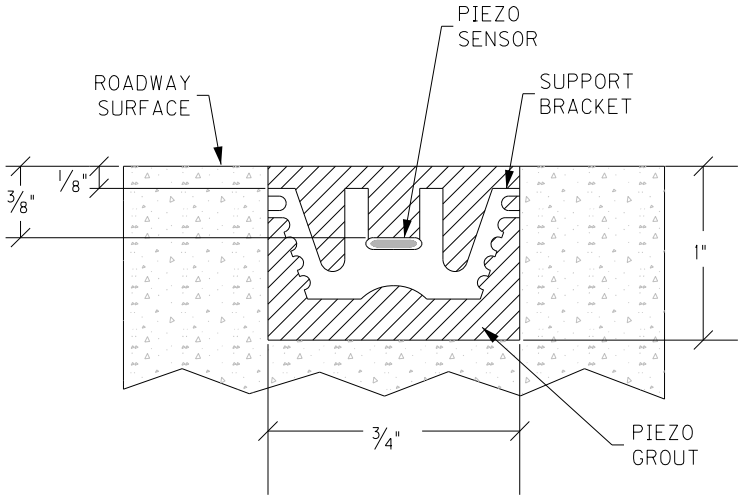
PLAN



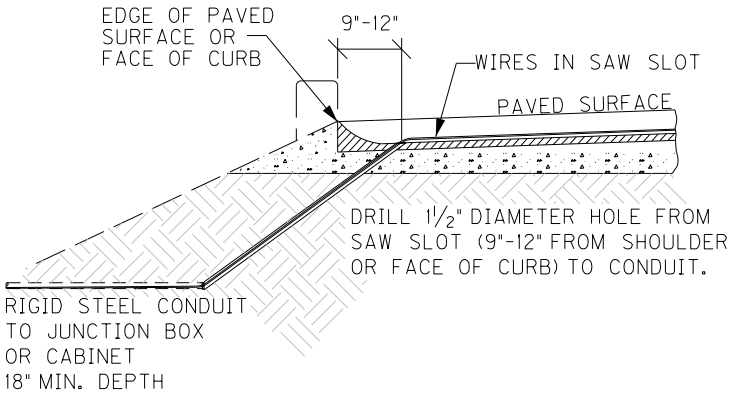
ELEVATION



SECTION B-B



SECTION A-A



SAW SLOT EDGE OF PAVEMENT TRANSITION

PIEZOELECTRIC SENSOR INSTALLATION

NOT TO SCALE

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. 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.

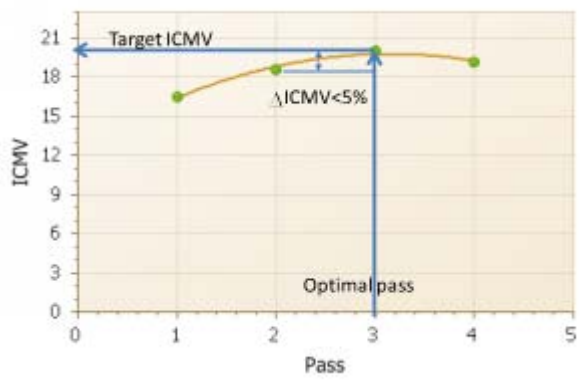
5. All acceptance testing shall be as outlined in Standard Specifications section 400.

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, 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.

Code	Pay Item	Pay Unit
24781EC	Intelligent Compaction for Asphalt	TON

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 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 ± 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.

Code	Pay Item	Pay Unit
24891EC	PAVE MOUNT INFRARED TEMP EQUIPMENT	SQFT

SPECIAL NOTE FOR REINFORCED SOIL SLOPES

1) REFERENCES:

All references to the Standard Specifications are to the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with all Supplemental Specifications.

All references to AASHTO are to the AASHTO LRFD Bridge Design Specifications, Current Edition with applicable Interim Revisions. All references for FHWA GEC No. 11 are to the Federal Highway Administration's Geotechnical Engineering Circular (GEC) No. 11: Design & Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, Volumes I and II.

The requirements in the Standard Specifications or AASHTO shall be used for information not provided. Where there are conflicts between the Standard Specifications and AASHTO, the Standard Specifications shall govern.

The Contractor shall provide the Reinforced Soil Slope (RSS) Designer with a complete set of project plans and specifications and shall ensure that the RSS design is compatible with all other project features that can impact the design and construction of the slope. Various terms of interest for this special note are defined below.

1.1 Definitions:

Structural Geogrid - A structural geogrid is formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth and functions primarily as reinforcement.

Department/Engineer - Refers to the Kentucky Transportation Cabinet representative and/or a designated consultant acting on behalf of KYTC.

Supplier - The entity contractually retained by the Contractor to provide approved Structural Geogrid.

Designer – The entity that provides specific design of an accepted RSS system as described in the special note. The "Supplier" and "Designer" may be the same entity or separate entities retained by the Contractor.

Manufacturer – The entity that oversees and facilitates production of the geogrid from its component materials.

Working Drawings – A detailed plan set for the RSS, providing all information required to complete RSS construction.

2) SCOPE OF WORK:

Furnishing and testing materials, and the design and construction of a Reinforced Soil Slope retention system. Work consists of:

1. Furnishing structural geogrid reinforcement, drainage composite, and erosion control vegetative facing system (or other facing alternate) as shown on the construction drawings.

2. Storing, cutting, and placing structural geogrid reinforcement, drainage composite, and erosion control system as specified herein and as shown on the construction drawings.
3. Furnishing sealed design calculations and construction drawings for the RSS.
4. Providing Supplier and Designer representatives for on-site pre-construction meeting with Contractor and Engineer and as-needed during construction. The Representatives shall be onsite for a minimum of the first five (5) days of RSS construction.
5. Excavation, placement, and compaction of reinforced fill and backfill material as specified herein and as shown on the construction drawings.

Acceptance of the Contractor's design calculations and construction plans does not constitute endorsement or approval of the work submitted. The acceptance is an acknowledgment of the work performed and authorization for the Contractor to proceed with the project.

3) DESIGNER QUALIFICATIONS:

The RSS Designer will need to meet the following minimum qualifications:
1. The selected geogrid reinforcement has been previously reviewed and approved for use by the Department District Materials personnel, Division of Materials, and Division of Structural Design, Geotechnical Branch.
2. The Designer has the operational capacity and necessary experience to provide expert support to the Contractor on a timely basis.
3. At least 3 years of experience in the design of Reinforced Soil Slopes.
4. Past documented experience in the design of at least 3 projects of a similar magnitude to the proposed RSS, that have been constructed successfully.
5. All calculations and RSS construction plans shall be dated, sealed, and signed by a registered professional engineer licensed to practice in Kentucky.

4) CALCULATIONS AND PLANS:

A materials list, draft working drawings, and design calculations clearly showing conformance with the Standard Specifications, AASHTO, and contract plans shall be submitted for review. The format for the construction plans shall be in accordance with the Division of Structural Design's Guidance Manual. The first sheet shall be a title sheet.

All review submittals shall be submitted electronically in .PDF format through the Contractor to the Engineer. Half-sized prints are preferred. The Engineer may request full size (22″ X 36″) PDF sheets if necessary. The Engineer shall forward the submissions to the Geotechnical Branch.

The Contractor shall allow 30 calendar days for the Department to review each submission. While this process does not require submission of paper copies, the Department reserves the right to require such copies on a case-by-case basis. The thirty-day period begins when submissions are received in the Geotechnical Branch. Revisions may be required by the Department. The revised package shall be resubmitted to the Engineer for review. The Engineer shall have 15 calendar days to complete review of the revised package. 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 and with no extension of contract time. The Working Drawings shall include the following items:

A. A plan view showing the RSS disturbed limits
B. Cross-sections showing RSS extents and slope steepness
C. All design parameters and assumptions, including design life
D. Clear and detailed descriptions of selected geosynthetic reduction factors for design, including test results that verify the chosen reduction factors. This also includes backfill properties, where applicable.
E. Accommodations for roadway drainage systems, subgrades, etc.
F. Show utilities impacted by slope
G. Primary and secondary reinforcement lengths and spacing
H. Selected facing system and justification, with specific construction methods
I. Overlap / seam requirements; include detailed overlap requirements for horizontal curves
J. Special design considerations, if applicable
(May include but not limited to guardrail/sign post installation, reinforcement placement around deep foundations or other obstructions, drainage systems, foundation modifications, scour protection, etc.)

Working drawings shall not be produced until after the Department has approved all submittals. Final design calculations and construction plans shall be dated, sealed, and signed by a registered professional engineer licensed to practice in Kentucky. The Designer shall submit reviewed and approved shop drawings. The Designer shall provide the Department with a statement of assurance that the Working Drawings are accurate and satisfy project requirements. Each sheet of the drawings shall be dated, sealed, and signed by the RSS design engineer providing the design.

A Certificate of Analysis for the Internal RSS Fill Material (See Sections 5.02 and 5.3 herein) may be required prior to final acceptance of the RSS design.

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 RSS shall not commence until the Contractor receives a written Notification to Begin RSS Construction from the Engineer, which will be issued once the complete package (drawings, calculations and construction procedures) is accepted. Fabrication of any RSS components before the written Notification to Begin RSS Construction shall be at the sole risk of the Contractor.

5) DESIGN:

The RSS design shall be in general accordance FHWA GEC No. 11 and AASHTO. Exceptions to these requirements are listed in this note or shown elsewhere in the contract documents.

- Earth reinforcement elements in Reinforced Slope Systems shall be designed to have a corrosion resistance/durability to ensure a minimum design life of 75 years, or 100 years for bridge abutments or when supporting utilities. Requirements may vary on a project-specific basis, and if so will be provided in the geotechnical notes.
- The length of primary reinforcement shall be the same throughout the RSS Structure.

- Construction and Traffic loading shall be considered equivalent to an additional two feet of earth surcharge. The internal RSS fill material shall extend 1 foot, minimum, beyond the ends of the reinforcement. The internal RSS fill should be separated from the non-reinforced embankment (where present) with Geotextile Fabric meeting survivability requirements for a Type I Geotextile, in accordance with AASTHO M 288 (2015).
- The following minimum factors of safety will be used for slope design.
    - Grid Pullout 2.0
    - Internal Stability 1.3
    - Global Stability 1.4
    - Sliding 1.4
- Minimum geogrid anchorage length = 3 ft.

6) MATERIALS:

6.1 Internal RSS Volume:

Provide internally reinforced fill material consisting of either A) Quarry-processed limestone or sandstone from a Department-approved quarry or B) Durable Limestone/Sandstone from Roadway Excavation meeting all applicable general requirements of Section 805 of the Standard Specifications, current edition, and requirements herein. Approval of the material source by the Department is required prior to beginning RSS construction. The required gradation of internal RSS fill is below. (If optional product-specific construction damage testing is successfully performed, the gradation may be adjusted to that used for the testing. See Section 6.2.2.)

Table 1: Gradation of Internal RSS Fill	
Sieve Size	**Percent Passing**
1"	100
3/4 "	80-100
3/8 "	20-80
No. 4	0-30
No. 8	0-10
Sizes No. 67, 68, 710, and 78 in the Department's Standard Specifications fall within these gradation limits. Sizes No. 57 and 610 may fall with these limits, depending on the specific gradation used.	

Gradations for the RSS volume should be attained and verified twice per week in order to meet the above requirements. Material having an internal friction angle greater than or equal to 34 degrees shall be used. Project-specific shear strength testing is not required if a design value of 34 degrees is used. (See Section 6.0). Uniform fine sands are not permitted in the RSS Volume. The Designer is responsible for establishing and maintaining a quality control program to ensure compliance with this section.

6.2 Geogrid:

Use only geogrid products placed on the Department's Kentucky Product Evaluation List (KYPEL) and accepted for use on a project basis. Geogrid Manufacturers are required to participate in the National Transportation Product Evaluation Program (NTPEP) for Geosynthetic Reinforcement Products and the product must have current test data posted in NTPEP DataMine.

Use a polymer geogrid consisting of High Density Polyethylene (HDPE) or high tenacity Polyester (PET) formed into a uniform regular network of integrally connected elements with apertures greater than one-fourth (1/4) inch (6.35 mm) to allow interlocking with surrounding soil, rock, earth, or other specified materials to function primarily as reinforcement. Use a geogrid that is generally inert to biological degradation and commonly encountered chemicals and is free of defects or flaws significantly affecting its physical properties.

Ensure the geogrid has a minimum width of four (4) feet (1.22 meter) and that each roll is labeled with the manufacturers' name, product type, lot number, roll number, manufactured date, and roll dimension.

6.2.1 Packaging:

Protect the reinforcement from direct sunlight, ultraviolet rays, temperatures greater than 48°C, mud, dirt, dust, and debris during all periods of shipment and storage. Keep geogrids dry until installation, and do not store directly on the ground.

6.2.2 Physical Requirements:

Furnish geogrid suitable to the final design. The minimum weight should be 8 oz/yd^2 to minimize construction damage.

Determine Long Term Design Tensile Strength based on the following:

TD = TULT ÷ RF

Where:

TD = Long Term Design Strength

TULT = Ultimate Tensile Strength determined in primary strength direction in accordance with ASTM D 6637 conducted at a strain rate of 10 % per minute. Tensile strength shall be reported without artificially deforming, manipulating, or massaging the test specimen under load before measuring such resistance or employing an artificial secant or offset tangent.

RF = Total Reduction Factor = RFCR x RFCD x RFDU
Minimum RF with product specific testing: 3.15 for HDPE and 2.0 for PET
Minimum RF without test data: 10

RFCR = Reduction Factor for Creep Deformation for 100-year Design Life calculated in accordance with *GRI-GG4 using ASTM D 5262 for Long Term Strength.
Minimum RFCR with product specific testing: 2.60 for HDPE and 1.60 for PET
Minimum RFCR without test data: 5.0 for HDPE and 3.0 for PET
*Either GRI-GG4 (a) or GRI-GG4 (b), depending on Flexural Rigidity value from ASTM D 1388.

RFCD = Reduction Factor for Construction Damage calculated in accordance with ASTM D 5818.

Minimum RFCD with product-specific testing with appropriate backfill:

PET: 1.1
HDPE: 1.2

Minimum RFCD without test data:

PET: 1.7
HDPE: 2.0

Note 1: Product-specific testing may allow adjustment of the gradation in Table 1, to that used in the construction damage testing, provided all other internal fill requirements are met.
Note 2: When product-specific testing is conducted, if RFCD > 1.7, the particular combination of geogrid, internal RSS fill, gradation, and placement method shall not be used.

RFDU = Reduction Factor for Durability based on index properties in Table 2.

If index properties satisfied and RFCD ≤ 1.7, RFDU = 1.3 (Default)
Minimum RFDU with product specific durability testing: 1.10
Minimum RFDU without durability or index test data: 2.0

Table 2: Required Values for Use of Default Durability Reduction Factor

Type	Index Test	Method	Value
HDPE	UV	ASTM D 4355	Min. 70% strength after 500 hours
PET	UV	ASTM D 4355	Min. 50% strength after 500 hours*
HDPE	Thermo-oxidation Resistance	ENV ISO 13438:1999, Method B	Min 50% strength after 56 days
PET	Hydrolysis Resistance	Inherent Viscosity Method (ASTM D 4603, GRI-GG8)	Min. Number (Mn) Molecular Weight of 25,000
PET	Hydrolysis Resistance	GRI GG7	Max. Carboxyl End Group Number of 30
HDPE & PET	Survivability	Weight per Unit Area (ASTM D 5261)	Min. 8 oz/yd^2
HDPE & PET	% Post-Consumer Recycled Material (by weight)	Certification	Max. 0%

* If buried in one week. If not, must meet minimum 70% strength after 500 hours.

6.3 Sampling & Testing:

6.3.1 Internal RSS Fill:

To obtain source approval, the Contractor shall furnish the Engineer with an 80-pound representative sample of the internal RSS fill material and a Certificate of Analysis containing results of all tests referenced in Table 3 at least four weeks prior to beginning construction of the Reinforced Soil Slope.

During construction, the internal RSS fill material shall be sampled by the Engineer for acceptance and quality control testing, performed by the Department and/or an independent approved, third party laboratory. A new sample and Certificate of Analysis shall be provided any time the material and/or source changes.

The RSS Designer will review all fill material tests and certify compliance with the design parameters. RSS Designer shall evaluate any failed material placed in the RSS and will provide a signed, stamped recommendation for modification and/or repair of the RSS system to adjust for the failed material.

Table 3: Sampling Frequency for Internal RSS Fill

Function	Tests	Frequency
Source Approval: (Testing by Contractor and/or its Consultant)	Soundness (AASHTO T 104)* Gradation (AASHTO T 27)*	At least four (4) weeks prior to beginning RSS construction and once per material change and/or change in source. One test is valid for up to 10,000 ft^2 of RSS area if there is no material change or change in source. **
Acceptance and Quality Control (Testing by Department)	Gradation (AASHTO T 27)*	One per 2,000 cubic yards at job site. (A change of more than +/- 5.0 percent passing any sieve size may require additional Gradation testing by the Contractor.)
	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.

* The laboratory performing these tests must be accredited by the AASHTO Materials Reference Laboratory (AMRL) for the tests they perform. The Contractor may consult the Geotechnical Branch to ensure that a lab is accredited or certified.
** e.g. 1 to 10,000 ft^2 of RSS requires 1 test, 10,001 to 20,000 ft^2 requires 2 tests, etc.

6.3.2 Geogrid:

No project-specific geogrid testing will be required during construction, however the Department reserves the right to require such testing of geogrid at any time.

7) GEOTECHNICAL DESIGN PARAMETERS:

Granular Embankment (if required) - See Subsection 805 of the Standard Specifications
$\gamma = 115$ lb/ft^3
phi = 38°
C = 0 psf
Internal RSS Fill -
$\gamma = 120$ lb/ft^3
*phi = 34°
C = 0 psf
In-Situ Soil – See Geotechnical Notes & Drawings

The coefficient of friction for sliding resistance for cohesionless soils shall be no greater than tangent phi of the weaker material. The coefficient of friction for sliding resistance for cohesive soils shall be no greater than the adhesion value for the in-situ soil.

In no case shall the geotechnical strength parameters used for design exceed the values allowed by the AASHTO Specifications.

*If a design friction angle of greater than 34 degrees is used, the value must be substantiated by Direct Shear Test (AASHTO T236) or CU Triaxial Test (AASHTO T 297) on project specific material. The design friction angle may be increased up to a maximum of 40 degrees based on laboratory testing. Generally, only one Direct Shear or CU Triaxial Test is required unless there is a change in material, source, or gradation.

8) GENERAL:

8.1 General requirements:

Comply with all dimensions shown on the contract plans and accommodate all other project features as shown on the contract plans.

Section 107 of the current specifications shall apply to the use of patented devices, materials, slope systems, and processes.

Geogrid shall be installed at the proper elevation and orientation as shown on the construction drawings or as directed by the Engineer. Correct orientation (roll direction) of the geogrid shall be verified by the Contractor. Geogrid may be temporarily secured in place with staples, pins, sand bags, or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the Engineer. All connections shall be in accordance with the Designer's recommendations and drawings.

When wrapped-face slopes are required (see below), a minimum overlap of 6 inches is recommended along edges perpendicular to slope. Alternatively, the edges of the grid may be clipped or tied together. When wrapped-face slopes are not necessary, no overlap is required and edges may be butted.

The non-reinforced embankment material (where present) shall be built concurrently with the Reinforced Soil Slope. The core cannot be constructed prior to the RSS.

Tracked construction equipment shall not be operated directly on the geogrid. A minimum fill thickness of 6 inches is required prior to operation of rubber-tired and tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

Any geogrid damaged during installation shall be replaced by the Contractor at no additional cost.

8.2 Slope Facing Requirements:

Treatment of slope faces shall be in accordance with Table 4 below, based on specific project conditions.

Table 4: RSS slope facing options (after Collin, 1996)

Slope Face Angle and Soil Type	Type of Facing			
	When Geosynthetic is not Wrapped at Face		When Geosynthetic is Wrapped at Face	
	Vegetated Face[1]	Hard Facing[2]	Vegetated Face[1]	Hard Facing[2]
> 50^0(> ~0.9H:1V) All Soil Types	Not Recommended	Gabions	Sod, Permanent Erosion Blanket w/ seed	Wire Baskets,[3] Stone, Shotcrete
35^0 to 50^0 (~ 1.4H:1V to 0.9H:1V) Clean Sands (SP)[4] Rounded Gravel (GP)	Not Recommended	Gabions, Soil-Cement	Sod, Permanent Erosion Blanket w/ seed	Wire Baskets,[3] Stone, Shotcrete
35^o to 50^o (~ 1.4H:1V to 0.9H:1V) Silts (ML) Sandy Silts (ML)	Soil Bio reinforcement, Drainage Composites[5]	Gabions, Soil-Cement, Stone Veneer	Sod, Permanent Erosion Blanket w/ seed	Wire Baskets,[3] Stone, Shotcrete
35^{0}to 50^0 (~ 1.4H:1V to 0.9H:1V) Silty Sands (SM) Clayey Sands (SC) Well graded sands and gravels (SW & GW)	Temporary Erosion Blanket w/ Seed or Sod, Permanent Erosion Mat w/ Seed or Sod	Hard Facing, Not Needed	Geosynthetic Wrap Not Needed	Geosynthetic Wrap Not Needed
25^0 to 35^0 (~ 2H:1V to 1.4H:1V) All Soil Types	Temporary Erosion Blanket w/ Seed or Sod, Permanent Erosion Mat w/ Seed or Sod	Hard Facing Not Needed	Geosynthetic Wrap Not Needed	Geosynthetic Wrap Not Needed

Notes: 1. Vertical spacing of reinforcement (primary/secondary) shall be no greater than 16 in. (400 mm) with primary reinforcements spaced no greater than 32 in. (800 mm) when secondary reinforcement is used.
2. Vertical spacing of primary reinforcement shall be no greater than 32 in. (800 mm).
3. 18 in. (450 mm) high wire baskets are recommended.
4. Unified Soil Classification
5. Geosynthetic or natural horizontal drainage layers to intercept and drain the saturated soil at the face of the slope.

(Table from FHWA GEC 011 – Volume II)

8.3 Compaction Requirements:

Backfill material shall be placed in lifts and compacted according to Section 206 of the current Specifications, unless thinner lift thicknesses are required by the Designer. Backfill shall be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in and/or movement of the geogrid. In addition, the Department shall monitor density with Plate Compaction Testing in accordance with the procedure outlined below in Section 8.3.1.

8.3.1 Plate Compaction Test Procedure:

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 ft^2 of RSS area (e.g. 1 to 10,000 ft^2 requires 1 trial fill section, 10,001 to 20,000 ft^2 requires 2, etc.) and for no more than one individual RSS.
- The minimum dimensions of the test pad shall be 15 ft. wide by 50 ft. long.
- The lift thickness shall not exceed one (1) foot.
- Compaction shall be determined by using a level to measure the settlement of the trial section at a number of locations after each pass (e.g., a minimum of 5 locations measured at the center of a 1 ft. square metal plates or other methods approved by the Engineer).
- After constructing a total thickness of approximately 3 feet, the third lift shall be used to determine the appropriate number of passes for production, 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 and equipment 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 Reinforced Soil Slope.

Within three (3) feet of the slope face, 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 one (1) foot.
- Compaction shall be determined by using a level to measure the settlement of the test pad section at a number of locations after each pass (e.g., a minimum of 3 locations measured at the center of 1-foot square plates or other methods approved by the Engineer).
- After constructing a total thickness of approximately 3 feet, the third lift shall be used to determine the appropriate number of passes for production, 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 and equipment 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 test pad section.
- The test pad sections are incidental to the bid price for Reinforced Soil Slope.

8.4 Project Plans Changes:

Design data is based on subsurface conditions and original project parameters. If project plans are changed subsequently, an additional subsurface investigation may be needed to verify the design parameters of the in-situ soils and embankment materials. The Engineer should notify the Division of Structural Design, Geotechnical Branch, of any plan changes as soon as possible. It is estimated that it will take approximately three (3) months for the Geotechnical Branch to complete its investigation and make any necessary geotechnical recommendations that may affect design prior to any construction. The Contractor will be responsible for providing access for drilling equipment to this area.

In the event the Contractor or Designer requires additional geotechnical investigation, those costs are incidental to the RSS bid item and no additional time will be allowed.

9) METHOD OF MEASUREMENT AND BASIS OF PAYMENT:

RSS quantities are calculated and paid from vertical projection of reinforced slope (toe to crest). No field measurement will be made. The final quantity will be the contract plan quantity increased or decreased by authorized changes. Internal RSS fill material will not be included in the calculation of Embankment-in-Place.

If required by geotechnical note, any Roadway Excavation beneath the reinforced zone shall be measured and paid according to Section 204 of the Standard Specifications. When required, the quantity of Granular Embankment or quarried stone for foundation replacement or rock embankment shall be measured and paid according to Section 206 of the Standard Specifications. The final quantities for these items will be the design plan quantity increased or decreased by authorized changes only. See Geotechnical Notes for possible need for other bid items for RSS construction, including but not limited to Granular Embankment, Roadway Excavation, and Geotextile Fabric.

Additional quantities of reinforcement, RSS Volume, and labor necessary to satisfy the design shall be incidental to the unit price bid for the Reinforced Soil Slope.

The granular material within the RSS volume, plus the volume in the area that extends 1 foot, minimum, beyond the ends of the reinforced volume, shall be included in the unit price bid for Reinforced Soil Slope.

The reinforcement shall be included in the unit price bid for Reinforced Soil Slope.

All work associated with providing the design, details and construction for the facing shall be incidental to the unit price bid for Reinforced Soil Slope.

PAY ITEM	UNIT	CODE
Reinforced Soil Slope	Square Foot	21587EN

INTERSTATE 75 WIDENING PROJECT
Rockcastle Co.
M.P. 55.7 TO M.P. 60.1
ITEM # 8-6.10
PUBLIC INFORMATION PLAN

The primary goal of the Public Information Plan (PIP) is to inform the motoring public and area stakeholders of project information including Maintenance of Traffic (MOT) which includes lane closures. The KYTC District 8 Public Information Officer (PIO) will coordinate and disseminate to stakeholders and the media appropriate information regarding the construction plans.

LOCAL STAKEHOLDERS

- Elected Officials
  - State Representative Jonathan Shell – (859) 792-4161; Jonathan.Shell@lrc.ky.gov
  - State Senator Jared Carpenter – (502) 564-8100; Jared.Carpenter@lrc.ky.gov
  - Rockcastle Co. Judge Executive Doug Bishop – (606) 256-2856; rockcastlejudge@windstream.net
  - Rockcastle Co. Sheriff Mike Peters – (606) 256-2032; rocksheriffdept@alltel.net

- Local Agencies
  - Rockcastle Co. Emergency Management – Howell Holbrook, Jr. – (606) 256-8436; holbrookhh@windstream.net

- State & Federal Agencies
  - KSP London Post – Lloyd Cochran – (606) 878-6622; Lloyd.Cochran@ky.gov
  - Kentucky Transportation Operations Center – (502)-564-2080
  - KY Overweight/Over-Dimensional Permits – owod.dmc@ky.gov

- Utility Companies
  - Not Applicable

TRUCKING FIRMS AND OUT OF STATE STAKEHOLDERS

Information will be distributed electronically to trucking firms via Rick Taylor at the Department of Vehicle Regulation (502-564-4540; rick.taylor@ky.gov). Information will also be posted on the GoKY website (http://goky.ky.gov).

PRESENTATIONS

A project description including anticipated schedule will be provided to the media, stakeholders and other emergency service agencies via e-mail prior to construction. Information will be provided to these groups via traffic advisories, press releases and the District 8 website.

MEDIA RELATIONS

The District PIO will prepare an initial news release regarding the contract award for the project. The PIO will conduct interviews with the media throughout the project duration to keep the public informed of construction progress. Traffic advisories will be submitted to the media when a change in the MOT occurs. The contractor must provide to the PIO via the Resident Engineer notification of any change in the MOT at least three (3) days prior to the change.

SPECIAL NOTE FOR PIPE CLEANING

PART 1 -- GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to clean all pipes, as specified herein.

B. Cleaning shall include the proper high pressure water jetting, rodding, snaking, bucketing, brushing and flushing of pipes prior to inspection by closed circuit television, pipeline rehabilitation, and testing operations.

C. Cleaning shall dislodge, transport and remove all sludge, mud, sand, gravel, rocks, bricks, grease, roots, sticks, and all other debris from the interior of the sewer pipe and structures as required for pipeline rehabilitation.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Hydraulically propelled Sewer Cleaning Equipment

1. Hydraulically propelled sewer cleaning equipment shall be the movable dam type constructed such that a portion of the dam may be collapsed during cleaning to prevent flooding of the sewer.

2. The movable dam shall be the same diameter as the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure total removal of grease.

3. Contractor shall take precautions against flooding prior to using sewer cleaning balls or other such equipment that cannot be collapsed instantly.

B. High Velocity Hydro-Cleaning Equipment shall have the following:

1. A minimum of 500-ft of high pressure hose.

2. Two or more high velocity nozzles capable of producing a scouring action from 15 to 45 degrees in all size lines to be cleaned.

3. A high velocity gun for washing and scouring manhole walls and floor.

4. Capability of producing flows from a fine spray to a long distance solid stream.

5. A water tank, auxiliary engines and pumps and a hydraulically driven hose reel.

6. Equipment operating controls located above ground.

C. Mechanical cleaning equipment for sewer mains shall be either power buckets or power rodders by the Sewer Equipment Company of America or equal.

1. Bucket machines
   a. Be furnished with buckets in pairs
   b. Use V-belts for power transmission or have an overload device. No direct drive machines will be permitted.
   c. Be equipped with a take up drum and a minimum of 500-ft of cable.
   d. Have sufficient dragging power to perform the work efficiently.

2. Power rodding machine
   a. Either sectional or continuous.
   b. Hold a minimum of 750-ft of rod.
   c. The machine shall have a positive rod drive to produce 2000 pounds of rod pull.

PART 3 -- EXECUTION

3.01 PERFORMANCE

A. Selection of cleaning equipment shall be based on the conditions of the structures and lines at the time the work commences based on the pre-construction CCTV inspection to be conducted by the Contractor under this Contract.

B. Use properly selected equipment to remove all dirt, grease, rock and other deleterious materials, and obstructions.

C. Protect existing lines from damage caused by improper use of cleaning equipment.

D. Take precautions to avoid damage or flooding to public or private property being served by the line being cleaned.

F. Removal of Materials

1. Remove all solids and semi-solids at the downstream opening of the section being cleaned.

2. Passing material from one section of a line to another will not be permitted; unless access to any one section of line cannot be achieved.

G. Remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation.

H. No cleaning shall take place in a particular segment until all upstream pipe segments have been cleaned. If cleaning is done in a downstream pipe segment in order to facilitate overall cleaning operations, the segment shall be re-cleaned at no additional cost, after all pipes upstream of that segment have been cleaned.

3.02 FIELD QUALITY CONTROL

A. Acceptance of this portion of the work shall be dependent upon the results of the television inspection. Lines not acceptably clean as to permit television inspection and rehabilitation shall be re-cleaned and re-inspected at no additional cost to the Owner

B. Following cleaning, the Contractor shall inspect each section in accordance with the Special Note for CIPP Acceptance Testing.

C. Upon the Engineer's final structure to structure inspection of the system, if any foreign matter is still present in the system, clean the sections and portions of the lines as required.

PART 4 – PAYMENT

Payment for cleaning of the pipes as detailed in the Pipe Drainage Summary will be made per linear foot as the price bid for CLEAN. The CLEAN bid item will be paid for the cleaning of all pipe sizes. Payment for CLEAN will be considered full compensation for all work, equipment, and incidentals necessary to clean the pipe in accordance with this note.

SPECIAL NOTE FOR CURED-IN-PLACE PIPE LINING

PART 1 -- GENERAL

1.01 REQUIREMENTS

A. It is the intent of this specification to provide for the reconstruction of pipelines by the installation of a resin-impregnated flexible tube which is formed to the original conduit and cured to produce a continuous and tight fitting Cured-In-Place Pipe (CIPP). Cured-In-Place Pipe shall be designed for storm water application.

B. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary to install and test cured-in-place (CIPP) pipe lining as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings and other information to the ENGINEER for review.

B. With the bid, the following submittals are required:

Documentation as outlined herein under paragraph 1.06 A, including installation references of projects that are similar in size and scope to this project. The submittal shall include, at a minimum, the client contact name, phone number, and the diameter and footage of pipe rehabilitated. Documentation for product and installation experience must be satisfactory to the ENGINEER.

C. After contract award, the following submittals are required.

1. The CONTRACTOR shall submit design data and specification data sheets listing all parameters used in the CIPP design and thickness calculations based on ASTM F1216 or F2019 and D2412 for “fully deteriorated gravity pipe conditions.” All CIPP liner design calculations shall be sealed and signed by a registered professional Engineer in the Commonwealth of Kentucky. Submit P.E. certification form for all CIPP design data. Submit detailed installation procedures, lining production schedule and location, testing procedures and schedule, quality control procedures, liner curing procedures including heat-up and cool-down rates, curing temperature and duration, and shipping and storage requirements, schedule and procedures. Detailed design calculations as specified herein under paragraph 2.01 Q.

2. Various test results as specified herein under Section 2.03.

3. Documentation as specified herein for the Cure Report under Paragraph 3.08 A.

4. Documentation as specified herein for the Television Survey under Paragraph Section 3.10 Television Survey.

D. Curing log, including temperatures, pressures, and times during the curing process to document that a proper cure has been achieved. Curing log is to be submitted immediately after the curing is complete for each line segment that is rehabilitated.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Special Note for Pipe Cleaning

B. Special Note for CIPP Acceptance Testing

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D638 – Standard Test Methods for Tensile Properties of Plastics.

2. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

3. ASTM D2412- Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.

4. ASTM D2990 – Standard Test Methods for Tensile, Compressive and Flexural Creep and Creep-Rupture of Plastics.

5. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.

6. ASTM F1743 – Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP).

7. ASTM F2019 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

8. ASTM E1252 - Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALIFICATIONS

A. The CONTRACTOR performing the CIPP lining work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by the CIPP manufacturer. Only commercially proven products and installers with substantial track records will be approved. In addition the Contractor shall meet the following requirements:

1. The CONTRACTOR shall have minimum of 10,000 LF of CIPP successfully installed of similar diameter and using the specific method of installation and curing being used.

2. The CONTRACTOR shall submit a certified statement from the manufacturer that he/she is a certified and/or licensed installer of the CIPP lining.

3. A minimum of three clients that the CONTRACTOR has performed this type of work for, including names, phone numbers, linear footage, and a description of the actual work performed.

4. The CONTRACTOR’S superintendent who will perform the work under this section must have at least 3 years of experience and have successfully installed at least 5,000 linear feet 24-inch diameter or greater of the proposed product and curing method.

B. The CONTRACTOR shall also be capable of providing crews as needed to complete the work without undue delay.

C. The ENGINEER shall approve or disapprove the CONTRACTOR and/or manufacturer based on the submitted information and a follow up interview, if warranted.

D. Inspection of the liner may be made by the representative of the ENGINEER after delivery. The liner shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample liner may have been accepted as satisfactory at the place of manufacture. Liner rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.06 GUARANTEE

A. All CIPP lining placed shall be guaranteed by the CONTRACTOR and manufacturer for a period of one year from the date of final acceptance. During this period, defects discovered in the CIPP lining, as determined by the ENGINEER, shall be removed and replaced in a satisfactory manner by the CONTRACTOR at no cost to the ENGINEER. The ENGINEER may conduct an independent television inspection, at his own expense, of the lining work prior to the completion of the one year guarantee period.

1.07 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and storage to avoid damaging the liner. Extra care shall be taken during cold weather construction. Any liner damaged in shipment shall be replaced as directed by the ENGINEER.

B. Any liner showing a split or tear, or which has otherwise received damage shall be marked as rejected and removed at once from the job site.

C. The liner shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times prior to installation. The liner shall be protected from UV light prior to installation. Any liner showing evidence of premature curing will be rejected for use and will be removed from the site immediately.

PART 2 -- PRODUCTS

2.01 CIPP LINING

A. CIPP lining shall be Insituform by Insituform Technologies, Inliner by Inliner Technologies, Premier Pipe, Blue-Tek by Reline America, or approved equal.

B. The tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge breaks and missing sections of the existing pipe, and stretch to fit irregular pipe sections. The new jointless pipe-within-a-pipe must fit tightly against the old pipe wall and consolidate all disconnected sections into a single continuous conduit, substantially reducing or eliminating infiltration or exfiltration.

C. The wetout tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the Design thickness.

D. The tube shall be fabricated to a size that when installed will tightly fit the internal circumference and length of the original pipe with minimal shrinkage, in such a way as to minimize water migration (tracking) between the liner and the host pipe. Allowance should be made for circumferential stretching during inversion, and longitudinal stretching during pull in. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.

E. The minimum tube length shall be that deemed necessary by the Contractor to effectively span the distance between the access points and to facilitate a good, "non-tracking" seal. The Contractor shall verify the lengths in the field before cutting liner to length and otherwise preparing it for installation.

F. The outside layer of the tube (before wetout) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wetout) procedure.

G. The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

H. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

I. Seams in the tube shall be stronger than the unseamed felt.

J. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes shall be manufactured in the USA.

K. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this project. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

L. The finished pipe in place shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage. All constituent materials will be suitable for service in the environment intended. The final product will not deteriorate, corrode or lose structural strength that will reduce the projected product life. In industrial areas a liner system using epoxy vinyl ester resin shall be utilized and a polyester resin shall be used in non-industrial areas. The ENGINEER shall determine the type of appropriate resin to be utilized for each line segment.

M. The CIPP shall be designed as per ASTM F1216, Appendix X1. The CIPP design shall assume no bonding to the original pipe wall. The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life.

N. The CIPP must have a minimum design life of fifty (50) years. The minimum design life may be documented by submitting life estimates by national and/or international authorities or specifying agencies. Otherwise, long-term testing and long-term in-service results (minimum ten (10) years) may be used, with the results extrapolated to fifty (50) years.

O. The CONTRACTOR must have performed long-term testing for flexural creep of the CIPP pipe material installed by his company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (tube and resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by

qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in design.

P. The minimum required structural CIPP wall thickness shall be based on the physical and structural properties described herein and in accordance with the design equations in the appendix of ASTM F 1216 or F 2019, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design *(as determined by Long-Term tests described in paragraph 2.03)*	50 %
Ovality*	2 %
Soil Depth (above crown)*	Refer to Contract Plans
Design Condition	Fully deteriorated
**Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.*	

Q. The lining manufacturer shall submit to the ENGINEER for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the Commonwealth of Kentucky and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. Modulus of soil reaction shall be 1000, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

R. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

S. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

2.02 END SEALS

A. A watertight seal shall be made at every manhole entrance and exit and all other terminus of the liner. End seals shall be made by using a hydrophilic seal such as Insignia or equal.

2.02 STRUCTURAL REQUIREMENTS FOR MAIN LINES

A. Resin shall be impregnated by vacuum application or approved equal. If reinforcing materials (fiberglass, etc.) are used, the reinforcing material must be fully encapsulated within the resin to assure that the reinforcement is not exposed, either to the inside of the pipe or at the interface of the CIPP and the existing pipe.

B. The design for the CIPP wall thickness will be based on the following strengths, unless otherwise submitted to and approved by the ENGINEER.

Property	Test Method	Cured Composite per ASTM F1216
Flexural Modulus of Elasticity	ASTM D-790	250,000 psi
Flexural Stress	ASTM D-790	4,500 psi

2.03 TESTING REQUIREMENTS

A. Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216 or F2019. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

B. Prior to any liner installation, the CONTRACTOR shall submit technical data sheets showing the physical and chemical properties and infrared spectrum analysis per ASTM E1252 (chemical fingerprint) of the proposed resin system as modified for the cured-in-place process. Additionally, copies of the certificates of analysis for resin used on the project must be made available to the ENGINEER.

C. The CONTRACTOR shall provide resin samples as directed by the ENGINEER during the duration of the project and infrared spectrography chemical fingerprints shall be run and compared to the submitted fingerprint to verify the resin used is the resin submitted for use on this project. These analyses shall be conducted at the ENGINEER's expense.

D. In the case of liner installation performed under this contract, CIPP samples shall be prepared and physical properties tested in accordance with ASTM F1216, F2019, or ASTM F1743, Section 8, using either method proposed.

1. Where the diameter is less than or equal to 15-inches, the samples shall be restrained type samples made by extending the liner through a form with a diameter as close as possible to the existing pipeline. The formed sample shall be provided with insulation to contain cure heat as well as a heat sink such as sand bags for cool down.

2. Where the diameter is greater than 15-inches, a plate sample shall be prepared. The test sample shall be fabricated from the material taken from the liner and cured in a clamped mold with the resin used in the liner construction placed in the down tube.

3. Each sample shall be large enough to provide at least five total specimens for testing. One thickness, flexural strength, and flexural modulus shall be conducted in accordance with ASTM F1216, ASTM D790, and ASTM D2290 for each segment. The material must meet the initial strength requirements of ASTM F1216, Table 1.

4. These samples will be tested to verify compliance with the installed material specifications and shall be paid for through the testing allowance on the bid form. The CONTRACTOR shall produce these test samples for each pipe segment installed, defined as a contiguous length of insertion. Liners which do not pass these material tests will be rejected. The cost for sample collection shall be included in the bid price for the cured in place pipe.

5. Test specimens shall be marked in indelible ink with the appropriate lateral or main section, work order number, date of installation, and orientation to the top of the pipe (direction of up) so the

results can be correlated to the field work performed. All test results shall use this designated labeling as a reference.

6. The extraction and labeling of test specimens shall be done in the presence of the ENGINEER. The ENGINEER and CONTRACTOR shall, upon completion of sample extraction and labeling, both sign a chain-of-custody form that shall subsequently accompany the sample at all times and shall ultimately be received and signed at the testing laboratory. Test reports shall include a copy of the chain-of-custody form with all signatures to ensure that reported test results are for the correct sample.

7. The flexural properties must meet or exceed the values specified herein.

8. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743.

9. Visual inspection of the CIPP shall be by closed-circuit television.

PART 3 -- EXECUTION

3.01 CLEANING/SURFACE PREPARATION

A. It shall be the responsibility of the CONTRACTOR to clean the pipeline and to remove all internal debris out of the pipeline in accordance with the Special Note for Pipe Cleaning.

3.02 JOINT, CRACK, ANNULAR SPACE, AND LINER END CHEMICAL SEALING

A. Prior to cured-in-place liner installation, all active leaks of a magnitude to compromise the integrity of the liner shall be stopped using chemical grout, at no additional cost to the ENGINEER.

B. Materials used on this Project shall have the following properties: react quickly to form a permanent watertight seal; resultant seal shall be flexible and immune to the effects of wet/dry cycles; non-biodegradable and immune to the effects of acids, and alkalis; component packaging and mixing compatible with field conditions and worker safety; extraneous sealant left inside pipe shall be readily removable; and shall be compatible with the CIPP liner resin system utilized. The chemical sealing materials shall be acrylic resin type and shall be furnished with activators, initiators, inhibitors and any other materials recommended by the manufacturer for a complete grout system. Sealing grout shall be furnished in liquid form in standard manufacturer's containers. Sealing grout shall be AV-100 manufactured by Avanti International or approved equal.

C. The Contractor shall modify his equipment as necessary to seal the leaks, however both his equipment and sealing method must meet the approval of the ENGINEER prior to use. Extreme caution shall be utilized during leak sealing (pressure) operations in order to avoid damaging the already weakened sewer pipe. If any damage occurs, it shall be repaired at the CONTRACTOR’s cost and to the satisfaction of the ENGINEER. Excessive pumping of grout which might plug a service lateral shall be avoided. Any service laterals blocked by the grouting operation shall be cleared immediately by the Contractor.

3.03 FLOW CONTROL

A. Flow control shall be exercised as required to ensure that no flowing water comes into contact with sections of pipe under repair.

3.04 LINER INSTALLATION FOR MAIN LINES AND LATERALS

A. In presence of ENGINEER, perform a pre-lining CCTV inspection immediately prior to CIPP lining to demonstrate that the pipe is clean and free of roots, grease, sand, rocks, sludge, PACP runners or gushers, pockets of water, or structural impediments that would affect long-term viability of the pipe liner. Obtain ENGINEER's approval of the acceptability of the existing pipe condition prior to installation of CIPP.

B. The CONTRACTOR shall present to the ENGINEER, for review, a description of his methods for avoiding liner stoppage due to conflict and friction with such points as the manhole entrance and the bend into the pipe entrance. He shall also present plans for dealing with a liner stopped by snagging within the pipe. This information shall be rendered to the ENGINEER in a timely fashion prior to the preconstruction conference.

C. The CONTRACTOR shall immediately notify the ENGINEER of any construction delays taking place during the insertion operation. Such delays shall possibly require sampling and testing by an independent laboratory of portions of the cured liner at the ENGINEER's discretion. The cost of such test shall be born by the CONTRACTOR and no extra compensation will be allowed. Any failure of sample tests or a lack of immediate notification of delay shall be automatic cause for rejection of that part of the work at the ENGINEER's discretion.

D. On site wet out (if applicable) - The CONTRACTOR shall designate a location where the tube will be impregnated with resin prior to installation. The CONTRACTOR shall allow the ENGINEER and/or ENGINEER to inspect the materials and the "wet-out" procedure.

E. The materials and processes must be reasonably available for pre-installation, installation and post-installation inspections. Areas which require inspection include, but are not limited to, the following:

1. Product materials should exhibit sufficient transparency to visually verify the quality of resin impregnation.

2. Temperature sensing devices, such as thermocouples, shall be located between the existing pipe and the CIPP to ensure the quality of the cure of the wall laminate.

3.05 LINER INSTALLATION FOR MAIN LINES

A. (Heat cured) After the inversion is complete, the CONTRACTOR shall supply a suitable heat source throughout the pipeline. The equipment shall be capable of delivering hot water or steam throughout the pipeline to uniformly raise the temperature to a level required to effectively cure the resin. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply or steam. Another such gage shall be placed between the tube and the host pipe at the termination end at or near the bottom to determine the temperatures during cure. Water temperature or steam in the pipe during the cure period shall be as recommended by the resin manufacturer.

B. Initial cure shall be deemed complete when the exposed portions of the tube appear to be hard and sound and the temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer and may require continuous recirculation of the water to maintain the temperature. The CONTRACTOR shall have on hand at all times, for use by his personnel and the ENGINEER, a digital thermometer or other means of accurately and quickly checking the temperature of exposed portions of the liner.

C. CIPP installation shall be in accordance with ASTM F1216, Section 7, ASTM F1743, Section 6 or ASTM F2019, with modifications as listed herein.

D. Resin Impregnation: The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of

resin through cracks and irregularities in the original pipe wall. A vacuum impregnation or approved equal process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction. After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.

E. Tube Insertion: The wetout tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

F. Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

G. Curing shall be in accordance with the manufacturer's recommended cure schedule.

H. Cooldown: The CONTRACTOR shall cool the hardened pipe to a temperature below 100 F before relieving the hydrostatic head. Cooldown may be accomplished by the introduction of cool water into the inversion standpipe to replace water being pumped out of the manhole. Care should be taken in release of static head so that vacuum will not be developed that could damage the newly installed liner.

I. Finish: The new pipe shall be cut off in the manhole at a suitable location. The finished product shall be continuous over the length of pipe reconstructed and be free from dry spots, delamination and lifts. Pipe entries and exits shall be smooth, free of irregularities, and watertight. No visible leaks shall be present and the CONTRACTOR shall be responsible for grouting to remove leaks or fill voids between the host pipe and the liner. During the warranty period, any defects which will affect the integrity or strength of the product shall be repaired at the CONTRACTOR's expense, in a manner mutually agreed upon by the ENGINEER and the CONTRACTOR.

3.06 FIELD QUALITY CONTROL

A. Field acceptance of the liner shall be based on the ENGINEER’s evaluation of the installation including TV video and a review of certified test data for the installed pipe samples.

1. Groundwater infiltration of the liner shall be zero.
2. There shall be no evidence of splits, cracks, breaks, lifts, kinks, delaminations or crazing in the liner.
3. If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to the ENGINEER.

3.07 ACCEPTANCE

A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. No pinholes, cracks, thin spots, dry spots, or other defects in the liner will be permitted. There shall be no visible infiltration through the liner or from behind the liner at manholes and service connections. Cut-ins and attachments at service connections shall be neat and smooth.

6. Liner thickness
7. Liner length
8. Liner and resin batch numbers
9. Resin type
10. Wet out length
11. Roller spacing
12. Vacuum setting
13. Quantity of resin and catalyst utilized
14. Wet out technicians
15. Time wet out started and completed
16. Applicable remarks
17. (Heat cure) Boiler and liner heating fluid pressure and temperature versus time log during cure period
18. (UV cure) Pressure and temperature versus time log and light train speed during cure period.
19. Cool down report

3.09 CLEANUP

A. After the liner installation has been completed and accepted, the CONTRACTOR shall cleanup the entire project area and return the ground cover to the original or better condition. All excess material and debris not incorporated into the permanent installation shall be disposed of by the CONTRACTOR.

3.10 TELEVISION SURVEY

A. Television survey, including Preconstruction Survey, Post Construction Survey, and Warranty Survey, shall be in accordance with Special Note for CIPP Acceptance Testing. Television survey shall be done for all cured-in-place lining, and shall be completed within 2 weeks of liner installation.

PART 4 – PAYMENT

Payment for Cured-in-Place Pipe Liners will be made per linear foot as CURE IN PLACE PIPE LINER 15 IN, CURE IN PLACE PIPE LINER 18 IN, AND CURE IN PLACE PIPE LINER". Lined storm sewer pipes 15 inch will be paid as CURE IN PLACE PIPE LINER 15 IN. Lined storm sewer pipes 18 inch will be paid as CURE IN PLACE PIPE LINER 18 IN. All other pipes required to be lined will be paid the price bid per linear foot for CURE IN PLACE PIPE LINER. Payment for CURE IN PLACE PIPE LINER 15 IN, CURE IN PLACE PIPE LINER 18 IN, and CURE IN PLACE PIPE LINER will be considered full compensation for all work, equipment, and incidentals necessary to install the pipe liners in accordance with this note.

B. Defects, which, in the opinion of the Engineer, will affect the liner's structural integrity, strength, hydraulic performance, future maintenance access, and overall line performance, shall be repaired or the sewer replaced at the Contractor's expense. Any lined section of segment (from manhole to manhole) exhibiting these defects will be rejected for payment until such time repairs have been made to the defective liner to the satisfaction of the Engineer. The following methods of repair shall be implemented by the Contractor to resolve defects unless otherwise approved by the Engineer:

Defects	**Repair Method**
Annular space or infiltration at lateral opening	Re-seal with structural grout or point repair
Damaged lateral caused by overly ground tap	Repair with structural grout or point repair
Annular space or infiltration at manhole wall and liner termination	Re-grout liner termination
Cracked, missing pipe or voids caused by the cleaning operation	Repair with structural grout, thicken liner, or point repair
Dropped pipe or shape loss caused by the cleaning operation	Point repair
Wrinkles or ridges in liner greater than 5% of the pipe diameter	Grinding allowed if not part of structural component of liner. If grinding would require removal of structural component, then Contractor must make point repair
Re-installed bulkheaded tap or inactive service connection	Re-seal with structural grout or point repair
Lined over debris	Point repair
Soft spots or lifts in the liner	Point repair
Final liner thickness less than required thickness bid	Replace inadequate liner

3.08 WET-OUT AND CURE REPORT

A. The CONTRACTOR shall submit "wet out" and "cure" reports documenting the specific details of the liner's vacuum impregnation and saturation with resin and the CIPP installation of the liner. A report shall be generated for each liner installation. A copy of all "wet out" and "cure" records shall be made available to the ENGINEER upon request, and shall be turned over to the ENGINEER on a weekly basis and prior to request for payment. If the "wet out" and "cure" reports are not presented prior to a payment request for a repair work order, payment for the work will not be made and the request will be rejected. At a minimum, this report shall include, in addition to CONTRACTOR and Contract identification:

1. Line identification and location
2. Wet-out date
3. Sample identification(s) and technician
4. Installation (in sewer) date
5. Host sewer pipe inside diameter

SPECIAL NOTE FOR CIPP ACCEPTANCE TESTING

PART 1 -- GENERAL

1.01 SCOPE OF WORK

A. Furnish all necessary labor, materials, equipment, services and incidentals required to visually inspect by means of closed-circuit television (CCTV) designated pipe sections including, but not limited to, recording and playback equipment, materials and supplies.

B. The inspection shall be performed on one section (i.e. curb box inlet to curb box inlet) at a time. The section being inspected shall be suitably isolated from the remainder of the system.

C. Video recordings shall be made of the television inspections and copies of both the recordings and printed inspection logs shall be supplied to the Engineer.

D. Contractor may have to perform point repairs, remove obstructions or remove protruding service connections to complete pre-rehabilitation TV inspection.

PART 2 -- PRODUCTS

2.01 EQUIPMENT

A. The television camera used for inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100 percent humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing a minimum 500-line resolution color video picture. Picture quality and definition shall be to the satisfaction of the Engineer and if unsatisfactory, inspection shall be performed again with the appropriate changes made as designated by the Engineer at no additional cost to the Engineer. The television inspection equipment shall have an accurate footage counter that shall display on the monitor, the exact distance of the camera from the centerline of the starting manhole.

PART 3 -- EXECUTION

3.01 PROCEDURE

A. The camera shall be moved through the pipe in either direction at a uniform rate, stopping when necessary to ensure proper documentation of the pipe's condition but in no case will the television camera be pulled at a speed greater than 30 fpm. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the pipe conditions shall be used to move the camera through the line. If, during the inspection operation, the television camera will not pass through the entire section, the equipment shall be removed and repositioned in a manner so that the inspection can be performed from the opposite opening. All set-up costs for the inspection shall be included in the unit prices bid. If the camera fails to pass through the entire section, the Contractor shall perform point repairs as required. Re-clean or further remove blockage at no additional cost to the Engineer.

B. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two openings of the line being inspected to ensure that good communications exist between members of the crew.

The camera height shall be adjusted such that the camera lens is always centered in the pipe being televised. Flow shall be controlled such that depth of flow shall not exceed 20% of pipe's diameter.

Lighting system shall be adequate for quality pictures.

3.02 RECORDING OF FIELD OBSERVATIONS

A. Television Inspection logs

1. Printed location records shall be kept which shall clearly show the location. In addition, other data of significance including joints, unusual conditions, roots, collapsed sections, or presence of scale and corrosion that the camera failed to pass through and reasons for the failure and other discernible features shall be recorded and annotated using the PACP system and a copy of such records shall be supplied to the Engineer.

B. Digital Recordings

1. The purpose of digital recording shall be to supply a visual and audio record of areas of interests of the pipe segments that may be replayed by the Engineer. Digital recording playback shall be at the same speed that it was recorded and shall be made in color. The Contractor shall be required to have all digital media and necessary playback equipment readily accessible for review by the Engineer during the project.

2. The Contractor shall perform CCTV inspection of each newly installed or rehabilitated pipe segment after testing and before re-introducing any flow into the pipe. Each test shall be witnessed by the Engineer.

3. The Contractor shall record each CCTV inspection on a DVD and submit such recordings to the Engineer as a prerequisite for Partial Utilization/Substantial Completion.

4. CCTV inspections shall be performed by a PACP certified and trained person.

5. Inspections shall include narration that notes the location and type of defects, if any.

6. At the completion of the project, the Contractor shall furnish all of the original digital recordings to the Engineer. Each disc shall be labeled as to its contents. Labels shall include the disc number, date televised, sewer segment reach designation, street location, and structure numbers on the disc. The Contractor shall keep a copy of the discs for 30 days after the final payment for the project, at which time the discs may be erased at the Contractor's option.

PART 4 – PAYMENT

Payment for both the video inspection prior to and after the Cured-in-Place Pipe Liners have been installed will be made as one lump sum payment as CIPP ACCEPTANCE TESTING. Payment for CIPP ACCEPTANCE TESTING will be considered full compensation for all work, equipment, and incidentals necessary to perform the video inspection in accordance with this note.

SPECIAL NOTE ALLOWING PVC FOLD AND FORM PIPE LINER

Contractor may elect to use Fold and form pipe liner in accordance with the Special Note for PVC Fold-and-Form Pipe Liner as an alternative to using CIPP Liner as detailed elsewhere in the proposal. Contractor will bid CIPP Liner bid items regardless of which type of liner is actually used. Bid item and requirement for CIPP Acceptance Testing in accordance with Special Note for CIPP Acceptance Testing will still apply regardless of which type of liner is actually used.

SPECIAL NOTE FOR PVC FOLD-AND-FORM PIPE LINER

GENERAL

SUMMARY

Section Includes: Definition of the approved methods and materials to rehabilitate gravity and pressure pipelines by the insertion of a continuously extruded, folded, PVC Fold-and-Form Pipe Liner into a conduit (host pipe), and the "blow-molding" (thermoforming) of the pipe liner to conform to the shape of the existing pipe. The rehabilitated host pipe shall:

Extend continuously from one access point to the next access point with no joints.

Provide a tightly conforming fit against the inner wall of the host pipe.

Provide for complete structural integrity independent of the load-bearing capacity of the host pipe.

Definitions:

PVC Fold-and-Form Pipe Liner: A continuously extruded (joint-less), polyvinyl chloride (PVC) Pipe Liner that is shaped into a reduced form to facilitate insertion into existing pipelines or conduits. The 4" to 12" PVC Fold-and-Form Pipe Liner shall be coiled in a flat shape and folded during insertion; whereas the 15" and larger PVC Fold-and-Form Pipe Liner shall be coiled in an "H" shape. The Pipe Liner shall be designed to return to its extruded, round memory upon application of heat alone and to be formed tightly against the host pipe by "blow molding" (thermoforming) techniques.

Host Pipe: An existing gravity or pressure pipeline or conduit to be internally rehabilitated by installation of the PVC Fold-and-Form Pipe Liner.

REFERENCES

Codes and standards referred to in this Special Note are:

ASTM D 256: Standard Test Methods for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

ASTM D 638: Standard Test Method for Tensile Properties of Plastics

ASTM D 790: Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics

ASTM D 1784: Standard Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds

ASTM D 2122: Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D 2152: Standard Test Method for Extrusion Quality using Acetone Immersion

ASTM D 2444: Standard Test Method for Impact Strength

ASTM F 1057: Standard Test Method for Extrusion Quality using Heat Reversion

ASTM F 1871: Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit rehabilitation

PIPE DESIGN AND DIMENSION

Submittals: The Contractor shall furnish engineering data covering materials and installation procedures.

The length of the PVC Fold-and-Form Pipe Liner shall be that which is required to effectively carry out the insertion and to seal the PVC Fold-and-Form Pipe Liner at the inlet and outlet access. The product supplier shall be capable of supplying continuous lengths to 100 LF in all applicable diameters to ensure the capability of spanning from the end of the host pipe without excavation.

The PVC Fold-and-Form Pipe Liner shall be supplied to an outside diameter and minimum wall thickness, based on the following project parameters and condition of the existing conduit as viewed in the video. The pipe design shall have sufficient strength to structurally enhance the existing conduit and support all ground water loads imposed.

Unless otherwise specified, the Contractor shall determine the minimum and maximum length of liner to effectively span the distance from the inlet to the outlet of the respective pipelines.

SAFETY

The CONTRACTOR shall conform to all safety requirements of pertinent regulatory agencies, and shall secure the site for the working conditions in compliance with the same. The CONTRACTOR shall erect signs and devices as are necessary for the safety of the work site.

The CONTRACTOR shall also provide all of the WORK in accordance with applicable OSHA standards. Emphasis shall be placed upon the requirements for entering confined spaces and working with steam.

PRODUCTS

MATERIAL SPECIFICATIONS:

The PVC Fold-and-Form Pipe Liner will be manufactured from virgin PVC Fold-and-Form Pipe Liner compound, containing no fillers, and meet or exceed the following minimum physical properties:

COMBUSTIBILITY:	Self-Extinguishing
FLEXURAL MODULUS:	ASTM D 790 145,000 PSI @73F
FLEXURAL STRENGTH:	ASTM D 790 4,100 PSI @73F
IZOD IMPACT:	ASTM D 256 15 FT-LB/IN
CHEMICAL RESISTANCE:	suitable under general sanitary sewer conditions

CHARACTERISTICS: The PVC Fold-and-Form Pipe Liner shall be designed to meet the following installation performance requirements:

The Pipe Liner shall be capable of expanding a full pipe size larger than the nominal diameter (ex: 8” to 10”) without splitting, or rupturing.

After being expanded by “blow-molding”, the installed Pipe Liner will match the configuration of the host pipe.

The Pipe Liner shall be capable of negotiating pipe line bends in the host pipe without splitting, rupturing, or wrinkling of the pipe liner material.

The pipe liner shall be dimensionally stable immediately after cool-down.

The pipe liner shall have an ASTM D 1784 impact resistance cell classification of no less than five (5), to resist splitting during remote controlled service connection reinstatement.

Processing of the pipe liner shall cause no degradation of the pipe liner physical properties.

MARKINGS: The pipe liner shall be marked at maximum five (5) foot intervals indicating ASTM D 1784 cell classification, manufacturer, and size (diameter and SDR). Each production lot will be uniquely coded.

DIMENSIONS:

The pipe liner outside diameter will be manufactured substantially smaller than the inside diameter of the host pipe. The pipe liner shall be manufactured with sufficient excess wall thickness to allow the pipe liner to meet or exceed the DR requirements after being expanded by “blow-molding”.

Standard Dimension Ration (SDR) of the Pipe Liner will be SDR 35, with a resulting DR Range between DR 33 and DR 38. The Pipe Liner will be continuously extruded (no joints) at the factory to the minimum length required to effectively span the distance between access points, in accordance with actual distances which shall be field verified by the Contractor prior to manufacturing.

ACCEPTABLE MANUFACTURERS:

AMLINER PVC Fold-and-Form pipe liner, manufactured by American Pipe & Plastics, Inc. of Binghamton, NY.

DynaLiner Thermoformed PVC Pipeliner, manufactured by DynaLiner, LLC, of Birmingham, Alabama.

Approved Equivalent

MATERIAL TESTING: Each production lot of pipe liner will be inspected and tested at the time of manufacture for defects is accordance with ASTM D 2444, and ASTM D 2152. All pipe liners shall conform to the specified dimensions. Material design properties shall be confirmed in accordance with ASTM D 790.

EXECUTION

HOST PIPE PREPARATION

The existing pipeline shall be cleaned of any obstructions and televised using CCTV immediately prior to installation of the pipe liner. The host pipe condition shall be acceptable to the ENGINEER as appropriate for lining prior to the insertion of the pipe Liner.

Prior to beginning the insertion of the pipe liner, the CONTRACTOR shall confirm that the host pipe is adequately cleaned.

INSTALLATION PROCEDURES:

The pipe liner manufacturer’s installation instructions and procedures shall be followed during installation.

Point Repairs

Point repairs and obstruction removals shall be completed, as necessary, in order to enable lining.

Liner Insertion

The entrance to the host pipe shall be covered so as to provide a smooth surface to prevent damage to the Pipe Liner.

The Pipe Liner shall be positioned to enable it to naturally curve into the access point and the host pipe.

The insertion end of the Pipe Liner shall be sealed to inhibit fluids and solids form entering the lumen of the Pipe Liner.

Insert the Pipe Liner into the entry access point. Slowly feed the Pipe Liner from the supply reel, while simultaneously pulling the Pipe Liner at the exit access point, to minimize tension on the Pipe Liner. Maintain two-way communication between personnel at entry and exit access points to coordinate the rate of Pipe Liner supply and pulling operations.

Use a power winch and a steel cable connected to the pulling head as recommended by the manufacturer to advance the Pipe Liner.

Pipe Liner Processing and “Blow-Molding”:

Process and “blow-mold” the PVC Fold and-Form Pipe Liner in accordance with the manufacturer’s instructions for heating and expanding the Pipe Liner. Upon completion of processing and “blow-molding”, the Pipe Liner shall fit tightly against the inside wall of the host pipe, be locked into the joints of the host pipe.

Temperature and pressure gauges shall be used at the insertion and termination access points to monitor internal conditions during Pipe Liner processing and “blow-molding”.

Introduce superheated, pressurized steam to heat and relax the Pipe Liner in strict accordance with the recommendations of the Pipe Liner manufacturer.

Continue the application of superheated steam while introducing compressed air to increase internal pressure on the Pipe Liner as recommended by the manufacturer. DO NOT ALLOW PRESSURE TO EXCEED 12 PSI, AS DAMAGE MAY OCCUR TO HOST PIPE.

Discontinue the use of superheated steam while continuing the use of compressed air to maintain the internal pressure. Allow the Pipe Liner to cool below 100 F before releasing pressure.

Liner Termination:

During the pulling in place and “blow-molding” process, the PVC liner shall be peeled back and folded across the face of the existing connection flange or flange adapter, as to create a flanged ending for the PVC Liner.

After cool down has occurred, the Contractor shall carefully proceed to drill the flange bolt pattern onto the PVC Liner without cracking or deteriorating the liner.

The PVC Liner flanged termination shall have a minimum thickness equal to a SDR of 35.

SPECIAL NOTE FOR TEMPORARY BARRIER WALL
I-75 ROCKCASTLE COUNTY
ITEM No. 8-6.10

Temporary Barrier wall installation will NOT be allowed prior to March 1, 2018. Engineer may allow prior installation based on District's choosing.

Special Note for Work over Railroad

Special care shall be taken to ensure no impact to the railroad under the highway. All work and equipment must be contained on KYTC right of way. Extreme care should be taken to ensure that nothing falls onto the railroad right of way. At no point shall the Contractor enter the railroad's right of way.

In the case that anything happens to fall onto railroad right of way, please immediately call the emergency contact listed below. When referring to the location, be sure to mention the DOT number and railroad mile post. Any costs associated with such an incident, including but not limited to removal of the obstruction and/or repairs to the railroad facilities shall be the responsibility of the Contractor.

Location
MP 59.07 on I-75
CSX Transportation, Inc.
DOT # 343 198H
Railroad mile post: 00C 132.20
Emergency contact: 1-800-232-0144

SPECIAL NOTE

For

FIXED COMPLETION DATE

Foxed Completion Date

This project will have a fixed completion date of October 1, 2020 for completion of all work associated with this project.

Liquidated damages pre the Standard Specifications will be charged for each calendar day that all work is not complete after October 1, 2020.

Contrary to Section 108.09 of Standard Specifications, **Liquidated Damages per the Standard Specifications will be charged during the months of December through March for all work that is not complete.**

COMMONWEALTH OF KENTUCKY

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

Rockcastle
ITEM NUMBER 8-6.20

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PROJECT DESCRIPTION

GENERAL
This project includes furnishing and installing Pole with cabinets, lowering device and Web cameras

This ITS Project complies with the requirements of 23 CFR 940. The ITS work to be performed is referenced in the current Kentucky 2014 Statewide ITS Architecture at Appendix C-4,5 and C-4 (Traffic Incident Management System ATMS08, and Traffic Information Dissemination ATMS06), and in the Updated Section 5 and Appendix B of the 2009 Addendum to the Original Kentucky ITS Business Plan.

EQUIPMENT AND MATERIALS
All equipment and materials shall be new, free of defects and damage.

SPECIFICATIONS AND WORKMANSHIP
Unless otherwise specified, all work shall conform to the following:

- Kentucky Standard Specifications for Road and Bridge Construction, latest edition.
- FHWA, Manual on Uniform Traffic Control Devices, latest edition.
- National Electrical Code, latest edition.
- National Electric Safety Code, latest edition.
- KYTC Department of Highways Standard Drawings, current editions.
- KYTC Department of Highways Sepia Drawings, current editions.
- International Municipal Signal Association (IMSA) Specification No. 51-7, current edition.
- AASHTO, Roadside Design Guide, latest edition.
- AASHTO, Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, latest edition.

All work shall be performed in a neat and professional manner. The Contractor shall remove debris and trash from work areas during construction. The Contractor shall restore areas to original condition and clean up all debris after construction.

DAMAGE TO EXISTING FACILITIES
The Contractor shall be responsible for locating all underground utilities prior to excavation. The contractor shall repair damage caused to any public or private facilities at his expense. Utilities include but are not limited to telephone, power, water, gas, fiber optic cable, underground vaults, roadway lighting wiring, traffic signal wiring, and roadway drainage systems.

EQUIPMENT LIST
The contractor shall provide an equipment list in Microsoft Excel format to the Engineer containing the following information:

- Type of equipment
- Field location
- Make
- Model
- Serial number
- Date of purchase
- Manufacturer contact information
- Equipment vendor contact information (if different)
- Date of Installation
- Date warranty expires

This list shall be provided to the Division of Traffic Operations and TRIMARC Systems Administrator prior to burn-in testing. See below for TRIMARC Info:

Mr. Todd Hood
TRIMARC Systems Administrator
901 W. Main St.
Louisville, KY 40202
Phone: 502-587-6624
Fax: 502-587-6645
Email: Todd.Hood@ngc.com

WARRANTY

The Contractor shall provide a copy of all equipment warranty information to the Division of Traffic Operations. The Contractor shall provide documentation from the manufacturer that ownership of the warranty is transferred to the following:

Kentucky Transportation Cabinet
Division of Traffic Operations
200 Mero Street
Frankfort, KY 40622

TESTING

The contractor shall demonstrate proper functioning of all devices at the field communications demarcation point. After each device can be successfully operated at the field communications demarcation point the devices will be integrated into the TRIMARC Traffic Operations Center. A 30 day equipment burn-in test will begin after each device is integrated and can be remotely controlled from the operations centers. The Contractor is responsible for repairing or replacing defective equipment during the period between the field test and the start of the 30 day burn-in test.
The 30 day burn-in test will be conducted by TRIMARC from the operations center and consist of operational control of PTZ and video of the remote camera location.
If a device fails during the 30 burn-in day test, TRIMARC personnel will test the device at the field cabinet. If the device cannot be operated at the field cabinet the Contractor shall repair or replace the device and a new 30 day burn-in test will begin for that device. The project will be accepted after all devices have completed their 30 day test successfully, acceptable as-built drawings and warranty information have been received.

SYSTEM COMPATIBILITY

The Contractor is responsible for coordinating with TRIMARC to insure equipment compatibility and to complete integration of equipment into the TRIMARC project.

COMMUNICATIONS

Camera shall communicate with the control center over the wireless router connection (coordinated with the TRIMARC). The Contractor shall be responsible for furnishing and installing all conduits, junction boxes and communication cables installed on Kentucky right-of-way as specified in the plans. The Contractor shall be responsible for the installation and correct operation of all communications systems located in the field cabinet to the field devices. Testing of the Contractor's work will be performed both

locally at the cabinet and remotely at the TRIMARC Traffic Operations Center. TRIMARC personnel will assist with any troubleshooting necessary to resolve problems with the communication equipment.

SHOP DRAWINGS
All items that are used on this project shall have shop drawings sent to Engineer, who will contact Division of Traffic Operations for approval. All items shall be approved before purchase of said items.

AS-BUILT DRAWINGS
The Contractor, at the completion of the project, shall submit as-built drawings. As-built drawings shall be submitted in electronic format such as .pdf, .tiff, .dgn or other standard image format acceptable to the Engineer. As-built drawings may be scanned from marked up field plans or drawn in MicroStation. As-built drawings shall be scanned at a resolution that will allow them to be clearly legible on a computer display. As-built drawings shall include the exact location of all above ground equipment, underground conduit, wire, sensors and other equipment. Drawings shall indicate any changes to the design including changes to the numbers of conductors, wire gage, splices, additional conduit, etc. Conduit locations shall be drawn to scale or shall be dimensioned and referenced to permanent roadway features. Turns in conduit shall be referenced so that the conduit paths may be derived from the as-built drawings. Existing underground utilities shall be indicated on the drawings. Two copies of the drawings shall be submitted. One copy of the drawings shall be submitted to the Engineer. One copy of the drawings shall be submitted to the KYTC Division of Traffic Operations Design Services Branch. The Contractor shall correct any drawings that are deemed unacceptable to the Engineer. As-built drawings shall be delivered prior to burn-in testing.
The project will be accepted after all devices have completed their 30 day test successfully, acceptable as-built drawings and warranty information have been received.

SITE PREPARATION

DESCRIPTION

Site Preparation shall be performed in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Site Preparation shall include all materials required to access and protect the work area.

INSTALLATION

The Contractor shall coordinate with the Engineer prior to performing any site preparation work. This item includes excavation, guardrail removal, guardrail replacement, temporary ditch crossings, temporary barriers and clearing of debris and foliage. Salvaged materials may be used at the discretion of the Engineer. Site preparation shall be one per VMS sign location and web camera location. There shall

not be site preparation for locations that have web cameras installed on existing signal poles and existing highmast.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Site Preparation will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

ADVANCED GROUNDING SYSTEM

DESCRIPTION

Furnish and install Advanced Grounding System in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Unless otherwise specified, the grounding system provided will be as shown in plan sheet T12. Minimum ground resistance reading needs to be 10 ohms or less as tested via the 3 point fall of potential test method.

If the installation of the advanced grounding system is not possible due to physical constraints of the location or other extenuating factors, the Engineer or Traffic Engineer may allow for a standard ground installation. The standard installation would be with ground wiring consisting of solid bare copper #4 AWG and securely connected inside enclosures with #4 AWG copper clamp connectors. Nuts and washers securing the wire are not acceptable. All grounding shall meet the National Electric Code. Ground wires shall be exothermically welded to the ground rods. Ground rod clamps are not acceptable. The following devices shall be grounded to an array of two or three, 10' X 1" copper coated steel ground rods:

- Model 334/336 Enclosures (two ground rods required)
- Camera Poles (three ground rods required)
- Side-mounted VMS(two ground rods required)
- Service Locations(two ground rods required)

All ground rods in arrays shall have a minimum of 6' separation.

The resistance to ground shall be less than 10 Ohms as measured with an AEMC clamp on ground resistance meter or equivalent. The Contractor shall leave all exothermic welds exposed for inspection by the Traffic Engineer before backfilling.

INSTALLATION

All grounding shall be according to standards shown on plan sheet T12. If contractor needs help with installation, they can contact Alltec Corporation for further assistance at 800-203-2658.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Advanced Grounding System will be measured for payment per each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

POLE BASE

DESCRIPTION

Furnish and install Pole Base in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Pole Base includes concrete, anchor bolts, reinforcing steel, and conduit within base. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION

The Contractor shall stake all proposed pole base locations and obtain approval before excavation. The Traffic Engineer (District 8) will approve locations for pole bases in their districts. The Contractor shall have utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule the location approval. KYTC approval of field device location does not relieve the contractor from his responsibility to avoid utilities and repair any damage to buried infrastructure. The Contractor shall grade and re-seed all disturbed areas and restore the area to the satisfaction of the Engineer. Poles located behind guardrail shall have a minimum 5' spacing from edge of pole to face of guardrail. Otherwise, poles shall be located as according to the plans sheets or a minimum of 30' from all driving lanes. This item includes all excavation including any special equipment required to install the base in rock. This item shall include a vented rodent barrier furnished and installed by the contractor. See Vented rodent barrier detail.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Pole Base/Pole Base-High Mast will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

POLE WITH LOWERING DEVICE

DESCRIPTION

Pole with lowering device shall be designed to support and lower/raise a CCTV camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The lowering device and the pole are interdependent and thus, must be considered a single unit or system. The lowering device system shall consist of a pole, suspension contact unit, divided support arm, pole adapter for attachment to a pole top tenon, pole top junction box, and camera connection box. The lowering device to be furnished shall be the product of a manufacturer with a minimum of two years of experience in the manufacturing of such systems.

MATERIALS

LOWERING DEVICE
Lowering device shall be [MG]² Model CLDMG2, Camera Lowering Systems CDP series or approved equal.

SUSPENSION CONTACT UNIT
The suspension contact unit shall have a load capacity 200 lbs. with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a latching mechanism with a minimum of two latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.

The prefabricated components of the lift unit support system shall be designed to preclude the lifting cable from contacting the power or video cabling. The only cable permitted to move within the pole or lowering device during lowering/raising shall be the stainless steel lowering cable. All other cables must remain stable and secure during lowering/raising operations.

The female side of the socket contact connector shall be made of thermosetting synthetic polymer. The connector shall be suitable for Ethernet type camera installation.. All wire shall be 18 AWG stranded. Pin contact half of connector shall be made of thermosetting synthetic polymer. All pins and wires shall be molded in place. A complete disconnect unit shall have two identical sets of 10 contacts each (20 contacts total). Male Pin contact halves shall be mounted to lower portion of disconnect unit.

The portable lowering device and pulleys for the lowering device shall have sealed, self lubricated bearings, oil tight bronze bearings, or sintered bronze bushings. The lowering

cable shall be a minimum 1/8 inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds and shall be 19 x 7 or 7 x 19.

All electrical and video connections between the fixed and moveable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits, one volt peak-to-peak video signals, and power requirements for operation of dome environmental controls. A direct coax connection is acceptable but not required.

The interface and locking components shall be made of stainless steel or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder-coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

POLE MATERIALS
All materials and products shall be manufactured in the United States of America, and comply with ASTM or AASHTO specifications. Mill certifications shall be supplied as proof of compliance with the specifications.

POLE DESIGN
Pole design shall be in accordance with loading and allowable stress requirements of 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals",current edition. Loading shall be based on:

- basic wind speed of 90 mph
- 30 percent gust factor using
- design life/recurrence interval of 50 years
- fatigue category I.

The lowering device manufacturer shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum EPA, an EPA equal to or greater than that of the camera system to be attached. All drawings and detail analysis shall be submitted in detail demonstrating compliance with the AASHTO Specification.

To avoid vortex shedding, the steel pole members shall have a taper of 0.14 in/ft. All structures shall be designed to natural wind gust conditions. The yearly mean wind speed for natural wind gusts will be assumed to be 11.2 per hour.

Poles up to 50' in length shall be one-piece construction. Poles greater than 50' in length shall be of two-piece construction. Poles shall conform to ASTM A 595, Grade A minimum yield strength of 55 ksi, ASTM A 572 Grade 65, ASTM A 53. Pole, base plate, and all associated hardware shall be galvanized per ASTM A 123 or A 153. The shaft shall

be round or 16 sided with a four inch corner radius and contain only one longitudinal seam weld. Circumferential welded tube butt splices and laminated tubes are not permitted. Longitudinal seam welds within 6 inches of complete penetration pole to base plate welds shall be complete penetration welds. The shaft shall be hot dip galvanized per the requirements of the contract documents.

The pole top deflection shall not exceed one inch in a 30-mph (non-gust) wind. The calculations shall include a pole, base plate, and anchor bolt analysis. The pole detail analysis shall be analyzed at the pole base, at 5-ft. pole intervals, and at each slip joint splice. Design shall be based on wind loading (EPA) from a CCTV assembly dome enclosure.

A detail analysis of the pole shall be submitted. The detailed analysis shall include, but not be limited to, the following calculations:

1. **Provide Group I, II, III, IV load combinations as listed in Table 3-1 Group Load Combinations in AASTHO.**
2. **Provide dimensions and weights for all attachments. This includes areas used for wind, ice and fatigue loads, drag coefficients, projected areas, velocity pressures and wind force for each segment.**
3. **For Group Loads II, III, and IV, which have wind loads, provide calculations for each controlling "worst case" wind direction that controls any aspect of the design (anchor bolts, pole sizing, ect.)**
4. **Anchor Bolts shall be designed for the orientation that would provide the maximum stress on any individual bolt.**
5. **Provide all structural properties for poles, anchor bolts and base plates. This includes the poles diameter, thickness, section modulus, moment of inertia, and cross sectional area.**
6. **Calculations for each member shall include loads, section properties, member forces (axial, shear and bending), member deflections (angular and linear), member stresses (actual and allowable), and the combined stress ratio (CSR).**
7. **Fatigue calculations should be shown for all fatigue related connections. Provide the corresponding detail, stress category and example from Table 11-2 in AASHTO.**
8. **In fatigue calculations, the effective throat thickness of a complete joint penetration groove weld shall be the thickness of the thinner part joined per AISC J2.1a.**

Provide steel strain poles with a permanently affixed label 6 feet from the bottom of the base plate on the outside with the following information:

manufacturer
height
minimum stringing tension at yield
order number, and
maximum deflection rate.

Provide detailed calculations of the pole. The detailed calculations shall be certified by a Professional Engineer licensed in the Commonwealth of Kentucky.

POLE HAND HOLES

The pole hand hole opening shall be reinforced with a minimum 2-inch wide hot rolled steel rim. The nominal outside dimensions shall be 6.5 inches x 27 inches. The handhole shall have a tapped hole for mounting the portable winch as shown on the drawings.

The handhole cover shall be removable from the handhole frame. On the frame side opposite the hinge, provide a mechanism on the handhole cover/frame to place the Department's standard padlock as specified in Section 834.25. The handhole frame shall have two stainless studs installed opposite the hinge to secure the handhole cover to the frame which includes providing stainless steel wing nuts and washers. The handhole cover shall be manufactured from 0.25 inch thick galvanized steel (ASTM 153) and have a neoprene rubber gasket that is permanently secured to the handhole frame to insure weather-tight protection. The hinge shall be manufactured from 7 gauge stainless steel to provide adjustability to insure a weather-tight fit for the cover. The handhole shall have a 3' L x3' W x4" D concrete pad install beside the opening of the handhole. Concrete for the pad is incidental to this item.

POLE TOP TENON

A tenon shall be welded to the pole top with mounting holes and slot as required for the mounting of the lowering system. The tenon shall be of dimensions required to facilitate camera lowering device component installation. Each slot shall be parallel to the pole centerline for mounting the lowering device.

POLE CABLE SUPPORTS

Electrical Cable Guides and Parking Stand (Eyebolts): Top and bottom electrical cable guides shall be located within the pole and aligned with each other as referenced in the drawings. One cable guide shall be positioned 2 inches below the handhole and the other shall be positioned 1 inch directly below the top of the tenon. A parking stand shall be positioned 2.75 inches below the top of the handhole.

BASE PLATE

Provide base plates that conform to ASTM A36 for grade 36 or ASTM 572 for grade 50. Ensure transverse plates have a thickness $\geq$ 2 inches. Provide a base plate for the vertical pole that fits inside a 48 in diameter concrete base. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration butt weld with backup bar. Plates shall be hot dip galvanized per the requirements of the contract documents.

POLE ANCHOR BOLTS

The anchor bolt design shall follow the NCHRP Report 494 Section 2.4 and NCHRP 469 Appendix A Specifications. Use anchor bolts that conform to the requirement of ASTM F 1554 grade 55 for hooked smooth bars or grade 105 for headed. Anchor bolts shall conform to AASHTO M 314 grade 55. Anchor bolts and all associated hardware shall

be fully galvanized per ASTM A 153. . Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts. For anchor bolt design, pole forces shall be positioned in such a manner to maximize the force on any individual anchor bolt regardless of the actual anchor bolt orientation with the pole. There shall be two steel templates (one can be used for the headed part of the anchor bolt when designed in this manner) provided per pole. Templates shall be contained within a 26.5 inch diameter. All templates shall be fully galvanized (ASTM A 153). Anchor bolt lengths should be based on NCHRP Report 494 Section 2.4.5.5 using #8 bars for the foundation reinforcing steel. The headed anchor bolt assembly shall be contained within 26.5 inch diameter. Minimum edge distance for bolt holes shall follow Table J3.4 of AISC Steel Construction Manual. NCHRP Report 494:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_494.pdf

NCHRP Report 469:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_469-a.pdf

POLE WELDING
All welding shall be in accordance with Sections 1 through 8 of the AWS D1.1 Structural Welding Code. Tackers and welders shall be qualified in accordance with the code. Tube longitudinal seam welds shall be free of cracks and excessive undercut, performed with automatic processes, and shall be visually inspected. Tube shall contain only one longitudinal seam weld. Longitudinal welds suspected to contain defects shall be magnetic-particle inspected by the manufacturer. All circumferential butt-welded pole and arm splices shall be ultrasonically or radiographically inspected by the manufacturer.

This item includes all assembly, mounting hardware, wiring, grounding, and mechanical and electrical adjustments. Due to the electrical connections involved, the CCTV Assembly must be installed to properly test the lowering device. The contractor shall demonstrate to the Engineer the proper and repeated operation of the lowering device. Proper camera operation and electrical connections shall be verified after each lowering/raising cycle.

INSTALLATION

POLE
Pole shall be installed in the correct orientation and plumb. Pole shall be grounded in accordance with the plans and specifications. Damaged galvanizing shall be repaired with a paint approved by the Engineer.

CAMERA BALANCING
The Camera shall be weighted and balanced to assure that the alignment of pins and connectors are proper for the camera support to be raised into position without binding. The lowering unit shall have sufficient weight to disengage the camera and its control components in order that it can be lowered properly.

CAMERA CONNECTIONS
The Contractor shall be responsible for meeting the Ethernet and power requirements and camera (120 volt, 18 AWG minimum).

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Pole with Lowering Device will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

PORTABLE WINCH LOWERING TOOL

DESCRIPTION

Furnish Portable Winch Lowering Tool in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Portable winch lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment. The tool shall consist of a lightweight metal frame and winch assembly with cable as described herein, a quick release cable connector, an adjustable safety clutch and a variable-speed, industrial-duty, battery powered drill motor. The tool shall be compatible with the winch accessible through the hand hole of the pole. When attached to the winch, the tool shall support itself and the load assuring raising/lowering operations and provide a means to prevent freewheeling when loaded. The tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise/lower a capacity load. The tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The tool shall be equipped with a positive locking mechanism to secure the cable reel during raising/lowering operations.

INSTALLATION

No installation is required. Portable winch lowering tools shall be delivered to a location determined by the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Portable Winch Lowering Tool will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

WEB CAMERA ASSEMBLY

DESCRIPTION

Furnish and install Web Camera Assembly in accordance with the plans, specifications and Standard Drawings.

MATERIALS

The Web Camera Assembly shall be an Axis Network Dome Model P5635-E or approved equivalent. This item shall include the color camera, zoom lenses, environmental enclosure, pan/tilt unit, housing, dome, parapet mount, and all mounting hardware, POE power cable, connections, and incidentals necessary to complete the work.

Proposed alternates shall be commercially available. The Contractor shall identify an installed site where the proposed alternate Web Camera Assembly has been operating for a period of at least one year in a similar climate region. The contractor shall supply a spare camera/POE and deliver it to Trimarc.

INSTALLATION

Web Camera Assembly shall be installed on a wood pole or steel strain pole as specified in the plans and in accordance with the manufacturer's instructions. Installation shall comply with all warranty provisions and warranty contract maintenance services. Installation shall comply with all local, state, and federal building, electrical and construction codes, and Motorola R-56 requirements. All wiring access to the Web Camera Assembly shall be through watertight fittings. Wiring access points shall be on the side or underneath components; no exposed top access is permitted. The Web Camera Assembly shall be installed so that the assembly is located on the side of the pole closest to the roadway when the camera is in its fixed position at the top of the pole. The contractor is responsible to verified all functions of the web camera through a laptop interface.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Web Camera Assembly will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

UNINTERRUPTIBLE POWER SUPPLY (RACK MOUNTED UPS)

DESCRIPTION

Furnish and install Uninterruptible Power Supply in accordance with the plans, specifications and Standard Drawings.

MATERIALS

The Uninterruptible Power Supply shall be provided emergency power to the load when the input power sources fails. The Uninterruptible Power Supply shall be APC UPS 1500VA LCD RM 2U (networkable card AP9630) or approved equal. The Uninterruptible Power Supply shall be networkable and have the following technical specifications:

Output Power Capacity: 980 Watts/ 1440 VA
Nominal Output/Input voltage: 120 Volts
Efficiency at Full Load: 95%
Waveform Type: Sine Wave
Output/Input Connections: (6) NEMA 5-15R
Battery Type: Maintenance-free sealed Lead-Acid Battery with suspended electrolyte:leakproof

Interface Ports: DB-9 Rs 232, USB
Surge Energy Rating: 459 Joules
Filtering: Meets UL 1449
Mounting: shall be able to mount in 19" rack
Operating Environment: 0-40 degrees Celsius
Regulatory Approvals: CSA, FCC Part 15 Class A, UL 1778
Warranty: At least 3 year for repair or replace

Network card shall have the following:

Protocols: HTTP, HTTPS, IPv4, SMTP, SNMP v1, SNMP v3, SSH V1, SSH V2, SSL, TCP/IP, Telnet
Network Interface Connections: RJ-45 10/100 Base-T
Regulatory Approvals: AS/NZS 3548 (C-Tick) Class A, EN 55022 Class A, En 55024, FCC Part 15 Class A, GOST, ICES-003, VCCI Class A
Warranty: At least 3 year for repair or replace

INSTALLATION

Uninterruptible Power Supply shall be installed in 334/336 Cabinet as specified in the plans sheets. It shall be securely mounted the 19" frame which is included in supplied 334/336 cabinet. All cables, rack Mounting Brackets, Rack Mounting support rails shall be incidental to the item.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Uninterruptible Power Supply will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

COMMUNICATIONS CABLE

DESCRIPTION

Furnish and install Communications Cable in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Communications cable shall be General Cable GenSpeed 5000 CAT 5e Outside Plant Cable 8 wire PN: 5136100 or approved equal. The cable shall meet or exceed the following specifications:

Performance:

- ANSI/TIA/EIA 568B (Category 5e)
- MIL-C-24640A Water Penetration
- Propagation Delay: 583 ns @ 100 MHz
- Return Loss @ 100 MHz: 20.1 DB
- Frequency Range: 1-350 MHz

Physical characteristics:

- Nominal Outside Diameter: 0.230 in
- Insulation Type: Polyolefin
- Maximum Pulling Tension: 25 lbs
- Maximum DC Resistance: 9.38 Ohms/100m
- Mutual Capacitance @ 1kHz: 17 pF/100m
- Operating Temperature: -45° C to 80° C

All connectors, terminators, fittings, etc. shall be incidental to the cost of installing the Communications Cable and no separate payment will be made. Wireless router shall be Sierra Wireless Airlink GX450 with ethernet add-on shall support ATT 3G/4G/LTE services at each location. The antenna should be Laird Lp-800-2500-9NF sku393969. All antennas for the wireless router shall be installed on the outside of the 334 cabinet shall be waterproof.

The Contractor shall deliver the wireless router (GX450) to Central Office Traffic Operations for provisioning on the KYTC APN. The cabinet will provision the router within 4 weeks of receipt and return via mail to the contractor. The cabinet will pay the monthly data plan charges. The cabinet will allow temporary access to the router until the close of the contract for configuring of the adaptive system.

All system components shall arrive at the job site completely factory pre-wired and ready for field installation. All connections shall be clearly and permanently labeled to facilitate correct and easy termination of equipment.

INSTALLATION

The Contractor shall install all cable and wire splice-free from the controller/service location to each cabinet, VMS sign, or CCTV camera the cable or wire is feeding. The Contractor shall not use excessive force when pulling wire through duct. The Contractor

shall replace all wire damaged during installation. The Contractor shall submit to material testing at the discretion of the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Communications Cable will be measured for payment per unit linear foot The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

CONDUIT

DESCRIPTION

Furnish and install Conduit in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Conduit shall be rigid steel, schedule 40 PVC, flexible, non-metallic, and ducted conduit as specified. This item includes fittings, connectors, clamps, caps and other materials necessary for proper installation. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION

All conduit installed above ground or below ground under pavement shall be rigid steel. All conduits installed below ground, not under pavement shall be PVC or ducted cable. Flexible, non-metallic conduit shall be used as required and shall be incidental to the project. Unused conduits shall be capped on both ends. Conduit containing wire or cable shall be sealed with a piece of steel wool and capped off with duct seal putty. All conduits shall be accessible inside junction boxes. All conduits shall have bushings included. If rigid steel conduit, the bushings shall be bonded together with other similar types of conduits.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Rigid Steel and PVC Conduit will be measured for payment per unit linear foot. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section. A direct measurement will not be made for flexible, non-metallic conduit. All flexible, non-metallic conduits shall be incidental to the project.

MODEL 334 AND 336 ENCLOSURES

DESCRIPTION

Furnish and install Enclosure in accordance with the plans, specifications and Standard Drawings.

MATERIALS

The two types of enclosures are Model 336 (36" H x 24" W x 22" D) and Model 334 (66" H x 24" W x 30" D). All enclosures shall be NEMA 3R rated. The enclosures shall include: all mounting accessories, access doors (minimum of two doors), ventilation, locking system, handles, door stops, rack assembly, light(s), shelves, drawer, and all required peripherals per the requirements of the contract documents and per the equipment submitted by the Contractor. **The contractor shall provide a cabinet, wiring, and all components that are approved as an assembly. This approved assembly shall be incidental to this item. Verification that the cabinet, wiring, and all components are an approved assembly shall be submitted to Central Office Traffic Operations.**

This item includes all excavation and any special equipment required to install the enclosure on a pole for a Model 336 enclosure or construct the concrete base for a Model 334 enclosure.

The Contractor shall provide a terminal facility harness by means of mating "MS" type connectors for interconnections of the field equipment specified. All cabinets of the same type shall be identical in size, shape and quality. In addition, the cabinets shall be equipped internally as specified herein and as required to suit the specific equipment specified on the plans.

Cabinets shall be of welded construction, using 0.125" minimum thickness 5052H32 or equivalent sheet aluminum. The equipment design shall utilize the latest available techniques, minimum number of different parts, subassemblies, circuits, cards and/or modules to maximize standardization and commonality.

Cabinets shall be provided with fully wired back and side panels with all necessary terminal boards, wiring harnesses, connectors and attachment hardware. All equipment shall be shelf or 19" rack mounted. Terminals and panel facilities shall be installed on the lower portion of the cabinet walls below all shelves.

Each field cabinet shall, at a minimum, be supplied with the following:

- Fan and Thermostat
- Left Side Power Distribution Panel
- Air Filter
- Adjustable Shelves (1-4 as needed for equipment submitted by the Contractor)
- Back Panel
- Right Side Panel
- Locking System
- Ground Bus (2)
- Terminal Blocks
- Duplex power outlet
- Drawer that slides out for supporting a laptop computer
- All necessary installation and mounting hardware

All external screws, nuts and locking washers shall be stainless steel; no self-tapping screws are permitted unless specifically approved by the Engineer. All screws, nuts and locking washers used internally shall be manufactured from corrosion resistant materials.

All parts of the cabinet shall be cleaned, smoothed and free from flaws, cracks, dents and other imperfections. The cabinet shall be rigidly constructed to provide vibration free

operation of the field equipment when installed. The cabinets shall be dust and rain tight and capable of maintaining a dry internal condition when subject to rain and wind gusts.

All components shall be made of corrosion resistant materials such as plastic, stainless steel, aluminum or brass; or shall be treated with corrosion resistance such as cadmium plating or galvanizing. All materials shall be resistant to fungus growth and moisture deterioration.

Individual cabinet components shall be pre-assembled upon installation in the cabinet such that the components can be easily replaced in the field. Modules of unlike function shall be mechanically keyed to prevent insertion into the wrong socket or connector.

Panels shall be designed to mount in the cabinet on mounting studs. It shall not be necessary to remove the panel to replace any panel-mounted equipment. The panels shall be capable of supporting specified equipment mounted on the panel. A lower input termination panel shall be provided to terminate all input field wires.

Electronic components shall meet the requirements contained herein and shall, at a minimum, comply with EIA Specifications. No component shall be of such design, fabrication, nomenclature or other identification as to preclude the purchase of said component from a wholesale electronics distributor or from the component manufacturer.

Components shall be down-rated by 50 percent with regard to ambient temperature, applied voltage, and power dissipation. All circuits shall be designed for reliability and maximum performance.

The design life of all components, under continuous operating conditions in their circuit application, shall be a minimum of ten years.

Each component shall meet all of its specified performance requirements when the input power is AC, 60 Hz, single phase, 120 volts +/- 20 volts. The equipment shall be designed such that the failure of a particular piece of equipment will not cause the failure of any other.

The cabinets shall be furnished with a power distribution panel mounted on the lower left hand inside wall when facing the front of the cabinet. This panel shall include a 115 VAC, convenience, dual outlet with integral ground fault interrupt protected by a circuit breaker. The left panel shall have:

- Circuit Breaker(s)
- Radio Interference Suppressor
- Power Cable Input and Junction Terminals

Circuit breakers shall be approved and listed by UL. Each cabinet shall have, at a minimum, a circuit breaker to protect the lamp, vent fan, and dual outlet. In addition, a properly rated equipment circuit breaker(s) shall be provided for the equipment shown on the plans. At each cabinet that houses VMS control equipment, a 220 VAC circuit breaker, sized to suit the cables that provide power to the VMS pixels shall be furnished and installed. Breakers shall have a minimum interrupt capacity of 50 amperes.

Each cabinet shall be equipped with a radio interference suppressor installed at the circuit breaker. The suppressor shall provide a minimum attenuation of 50 dB over a frequency range of 200 kHz to 75 MHz. The suppressor shall be hermetically sealed in a case filled with a suitable insulation compound.

The suppressor terminals shall be nickel-plated, with brass studs of sufficient external length to provide space for connection of two appropriately sized conductors and shall be mounted such that the terminals cannot be turned in the case. The suppressors shall be designed for operation at the proper current ampere rating as determined by the Contractor per the equipment specified on the plans and shall be approved by UL and EIA.

Power distribution blocks suitable for use as a power feed and junction points shall be furnished and installed for two and three wire circuits. The line side of each circuit shall be capable of handling the specified number of and size of all wires.

Each cabinet shall include a fully wired equipment panel mounted on the lower rear inside of the wall of the cabinet. The back panel shall be utilized to distribute and properly interconnect all cabinet wiring related to the specific equipment. Each piece of equipment specified shall have its cable harness properly connected at terminal boards on the back panel. All functions available at the equipment connector shall be carried in the connector cable harness to a terminal board point on the back panel.

Wiring shall be provided for the equipment specified. All cabinet wiring, where connected to terminal strips, switches, radio interference suppressor, etc., shall be identified by the use of insulated pre-printed sleeving (wire markers) slipped over the wire before attachment of the lug or terminating the connection. The wire markers shall have a text label with sufficient detail so that a translating sheet is not required.

All wires shall be cut to the proper length before assembly. No wires shall be doubled back to take up slack. Wires shall be neatly secured with nylon lacing or cable ties. Cables shall be secured with nylon cable clamps.

The grounded side of the electric service shall be carried throughout the cabinet to the ground bus without a break.

All electrical connections in the cabinet shall have sufficient clearance between each terminal and the cabinet to prevent a leakage path or physical contact under stress. Where these distances cannot be maintained, barriers must be provided. All equipment grounds shall run directly and independently to the ground bus. The lay of the interconnect cable between the components must be such that when the door is closed, it does not press against the cables or force the cables against the various components inside the cabinet. Sufficient length of cable harnesses shall be provided to easily reach the electronic equipment placed anywhere on the shelves.

All wiring containing line voltage AC shall be routed and bundled separately and/or shielded from all low voltage (i.e. control) circuits. All conductors and live terminals or parts, which

could be hazardous to maintenance personnel, shall be covered with suitable insulating materials.

All conductors used in the cabinet wiring shall be 22 AWG or larger with a minimum of 19 strands. The insulation shall have a minimum thickness of 10 MILS. All wiring containing line voltage shall be 14 AWG or larger.

The AC+, AC-, and equipment ground wiring shall be electrically isolated from the other by an insulation resistance of at least 10 Megohms when measured at 250 VAC. Return and equipment grounding wiring shall be color-coded white and green respectively.

Terminal blocks located on the panels shall be accessible such that it shall not be necessary to remove the electronic equipment from the cabinet to make a connection or perform an inspection.

Terminal blocks shall be two-position, multiple-pole, and barrier type. Shorting bars, along with integral marking strip, shall be provided. Terminal blocks shall be arranged such that they do not impede the entrance, training, or connection of incoming field conductors. All terminals shall be identified by legends permanently attached to the terminal blocks. Not more than three conductors shall be brought to any one terminal screw. No electrically live parts shall extend beyond the protection afforded by the barriers. All terminal blocks shall be located below the shelves.

AC terminal blocks shall be Underwriter's Laboratory approved for 600 volts AC minimum and shall be suitable for outdoor use. Terminals used for field connections or interwiring connections shall secure conductors by means of a nickel or cadmium plated brass binder head screw.

All connections to and from the electronic equipment shall terminate at an interwiring block. These blocks shall act as intermediate connection points for all electronic equipment inputs and outputs.

A varistor shall be installed across the thermostat used to control the fan to act as a surge and transient noise suppressor. The varistor shall be GE VI5OLAIOA, Stetron 250NRO7-1, Siemens SIOK150, or approved equal.

MOUNTING

Model 336 cabinets shall be pole mounted or mounted to an existing concrete wall as specified. Model 334 cabinets shall be mounted on a poured concrete base or on existing concrete surfaces as specified. All holes drilled into existing concrete surfaces shall penetrate the concrete no more than 4 inches unless otherwise approved by the Engineer. Bolts inserted into any concrete surface shall be properly secured and epoxied, per manufacturer's recommendations. Prefabricated fiberglass bases used in lieu of poured concrete bases must be approved by the Engineer. Cabinet installation shall conform to the details shown. All cabinets shall be furnished with stainless steel mounting plates, nuts, bolts, washers and all other necessary hardware to mount the cabinet as shown or described.

DOORS

All cabinets shall be provided with doors in the front and back. Doors shall have secure gaskets to prevent the entrance of dust and moisture. Doors shall be sized to encompass the full area of the cabinet opening. Doors shall be provided with two stop positions to hold the door open at 90 degrees and 135 degrees. The stops shall hold the door securely open until released manually. The front door shall be hinged on the right-hand side by means of three butt hinges with 1/4" minimum stainless steel hinge pins.

VENTILATION

Cabinets shall be furnished with louvers properly designed to provide natural ventilation to the interior. The louver area shall be of sufficient size to permit the free flow of air corresponding to the rated capacity of the associated cabinet fan. A pleated media fiber filter shall be provided and shall cover all louvers.

Cabinets shall be furnished with an electric, thermostatically-controlled ventilation fan or fans mounted in the cabinet. The fan(s) shall have a rated capacity of at least 200 cubic feet per minute. The fan and cabinet ventilation louvers shall be located with respect to each other so as to direct the bulk of the air flow throughout the entire cabinet and, in particular, over the field equipment units. The thermostat shall be adjustable to turn on between 90 degrees and 120 degrees Fahrenheit.

LOCKING SYSTEM

Each door shall be furnished with a 3-point positive locking system. The lock for the door shall be a self-locking, heavy-duty, five-pin tumbler cylinder rim type. The handles shall be made of stainless steel and shall be provided with a padlock feature. Locks shall be keyed identically to Corbin #2. Two keys shall be provided for each cabinet.

LIGHT

A fluorescent light shall be provided in front for all cabinets and also in the back for Model 334 cabinets. A panel mounted 40-Watt weatherproof incandescent lamp with an on-off switch shall be positioned to provide light to the face of the equipment installed in the cabinet.

SHELF/DRAWER/RACK

A removable 19" EIA rack shall be provided for mounting sub-assemblies in Model 334 cabinet. Adjustable shelves shall be provided to hold the equipment. Vertical shelf adjustment intervals shall be 2" maximum. The shelves shall be positioned from the top of the cabinet in accordance with the actual equipment configuration of the particular cabinet. All devices/sub-assemblies shall be mounted on the rack if possible. Otherwise, they shall be placed on the shelves.

A sliding drawer shall be provided in each cabinet. The drawer shall be installed below the shelves in a suitable position for placement of a laptop computer. The drawer shall have a nominal depth of 1" and a hinged lid.

LABELING

The letters "KYTC ITS" shall be permanently displayed along the top of each door on the outside of each cabinet. The letters shall be a minimum of 1" tall. The letters shall be die-cut or engraved into the metal before galvanizing and shall be readable after galvanizing. All excess galvanizing shall be brushed off. The location and description of the label must be shown on the shop plan submittal for the cabinets. Stenciling with paint or other markers is not permitted. If required information is placed on a steel plate, the plate must match the surface profile of the cabinet. The plate must then be welded completely around the plate before galvanizing.

QUALITY ASSURANCE PROVISIONS

The following water spray test shall be performed on each empty cabinet: Water shall be sprayed from a point directly overhead at an angle of 60° from the vertical axis of the cabinet. This procedure shall be repeated for each of eight equally spaced positions around the cabinet for a period of not less than five minutes in each position. The water shall be sprayed using a domestic type-sprinkling nozzle at a rate of not less than one gallon per minute per square foot of the cabinet's surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

A manufacturer's certification of successful completion of the water spray test and that the cabinet conforms to these specifications shall be the basis of acceptance of the cabinet. Separate submission of test cabinets shall not be required.

MAINTENANCE

All components and assemblies shall be clearly identified with name, model number, serial number and any other pertinent information required to facilitate equipment maintenance.

All equipment shall be designed for ease of installation and maintenance. Location, accessibility, serviceability and features that will lead to simplified maintenance shall be a prime consideration. All component parts shall be readily accessible for inspection and maintenance. The only tools and test instruments required by maintenance personnel shall be simple hand tools and basic meters.

After the wiring is complete, all conduit penetrations into the cabinets shall be sealed in such a manner as to prevent rodents and insects from entering the cabinet. The conduit sealants and insect traps used shall be approved by the Engineer prior to installation.

DOCUMENTATION

Each field cabinet shall be supplied with three copies of the final cabinet wiring diagram. One copy shall be placed in a clear plastic envelope and left in the cabinet drawer. Two sets of Mylar plans shall be delivered to the Engineer.

INSTALLATION

Model 334/336 enclosure shall be installed in accordance with the plans and specifications. The Contractor shall stake all proposed enclosure locations and shall obtain approval of staked locations before excavation. A representative from the KYTC Division of Traffic Operations, Design Services Branch or the Traffic Engineer, District

4/6, TRIMARC representatives (for Jefferson/Oldham only) will approve locations for all field devices. The Contractor shall have all utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule this location approval with KYTC. KYTC approval of field device locations does not relieve the contractor from his responsibility to repair any damage incurred during construction. Enclosures located behind guardrail shall have minimum 5 foot spacing from edge of pole to face of guardrail. Otherwise, enclosures shall be located as specified on the plan sheets or a minimum of 30' from all driving lanes. All materials shall be installed in a neat and professional manner. All pole mount cabinets shall be mounted approximately 42" from the ground. All 336 pole mounted cabinets shall a 3' L x3' W x4" D concrete pad install for each door. Concrete for the pad is incidental to the cabinets. The Contractor shall grade and re-seed all disturbed areas to the satisfaction of the Engineer. This item includes the furnishing and installing of Fastrac bait bag in each cabinet for rodent control.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Model 334/336 Enclosure will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

SURGE DEVICES

DESCRIPTION

Furnish and install video surge device, data surge device, power surge device, and RF surge device in accordance with the plans, specifications and Standard Drawings.

MATERIALS

GENERAL

Each surge device shall be compatible with the equipment it is protecting. Each surge device shall include cables, connectors, power supplies, and all incidentals required for operation.

VIDEO SIGNAL COAX CONDUCTOR SURGE DEVICE

Video Signal Coax Conductor Surge Device shall be EDCO CX12-BNC-Y or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 12 volts when subjected to a 3 kA, 8x20 microsecond wave
- Have a peak surge current of 20kA with 8x20 microsecond wave
- Have BNC connectors
- Pass signals from DC to 80 MHz with less than 3 dB insertion losses

- Be UL 497B listed

DATA SIGNAL CONDUCTOR SURGE DEVICE
Data Signal Conductor Surge Device shall be for RS 422 and RS 485 Communication conductors shall be EDCO PC642C-015 or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 12 volts when subjected to a 1 kA 8x20 microsecond wave
- Have a peak surge current per wire of 10 kA with 8x20 microsecond wave
- Have a maximum inline resistance of 6 ohms
- Have a maximum attenuation of -3db at 50MHz

RS 232 COMMUNICATION DATA SIGNAL CONDUCTOR SURGE DEVICE
Data Signal Conductor Surge Device for RS 232 Communication conductors shall be EDCO PC642C-015 or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 30 volts when subjected to a 1 kA 8x20 microsecond wave
- Have a peak surge current per wire of 3kA with 8x20 microsecond wave
- Have a maximum inline resistance of 6 ohms
- Have a maximum attenuation of -3 db at 0.5 MHz

100 BASE-T AND 10 BASE-T COMMUNICATION DATA SIGNAL CONDUCTOR SURGE DEVICE
Data Signal Conductor Surge Device for 100BaseT and 10BaseT Communication conductors shall be EDCO LCDP-30 or approved equal. This surge protector shall:

- Have a clamping voltage response time of less than one nanosecond
- Have a maximum clamping voltage of 30 volts when subjected to a 0.5 kA 8x20 microsecond wave
- Have a peak surge current per wire shall be 1kA with 8x20 microsecond wave
- Have a maximum attenuation shall be -3db at 100 MHz
- Have a N.E.X.T. worst pair of better than -40 db at 100 MHz
- Have a maximum attenuation of -3db at 0.5 MHz

POWER CONDUCTOR SURGE DEVICE
Conductor Surge Device for power carrying conductors shall be EDCO SHA-1210 or approved equal. This surge protector shall meet or exceed the following specifications:

- Nominal Line Voltage 120 V
- Peak Current 20,000 Amps
- Clamp Voltage 280 volt typical @ 20kA
- Response time <5ns
- Continuous Service Current 10 Amps max. 120 VAC, 60 Hz

RF ANTENNA COAX CONDUCTOR SURGE DEVICE

RF Antenna Coax Conductor Surge Devices shall meet all manufacturer recommendations for the particular use of the radio antenna coax conductors.

INSTALLATION

The Contractor shall supply surge devices in model 334/336 enclosures, VMS signs, on poles, and on sign trusses as specified on layout sheets. Surge devices shall be located in said equipment such that they are easily accessible for maintenance activities.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Surge Device will be measured for payment per unit each. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

TRENCHING AND BACKFILLING

DESCRIPTION

Trenching and Backfilling shall be performed in accordance with the plans, specifications and Standard Drawings.

MATERIALS

All trenches shall be marked with underground utility warning tape.

INSTALLATION

The Contractor shall be responsible for locating all underground utilities prior to excavation. The Contractor shall excavate the trench, place warning tape above the conduit, backfill the trench and restore all disturbed areas to the satisfaction of the Engineer. Backfill material shall be placed and compacted in lifts of 9 inches or less.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Trenching and Backfilling will be measured for payment per unit linear foot. The Department will make payment for complete, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

WIRE, CABLE, DUCTED CABLE

DESCRIPTION

Furnish and install Wire and Cable in accordance with the plans, specifications and Standard Drawings.

MATERIALS

Unless otherwise specified, wire shall be stranded copper type USE and conform to section 834.06. This item shall include all connectors, splicing and insulating hardware, ties, tape, labels and incidentals required for electrical connections. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION

The Contractor shall install all cable or wire runs splice-free from the controller/service location to each cabinet, VMS sign, or CCTV camera the cable or wire is feeding. All wire shall be labeled inside cabinets and junction boxes. The contractor shall not use excessive force when pulling wire through duct. The contractor shall replace all wire damaged during installation. The Engineer may require testing of wiring for damaged insulation. Wire that does not pass an insulation resistance test of a minimum of 100 hundred megohms to ground shall be replaced by the Contractor at his cost.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Wire and cable will be measured for payment per unit linear foot. The Department will make payment for complete, functioning, inspected, and accepted quantities. The Department will consider payment as full compensation for all work required under this section.

Vented Rodent Barrier Detail

Vented rodent barrier – Prior to erecting tubular structures and poles on concrete foundations formed with conduit sweeps, a double lapped ring barrier of standard commercial grade 27 gauge hot dipped galvanized 1/8 inch woven wire mesh shall be placed inside the foundations bolt circle. The height of the wire mesh ring barrier shall be from the concrete foundation to the top of the leveling nuts and washers plus 1/4 inch. The Contractor shall take all necessary steps to assure the wire mesh ring will remain in place to eliminate any access through the base plate opening of the tubular structure or pole when erected and plumbed. The Contractor shall not weld or drill to the base plate of the pole. Optional vented rodent barrier designs and materials may be used when approved by the Engineer and at no additional cost to the Department.

Vented Rodent Barrier

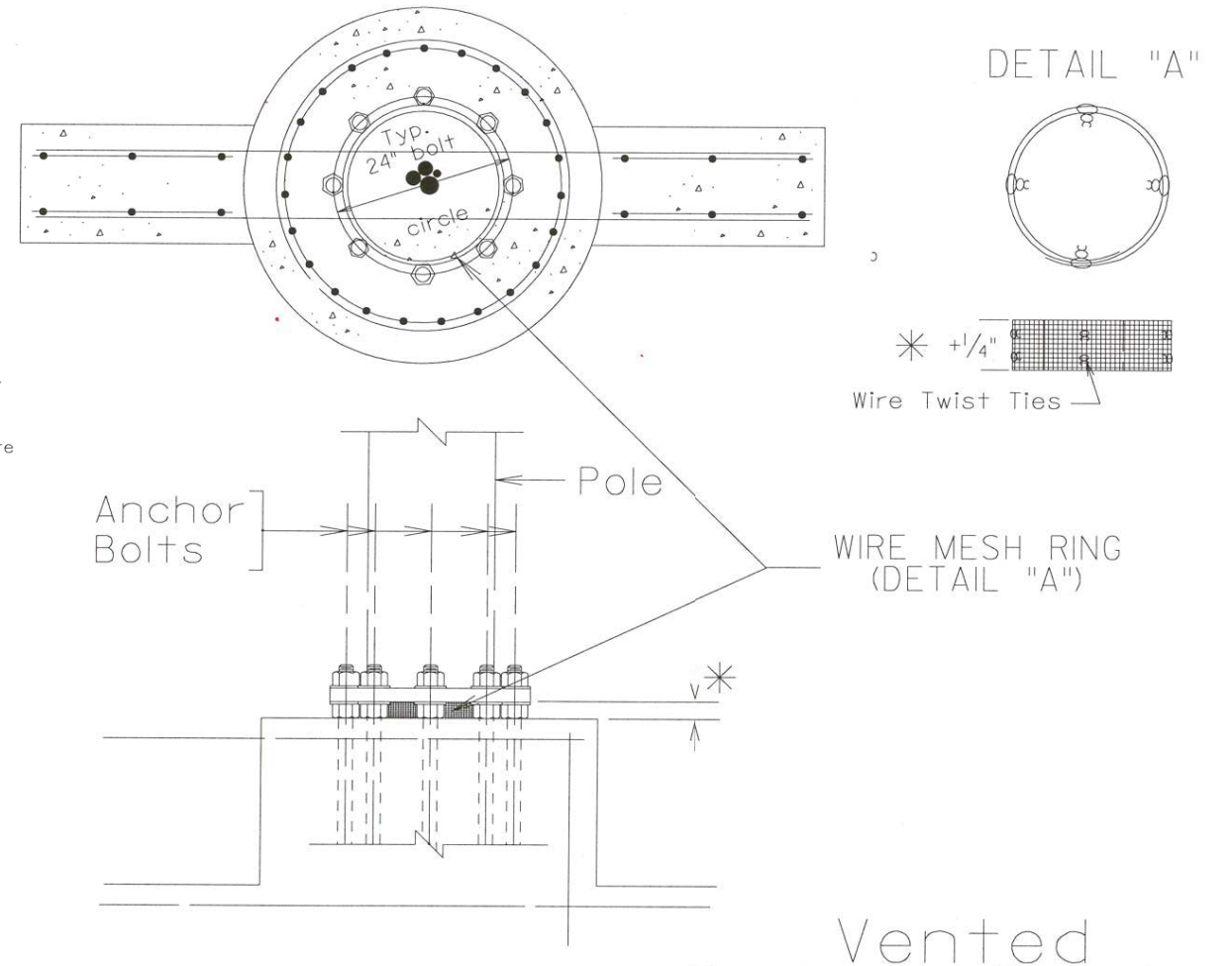
Notes:

1) Wire Mesh Ring
   - 1/8" Woven Hardware Cloth
   - 27 Gauge (Commerical Grade)
   - Hot dipped galvanized
   - Doubled Lapped
   - Length & Height determined by field measurements
   - Secured with Wire Twist Ties

2) Wire mesh ring shall be placed inside the bolt circle before pole is erected and plumbed.

3) Wire mesh ring shall be compressed between pole base plate, concrete foundation and bolt circle. Take all necessary steps to assure the wire mesh ring will remain in place and any access through the pole base plate opening is eliminated.

4) Welding or drilling is not permitted on base plate of pole.



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GLOSSARY

The following acronyms, abbreviations, and definitions shall govern this specification:

- AASHTO – American Association of State Highway and Transportation Officials
- ABS - Acrylonitrile Butadiene Styrene
- AC – Alternating Current
- AlInGaP – Aluminum Indium Gallium Phosphide (refers to the chemical composition of an LED).
- ANSI – American National Standards Institute
- ASCII – American Standard Code for Information Interchange
- ASN.1 – Abstract Syntax Notation 1
- ASTM – American Society for Testing and Materials
- AWG - American Wire Gauge
- AWS – American Welding Society
- BCD – Binary Coded Decimal
- B frames – Bi-directional Predicted Frames
- BGP – Border Gateway Protocol
- Bin – Group of LEDs categorized and sorted by intensity or color. Each bin has upper and lower intensity or color specifications and contains only LEDs that are measured to be within that range. LED manufacturers sort LEDs into bins to ensure consistent intensity and color properties.
- BOOTP – Bootstrap Protocol
- CALTRANS – California Department of Transportation
- CAN – Control Area Network
- CCTV – Closed Circuit Television
- CDPD – Cellular Digital Packet Data
- CLI – Command Line Interface
- CNC – Computer Network Control
- Control Computer – A desktop or laptop computer used in conjunction with VMS control software to communicate with VMS sign controllers. The control computer can instruct a VMS sign controller to program and control the VMS, monitor VMS status, and run VMS diagnostic tests. A control computer can be used for remote control of one of more VMS, as well as for local control of a single VMS
- DC – Direct Current
- DHCP – Dynamic Host Configuration Protocol
- DMS – Dynamic Message Sign. An industry term that applies to various types of changeable sign technology
- DVI-D – Digital Visual Interface - Digital
- EIA – Electronic Industries Association
- ELFEXT – Equal Level Far End Crosstalk
- EPA – Effective Projected Area
- FCC – Federal Communications Commission
- FDA – Food and Drug Administration

- Font – The style and shape of alphanumeric characters that are displayed on the VMS matrix to create messages viewed by motorists and travelers
- Frame – see *Page*
- FSORS – Full, Standardized Object Range Support – an NTCIP term. See the NTCIP standards for additional information.
- GUI – Graphical User Interface
- HDPE – High Density Polyethylene
- HHR – Half Horizontal Resolution
- HTTP – Hypertext Transfer Protocol
- IEEE – Institute of Electrical and Electronic Engineers
- I frames – Intra-frames
- IC – Integrated Circuit
- IGMP
- InGaAlP – Indium Gallium Aluminum Phosphide
- I/O – Input/Output
- IP – Internet Protocol – in transceivers
- IRE – Institute of Radio Engineers
- ISO – International Organization for Standardization
- ITE – Institute of Transportation Engineers
- ITS – Intelligent Transportation System
- Kbps – Kilobits per second
- KYTC – Kentucky Transportation Cabinet
- LAN – Local Area Network
- LCD – Liquid Crystal Display
- LED – Light Emitting Diode
- MDPE – Medium Density Polyethylene
- Message – Information displayed on the VMS for the purpose of visually communicating with motorists. A VMS message can consist of one or more pages of data that are displayed consecutively
- MIB – Management Information Base
- Module – Assembly consisting of a two-dimensional LED pixel array, pixel drive circuitry, and mounting hardware. Modules are installed in the display adjacent to each other to form the display matrix.
- MTBF – Mean Time Between Failures
- MPEG – Moving Picture Experts Group
- NEC – National Electrical Code
- NEMA – National Electrical Manufacturers Association
- NESC – National Electrical Safety Code
- NEXT – Near End Crosstalk
- NCHRP – National Cooperative Highway Research Program
- NRZ – Non Return to Zero
- NRZI – Non Return to Zero Inverted
- NTCIP – National Transportation Communications for ITS Protocol

- NTSC - National Transmission Standards Committee
- Object – An NTCIP term referring to an element of data in an NTCIP-compatible device that can be manipulated to control or monitor the device.
- OER – Octet Encoding Rules
- OSHA – Occupational Safety and Health Administration
- OTDR – Optical Time Domain Reflectometer
- Page – An NTCIP term referring to the data that is displayed on the VMS display matrix at a given moment in time. Also referred to as a frame.
- P frames – Forward Predicted Frames
- PCB – Printed Circuit Board
- Pixel – Picture element. The smallest changeable (programmable) portion of a VMS display matrix
- PMPP – Point to Multi-Point Protocol
- PPP – Point to Point Protocol
- PSELFEXT – Power Sum Equal Level Far End Cross Talk
- PSNEXT – Power Sum Near End Crosstalk
- PTZ – Pan/Tilt/Zoom
- PVC – Polyvinyl Chloride
- PWM – Pulse Width Modulation
- QSIF – Quarter Source Input Format
- RAM – Random Access Memory
- RARP – Reverse Address Resolution Protocol
- RGB – Red-Green-Blue
- Schedule – A set of data that determines the time and date when a VMS sign controller will cause a stored message to be displayed on the VMS
- SDRAM – Synchronous Dynamic Random Access Memory
- SIF – Source Input Format
- SNMP – Simple Network Management Protocol
- STMP – Simple Transportation Management Framework
- Stroke – Refers to the vertical and horizontal width of the lines and curves of a display font. Single stroke denotes character segments that are one pixel wide. Double stroke denotes character segments that are two pixels wide.
- TFTP – Trivial File Transfer Protocol
- TIA - Telecommunications Industry Association
- TMA – Truck Mounted Attenuator
- TOC – Traffic Operations Center
- UL – Underwriters Laboratories
- UPS – Uninterruptible Power Supply
- USB – Universal Serial Bus
- VLAN – Virtual Local Area Network
- VMS – Variable Message Sign. A type of VMS that is fully programmable such that the content of its messages are fully changeable remotely and electronically.
- VMS Controller – A stand-alone computer that is located at a VMS site, which

controls a single VMS. A sign controller receives commands from and sends information to a control computer

- WAN – Wide Area Network
- WYSIWYG – What You See Is What You Get. More specifically, what you see on the VMS control computer monitor is a scaled representation of how a message will appear when it is being displayed on the VMS. Similarly, after a pixel diagnostic test routine has been run, what you see on the control computer monitor is a scaled representation of the functional status of each pixel in the VMS display matrix.

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DIVISION OF TRAFFIC OPERATIONS

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

Item Number: **8-06.20**
County: **Rockcastle**
Description: **I 75 & US 25 N Bound Ramp Renfro Vaqlley Exit**

Cabinets	Master code	Description of Item
1	T-01-0020	Base Mounted 332 Cabinet
1	T-01-0100	170 Controller
5	T-01-0600	Loop Detector, Model 222
5	T-01-0700	Load Switches

Signals		
8	T-02-0009	Siemens 3 Section Signal
2	T-02-0033	Siemen 4 secton 12" signal (poly)
2	T-02-0300	LED Module 12" red arrow
4	T-02-0310	LED Module 12" yellow arrow
2	T-02-0320	LED Module 12" green arrow
8	T-02-0330	LED Module 12" red ball
8	T-02-0340	LED Module 12" yellow ball
8	T-02-0350	LED Module 12" green ball

Special items		
1	T-02-0504	Router (this includes power supply/antenna/cabling)

Poles		
1	T-04-0030	Steel Strain Pole 32 foot
1	T-04-0040	Steel Strain Pole 34 foot
1	T-04-0055	Steel Strain Pole 40 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 INLAID PAVEMENT MARKERS

I. DESCRIPTION

Except as provided herein, perform all work in accordance with the Department's Standard and Supplemental Specifications and applicable Standard and Sepia Drawings, current editions. Article references are to the Standard Specifications. This work shall consist of:

(1) Maintain and Control Traffic; and (2) Furnish and install Inlaid Pavement Markers (IPMs) in recessed grooves; and (3) Any other work as specified by these notes and the Contract.

II. MATERIALS

The Department will sample all materials in accordance with the Department's Sampling Manual. Make the materials available for sampling a sufficient time in advance of the use of the materials to allow for the necessary time for testing unless otherwise specified in these Notes.

A. Maintain and Control Traffic. See Traffic Control Plan.

B. Markers. Provide reflective lenses with depth control breakaway positioning tabs. Before furnishing the markers, provide to the Engineer the manufacturer's current recommendations for adhesives and installation procedures. Use one brand and design throughout the project. Use markers meeting the specifications in the table below.

SPECIFICATIONS FOR HOUSING AND REFLECTOR	
Material:	Polycarbonate Plastic
Weight:	Housing 2.00 oz.
	Reflector 2.00oz.
Housing Size:	5.00" x 3.00" x 0.70" high
Specific Intensity of Reflectivity at 0.2° Observation Angle	
White:	3.0 at 0°entrance angle
	1.2 at 20°entrance angle
Yellow:	60% of white values
Red:	25% of white values

C. Adhesives. Use adhesives that conform to the manufacturer's recommendations.

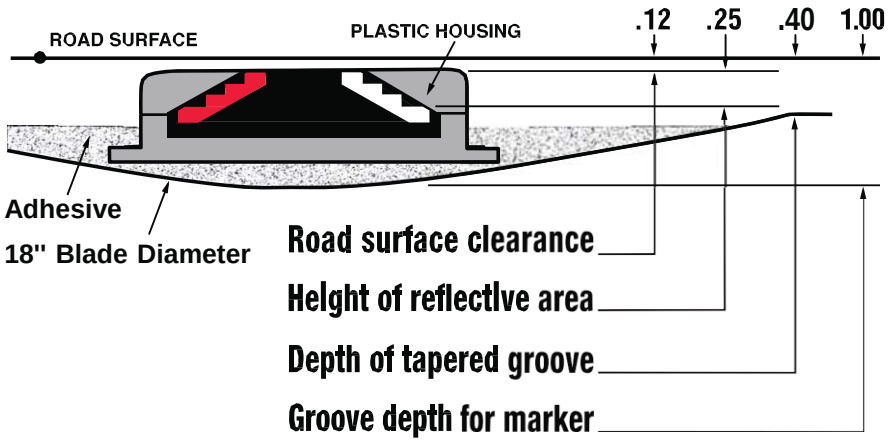
III. CONSTRUCTION

A. Experimental Evaluation. The University of Kentucky Transportation Center will be evaluating this installation of IPMs. Notify the Engineer a minimum of 14 calendar days prior to beginning work. The Engineer will coordinate the University's activities with the Contractor's work.

B. Maintain and Control Traffic. See Traffic Control Plan.

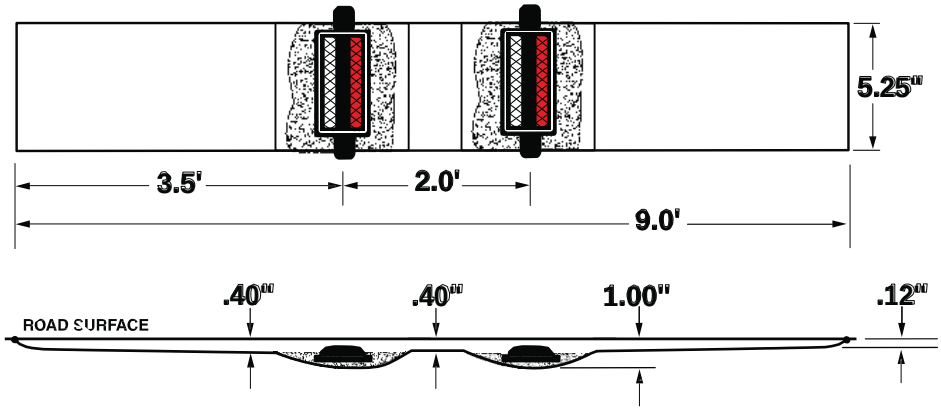
C. Installation. Install IPMs in recessed grooves cut into the final course of pavement according to the manufacturer's recommendations. Do not cut the grooves until the pavement has cured sufficiently to prevent damaging the pavement. Cut installation grooves using diamond blades on saws that accurately control groove dimensions. Remove all dirt, grease, oil, loose or unsound layers, and any other material from the marker area which would reduce the bond of the adhesive. Maintain pavement surfaces in a clean condition until placing markers.

Prepare the pavement surfaces, and install the markers in the recessed groove according to the drawing below. Use an approved snowplowable epoxy adhesive. Ensure that the adhesive bed area is equal to the bottom area of the marker, and apply adhesive in sufficient quantity to force excess out around the entire perimeter of the marker. Use materials, equipment, and construction procedures that ensure proper adhesion of the markers to the pavement surface according to the manufacturer's recommendations. Remove all excess adhesive from in front of the reflective faces. If any adhesive or foreign matter cannot be removed from the reflective faces, or if any marker fails to properly adhere to the pavement surface, remove and replace the marker at no additional cost to the Department.



D. Location and Spacing. Install the markers in the pattern for high reflectivity with two (2) IPMs per groove. Locate and space markers as shown in the current standard drawings or sepias (note: use Inlaid Pavement Markers wherever Type V Pavement Markers are called for). Do not install markers on bridge decks. Do not install a marker

on top of a pavement joint or crack. Offset the recessed groove a minimum of 2 inches from any longitudinal pavement joint or crack and at least one inch from the painted stripe, ensuring that the finished line of markers is straight with minimal lateral deviation. Give preference to maintaining the 2-inch offset between recessed groove and joint as opposed to keeping the line of markers straight.



Place inlaid markers as much in line with existing pavement striping as possible. Place markers installed along an edge line or channelizing line so that the near edge of the plastic housing is no more than one inch from the near edge of the line. Place markers installed along a lane line between and in line with the dashes. Do not place markers over the lines except where the lines deviate visibly from their correct alignment, and then only after obtaining the Engineer's prior approval of the location.

If conflicts between recessed groove placement in relation to pavement joint and striping cannot be resolved, obtain the Engineer's approval to eliminate the marker or revise the alignment.

E. Disposal of Waste. Dispose of all removed pavement, debris, and other waste at sites off the right of way obtained by the Contractor at no additional cost to the Department. See Special Note for waste and Borrow.

F. Restoration. Be responsible for all damage to public and/or private property resulting from the work. Restore all damaged features in like kind materials and design at no additional cost to the Department.

G. On-Site Inspection. Make a thorough inspection of the site prior to submitting a bid and be thoroughly familiar with existing conditions so that the work can be expeditiously performed after a contract is awarded. The Department will consider submission of a bid as evidence of this inspection having been made and will not honor any claims for money or grant Contract time extensions resulting from site conditions.

H. Caution. Do not take information shown on the drawings and in this proposal and the types and quantities of work listed as an accurate or complete evaluation of the

material and conditions to be encountered during construction, but consider the types and quantities of work listed as approximate only. The bidder must draw his own conclusion as to the conditions encountered. The Department does not give any guarantee as to the accuracy of the data and no claim will be considered for additional compensation or extension of Contract time if the conditions encountered are not in accordance with the information shown.

IV. MEASUREMENT

A. Maintain and Control Traffic. See Traffic Control Plan.

B. "INLAID PAYMENT MARKER" shall be measured as each. One (1) installation of "INLAID PAVEMENT MARKER" will consist of grooving the pavement, removing cuttings and debris, preheating pavement to remove moisture, adhesives, and installation of two (2) markers with all lenses in accordance with this note.

Note: Each pay item of Inlaid Pavement Marker will require two markers.

V. PAYMENT

A. Maintain and Control Traffic. See Traffic Control Plan.

B. Inlaid Pavement Markers. The Department will make payment for the completed and accepted quantity of completely installed "INLAID PAVEMENT MARKERS" at the Contract unit price, each. Accept payment as full compensation for all labor, equipment, materials, and incidentals to accomplish this work to the satisfaction of the Engineer. A system of one (1) groove and two (2) markers shall be paid as one "INLAID PAVEMENT MARKER". The bid item "INLAID PAVEMENT MARKER" shall be used regardless of the color and type of lenses required.

SPECIAL NOTE ALLOWING PVC FOLD AND FORM PIPE LINER

Contractor may elect to use Fold-and-Form Pipe Liner in accordance with the Special Note for PVC Fold-and-Form Pipe Liner as an alternative to using CIPP Liner as detailed elsewhere in the proposal. Contractor will bid CIPP Liner bid items regardless of which type of liner is actually used. Bid item and requirement for CIPP Acceptance Testing in accordance with Special Note for CIPP Acceptance Testing will still apply regardless of which type of liner is actually used.

SPECIAL NOTE FOR PVC FOLD-AND-FORM PIPE LINER

GENERAL

SUMMARY

Section Includes: Definition of the approved methods and materials to rehabilitate gravity and pressure pipelines by the insertion of a continuously extruded, folded, PVC Fold-and-Form Pipe Liner into a conduit (host pipe), and the “blow-molding” (thermoforming) of the pipe liner to conform to the shape of the existing pipe. The rehabilitated host pipe shall:

Extend continuously from one access point to the next access point with no joints.

Provide a tightly conforming fit against the inner wall of the host pipe.

Provide for complete structural integrity independent of the load-bearing capacity of the host pipe.

Definitions:

PVC Fold-and-Form Pipe Liner: A continuously extruded (joint-less), polyvinyl chloride (PVC) Pipe Liner that is shaped into a reduced form to facilitate insertion into existing pipelines or conduits. The 4” to 12” PVC Fold-and-Form Pipe Liner shall be coiled in a flat shape and folded during insertion; whereas the 15” and larger PVC Fold-and-Form Pipe Liner shall be coiled in an “H” shape. The Pipe Liner shall be designed to return to its extruded, round memory upon application of heat alone and to be formed tightly against the host pipe by “blow molding” (thermoforming) techniques.

Host Pipe: An existing gravity or pressure pipeline or conduit to be internally rehabilitated by installation of the PVC Fold-and-Form Pipe Liner.

REFERENCES

Codes and standards referred to in this Special Note are:

ASTM D 256: Standard Test Methods for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

ASTM D 638: Standard Test Method for Tensile Properties of Plastics

ASTM D 790: Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics

ASTM D 1784: Standard Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds

ASTM D 2122: Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

ASTM D 2152: Standard Test Method for Extrusion Quality using Acetone Immersion

ASTM D 2444: Standard Test Method for Impact Strength

ASTM F 1057: Standard Test Method for Extrusion Quality using Heat Reversion

ASTM F 1871: Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit rehabilitation

PIPE DESIGN AND DIMENSION

Submittals: The Contractor shall furnish engineering data covering materials and installation procedures.

The length of the PVC Fold-and-Form Pipe Liner shall be that which is required to effectively carry out the insertion and to seal the PVC Fold-and-Form Pipe Liner at the inlet and outlet access. The product supplier shall be capable of supplying continuous lengths to 100 LF in all applicable diameters to ensure the capability of spanning from the end of the host pipe without excavation.

The PVC Fold-and-Form Pipe Liner shall be supplied to an outside diameter and minimum wall thickness, based on the following project parameters and condition of the existing conduit as viewed in the video. The pipe design shall have sufficient strength to structurally enhance the existing conduit and support all ground water loads imposed.

Unless otherwise specified, the Contractor shall determine the minimum and maximum length of liner to effectively span the distance from the inlet to the outlet of the respective pipelines.

SAFETY

The CONTRACTOR shall conform to all safety requirements of pertinent regulatory agencies, and shall secure the site for the working conditions in compliance with the same. The CONTRACTOR shall erect signs and devices as are necessary for the safety of the work site.

The CONTRACTOR shall also provide all of the WORK in accordance with applicable OSHA standards. Emphasis shall be placed upon the requirements for entering confined spaces and working with steam.

PRODUCTS

MATERIAL SPECIFICATIONS:

The PVC Fold-and-Form Pipe Liner will be manufactured from virgin PVC Fold-and-Form Pipe Liner compound, containing no fillers, and meet or exceed the following minimum physical properties:

COMBUSTIBILITY:	Self-Extinguishing
FLEXURAL MODULUS:	ASTM D 790 145,000 PSI @73F
FLEXURAL STRENGTH:	ASTM D 790 4,100 PSI @73F
IZOD IMPACT:	ASTM D 256 15 FT-LB/IN
CHEMICAL RESISTANCE:	suitable under general sanitary sewer conditions

CHARACTERISTICS: The PVC Fold-and-Form Pipe Liner shall be designed to meet the following installation performance requirements:

The Pipe Liner shall be capable of expanding a full pipe size larger than the nominal diameter (ex: 8” to 10”) without splitting, or rupturing.

After being expanded by “blow-molding”, the installed Pipe Liner will match the configuration of the host pipe.

The Pipe Liner shall be capable of negotiating pipe line bends in the host pipe without splitting, rupturing, or wrinkling of the pipe liner material.

The pipe liner shall be dimensionally stable immediately after cool-down.

The pipe liner shall have an ASTM D 1784 impact resistance cell classification of no less than five (5), to resist splitting during remote controlled service connection reinstatement.

Processing of the pipe liner shall cause no degradation of the pipe liner physical properties.

MARKINGS: The pipe liner shall be marked at maximum five (5) foot intervals indicating ASTM D 1784 cell classification, manufacturer, and size (diameter and SDR). Each production lot will be uniquely coded.

DIMENSIONS:

The pipe liner outside diameter will be manufactured substantially smaller than the inside diameter of the host pipe. The pipe liner shall be manufactured with sufficient excess wall thickness to allow the pipe liner to meet or exceed the DR requirements after being expanded by “blow-molding”.

Standard Dimension Ration (SDR) of the Pipe Liner will be SDR 35, with a resulting DR Range between DR 33 and DR 38. The Pipe Liner will be continuously extruded (no joints) at the factory to the minimum length required to effectively span the distance between access points, in accordance with actual distances which shall be field verified by the Contractor prior to manufacturing.

ACCEPTABLE MANUFACTURERS:

AMLINER PVC Fold-and-Form pipe liner, manufactured by American Pipe & Plastics, Inc. of Binghamton, NY.

DynaLiner Thermoformed PVC Pipeliner, manufactured by DynaLiner, LLC, of Birmingham, Alabama.

Approved Equivalent

MATERIAL TESTING: Each production lot of pipe liner will be inspected and tested at the time of manufacture for defects is accordance with ASTM D 2444, and ASTM D 2152. All pipe liners shall conform to the specified dimensions. Material design properties shall be confirmed in accordance with ASTM D 790.

EXECUTION

HOST PIPE PREPARATION

The existing pipeline shall be cleaned of any obstructions and televised using CCTV immediately prior to installation of the pipe liner. The host pipe condition shall be acceptable to the ENGINEER as appropriate for lining prior to the insertion of the pipe Liner.

Prior to beginning the insertion of the pipe liner, the CONTRACTOR shall confirm that the host pipe is adequately cleaned.

INSTALLATION PROCEDURES:

The pipe liner manufacturer’s installation instructions and procedures shall be followed during installation.

Point Repairs

Point repairs and obstruction removals shall be completed, as necessary, in order to enable lining.

Liner Insertion

The entrance to the host pipe shall be covered so as to provide a smooth surface to prevent damage to the Pipe Liner.

The Pipe Liner shall be positioned to enable it to naturally curve into the access point and the host pipe.

The insertion end of the Pipe Liner shall be sealed to inhibit fluids and solids form entering the lumen of the Pipe Liner.

Insert the Pipe Liner into the entry access point. Slowly feed the Pipe Liner from the supply reel, while simultaneously pulling the Pipe Liner at the exit access point, to minimize tension on the Pipe Liner. Maintain two-way communication between personnel at entry and exit access points to coordinate the rate of Pipe Liner supply and pulling operations.

Use a power winch and a steel cable connected to the pulling head as recommended by the manufacturer to advance the Pipe Liner.

Pipe Liner Processing and “Blow-Molding”:

Process and “blow-mold” the PVC Fold and-Form Pipe Liner in accordance with the manufacturer’s instructions for heating and expanding the Pipe Liner. Upon completion of processing and “blow-molding”, the Pipe Liner shall fit tightly against the inside wall of the host pipe, be locked into the joints of the host pipe.

Temperature and pressure gauges shall be used at the insertion and termination access points to monitor internal conditions during Pipe Liner processing and “blow-molding”.

Introduce superheated, pressurized steam to heat and relax the Pipe Liner in strict accordance with the recommendations of the Pipe Liner manufacturer.

Continue the application of superheated steam while introducing compressed air to increase internal pressure on the Pipe Liner as recommended by the manufacturer. DO NOT ALLOW PRESSURE TO EXCEED 12 PSI, AS DAMAGE MAY OCCUR TO HOST PIPE.

Discontinue the use of superheated steam while continuing the use of compressed air to maintain the internal pressure. Allow the Pipe Liner to cool below 100 F before releasing pressure.

Liner Termination:

During the pulling in place and “blow-molding” process, the PVC liner shall be peeled back and folded across the face of the existing connection flange or flange adapter, as to create a flanged ending for the PVC Liner.

After cool down has occurred, the Contractor shall carefully proceed to drill the flange bolt pattern onto the PVC Liner without cracking or deteriorating the liner.

The PVC Liner flanged termination shall have a minimum thickness equal to a SDR of 35.

SPECIAL NOTE FOR CIPP ACCEPTANCE TESTING

PART 1 -- GENERAL

1.1 SCOPE OF WORK

A. Furnish all necessary labor, materials, equipment, services and incidentals required to visually inspect by means of closed-circuit television (CCTV) designated pipe sections including, but not limited to, recording and playback equipment, materials and supplies.

B. The inspection shall be performed on one section (i.e. curb box inlet to curb box inlet) at a time. The section being inspected shall be suitably isolated from the remainder of the system.

C. Video recordings shall be made of the television inspections and copies of both the recordings and printed inspection logs shall be supplied to the Engineer.

D. Contractor may have to perform point repairs, remove obstructions or remove protruding service connections to complete pre-rehabilitation TV inspection.

PART 2 -- PRODUCTS

2.1 EQUIPMENT

A. The television camera used for inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100 percent humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing a minimum 500-line resolution color video picture. Picture quality and definition shall be to the satisfaction of the Engineer and if unsatisfactory, inspection shall be performed again with the appropriate changes made as designated by the Engineer at no additional cost to the Engineer. The television inspection equipment shall have an accurate footage counter that shall display on the monitor, the exact distance of the camera from the centerline of the starting manhole.

PART 3 -- EXECUTION

3.1 PROCEDURE

A. The camera shall be moved through the pipe in either direction at a uniform rate, stopping when necessary to ensure proper documentation of the pipe's condition but in no case will the television camera be pulled at a speed greater than 30 fpm. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the pipe conditions shall be used to move the camera through the line. If, during the inspection operation, the television camera will not pass through the entire section, the equipment shall be removed and repositioned in a manner so that the inspection can be performed from the opposite opening. All set-up costs for the inspection shall be included in the unit prices bid. If the camera fails to pass through the entire section, the Contractor shall perform point repairs as required. Re-clean or further remove blockage at no additional cost to the Engineer.

B. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two openings of the line being inspected to ensure that good communications exist between members of the crew.

The camera height shall be adjusted such that the camera lens is always centered in the pipe being televised. Flow shall be controlled such that depth of flow shall not exceed 20% of pipe's diameter.

Lighting system shall be adequate for quality pictures.

3.2 RECORDING OF FIELD OBSERVATIONS

A. Television Inspection logs

1. Printed location records shall be kept which shall clearly show the location. In addition, other data of significance including joints, unusual conditions, roots, collapsed sections, or presence of scale and corrosion that the camera failed to pass through and reasons for the failure and other discernible features shall be recorded and annotated using the PACP system and a copy of such records shall be supplied to the Engineer.

B. Digital Recordings

1. The purpose of digital recording shall be to supply a visual and audio record of areas of interests of the pipe segments that may be replayed by the Engineer. Digital recording playback shall be at the same speed that it was recorded and shall be made in color. The Contractor shall be required to have all digital media and necessary playback equipment readily accessible for review by the Engineer during the project.

2. The Contractor shall perform CCTV inspection of each newly installed or rehabilitated pipe segment after testing and before re-introducing any flow into the pipe. Each test shall be witnessed by the Engineer.

3. The Contractor shall record each CCTV inspection on a DVD and submit such recordings to the Engineer as a prerequisite for Partial Utilization/Substantial Completion.

4. CCTV inspections shall be performed by a PACP certified and trained person.

5. Inspections shall include narration that notes the location and type of defects, if any.

6. At the completion of the project, the Contractor shall furnish all of the original digital recordings to the Engineer. Each disc shall be labeled as to its contents. Labels shall include the disc number, date televised, sewer segment reach designation, street location, and structure numbers on the disc. The Contractor shall keep a copy of the discs for 30 days after the final payment for the project, at which time the discs may be erased at the Contractor's option.

PART 4 – PAYMENT

Payment for both the video inspection prior to and after the Cured-in-Place Pipe Liners have been installed will be incidental to the Cured-in-Place Pipe Liner bid item for which the video inspection is required. Payment for the Cured-in-Place Pipe Liner bid item will be considered full compensation for all work, equipment, and incidentals necessary to perform the video inspection in accordance with this note.

SPECIAL NOTE FOR CURED-IN-PLACE PIPE LINING

PART 1 -- GENERAL

1.01 REQUIREMENTS

A. It is the intent of this specification to provide for the reconstruction of pipelines by the installation of a resin-impregnated flexible tube which is formed to the original conduit and cured to produce a continuous and tight fitting Cured-In-Place Pipe (CIPP). Cured-In-Place Pipe shall be designed for storm water application.

B. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary to install and test cured-in-place (CIPP) pipe lining as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings and other information to the ENGINEER for review.

B. With the bid, the following submittals are required:

Documentation as outlined herein under paragraph 1.06 A, including installation references of projects that are similar in size and scope to this project. The submittal shall include, at a minimum, the client contact name, phone number, and the diameter and footage of pipe rehabilitated. Documentation for product and installation experience must be satisfactory to the ENGINEER.

C. After contract award, the following submittals are required.

1. The CONTRACTOR shall submit design data and specification data sheets listing all parameters used in the CIPP design and thickness calculations based on ASTM F1216 or F2019 and D2412 for “fully deteriorated gravity pipe conditions.” All CIPP liner design calculations shall be sealed and signed by a registered professional Engineer in the Commonwealth of Kentucky. Submit P.E. certification form for all CIPP design data. Submit detailed installation procedures, lining production schedule and location, testing procedures and schedule, quality control procedures, liner curing procedures including heat-up and cool-down rates, curing temperature and duration, and shipping and storage requirements, schedule and procedures. Detailed design calculations as specified herein under paragraph 2.01 Q.

2. Various test results as specified herein under Section 2.03.

3. Documentation as specified herein for the Cure Report under Paragraph 3.08 A.

4. Documentation as specified herein for the Television Survey under Paragraph Section 3.10 Television Survey.

D. Curing log, including temperatures, pressures, and times during the curing process to document that a proper cure has been achieved. Curing log is to be submitted immediately after the curing is complete for each line segment that is rehabilitated.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Special Note for Pipe Cleaning

B. Special Note for CIPP Acceptance Testing

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D638 – Standard Test Methods for Tensile Properties of Plastics.

2. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

3. ASTM D2412- Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.

4. ASTM D2990 – Standard Test Methods for Tensile, Compressive and Flexural Creep and Creep-Rupture of Plastics.

5. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.

6. ASTM F1743 – Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP).

7. ASTM F2019 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

8. ASTM E1252 - Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALIFICATIONS

A. The CONTRACTOR performing the CIPP lining work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by the CIPP manufacturer. Only commercially proven products and installers with substantial track records will be approved. In addition the Contractor shall meet the following requirements:

1. The CONTRACTOR shall have minimum of 10,000 LF of CIPP successfully installed of similar diameter and using the specific method of installation and curing being used.

2. The CONTRACTOR shall submit a certified statement from the manufacturer that he/she is a certified and/or licensed installer of the CIPP lining.

3. A minimum of three clients that the CONTRACTOR has performed this type of work for, including names, phone numbers, linear footage, and a description of the actual work performed.

4. The CONTRACTOR’S superintendent who will perform the work under this section must have at least 3 years of experience and have successfully installed at least 5,000 linear feet 24-inch diameter or greater of the proposed product and curing method.

B. The CONTRACTOR shall also be capable of providing crews as needed to complete the work without undue delay.

C. The ENGINEER shall approve or disapprove the CONTRACTOR and/or manufacturer based on the submitted information and a follow up interview, if warranted.

D. Inspection of the liner may be made by the representative of the ENGINEER after delivery. The liner shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample liner may have been accepted as satisfactory at the place of manufacture. Liner rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.06 GUARANTEE

A. All CIPP lining placed shall be guaranteed by the CONTRACTOR and manufacturer for a period of one year from the date of final acceptance. During this period, defects discovered in the CIPP lining, as determined by the ENGINEER, shall be removed and replaced in a satisfactory manner by the CONTRACTOR at no cost to the ENGINEER. The ENGINEER may conduct an independent television inspection, at his own expense, of the lining work prior to the completion of the one year guarantee period.

1.07 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and storage to avoid damaging the liner. Extra care shall be taken during cold weather construction. Any liner damaged in shipment shall be replaced as directed by the ENGINEER.

B. Any liner showing a split or tear, or which has otherwise received damage shall be marked as rejected and removed at once from the job site.

C. The liner shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times prior to installation. The liner shall be protected from UV light prior to installation. Any liner showing evidence of premature curing will be rejected for use and will be removed from the site immediately.

PART 2 -- PRODUCTS

2.01 CIPP LINING

A. CIPP lining shall be Insituform by Insituform Technologies, Inliner by Inliner Technologies, Premier Pipe, Blue-Tek by Reline America, or approved equal.

B. The tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge breaks and missing sections of the existing pipe, and stretch to fit irregular pipe sections. The new jointless pipe-within-a-pipe must fit tightly against the old pipe wall and consolidate all disconnected sections into a single continuous conduit, substantially reducing or eliminating infiltration or exfiltration.

C. The wetout tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the Design thickness.

D. The tube shall be fabricated to a size that when installed will tightly fit the internal circumference and length of the original pipe with minimal shrinkage, in such a way as to minimize water migration (tracking) between the liner and the host pipe. Allowance should be made for circumferential stretching during inversion, and longitudinal stretching during pull in. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.

E. The minimum tube length shall be that deemed necessary by the Contractor to effectively span the distance between the access points and to facilitate a good, "non-tracking" seal. The Contractor shall verify the lengths in the field before cutting liner to length and otherwise preparing it for installation.

F. The outside layer of the tube (before wetout) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wetout) procedure.

G. The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

H. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

I. Seams in the tube shall be stronger than the unseamed felt.

J. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes shall be manufactured in the USA.

K. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this project. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

L. The finished pipe in place shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage. All constituent materials will be suitable for service in the environment intended. The final product will not deteriorate, corrode or lose structural strength that will reduce the projected product life. In industrial areas a liner system using epoxy vinyl ester resin shall be utilized and a polyester resin shall be used in non-industrial areas. The ENGINEER shall determine the type of appropriate resin to be utilized for each line segment.

M. The CIPP shall be designed as per ASTM F1216, Appendix X1. The CIPP design shall assume no bonding to the original pipe wall. The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life.

N. The CIPP must have a minimum design life of fifty (50) years. The minimum design life may be documented by submitting life estimates by national and/or international authorities or specifying agencies. Otherwise, long-term testing and long-term in-service results (minimum ten (10) years) may be used, with the results extrapolated to fifty (50) years.

O. The CONTRACTOR must have performed long-term testing for flexural creep of the CIPP pipe material installed by his company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (tube and resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by

qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in design.

P. The minimum required structural CIPP wall thickness shall be based on the physical and structural properties described herein and in accordance with the design equations in the appendix of ASTM F 1216 or F 2019, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design *(as determined by Long-Term tests described in paragraph 2.03)*	50 %
Ovality*	2 %
Soil Depth (above crown)*	Refer to Contract Plans
Design Condition	Fully deteriorated
**Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.*	

Q. The lining manufacturer shall submit to the ENGINEER for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the Commonwealth of Kentucky and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. Modulus of soil reaction shall be 1000, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

R. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

S. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

2.02 END SEALS

A. A watertight seal shall be made at every manhole entrance and exit and all other terminus of the liner. End seals shall be made by using a hydrophilic seal such as Insignia or equal.

2.02 STRUCTURAL REQUIREMENTS FOR MAIN LINES

A. Resin shall be impregnated by vacuum application or approved equal. If reinforcing materials (fiberglass, etc.) are used, the reinforcing material must be fully encapsulated within the resin to assure that the reinforcement is not exposed, either to the inside of the pipe or at the interface of the CIPP and the existing pipe.

B. The design for the CIPP wall thickness will be based on the following strengths, unless otherwise submitted to and approved by the ENGINEER.

Property	Test Method	Cured Composite per ASTM F1216
Flexural Modulus of Elasticity	ASTM D-790	250,000 psi
Flexural Stress	ASTM D-790	4,500 psi

2.03 TESTING REQUIREMENTS

A. Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216 or F2019. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

B. Prior to any liner installation, the CONTRACTOR shall submit technical data sheets showing the physical and chemical properties and infrared spectrum analysis per ASTM E1252 (chemical fingerprint) of the proposed resin system as modified for the cured-in-place process. Additionally, copies of the certificates of analysis for resin used on the project must be made available to the ENGINEER.

C. The CONTRACTOR shall provide resin samples as directed by the ENGINEER during the duration of the project and infrared spectrography chemical fingerprints shall be run and compared to the submitted fingerprint to verify the resin used is the resin submitted for use on this project. These analyses shall be conducted at the ENGINEER's expense.

D. In the case of liner installation performed under this contract, CIPP samples shall be prepared and physical properties tested in accordance with ASTM F1216, F2019, or ASTM F1743, Section 8, using either method proposed.

1. Where the diameter is less than or equal to 15-inches, the samples shall be restrained type samples made by extending the liner through a form with a diameter as close as possible to the existing pipeline. The formed sample shall be provided with insulation to contain cure heat as well as a heat sink such as sand bags for cool down.

2. Where the diameter is greater than 15-inches, a plate sample shall be prepared. The test sample shall be fabricated from the material taken from the liner and cured in a clamped mold with the resin used in the liner construction placed in the down tube.

3. Each sample shall be large enough to provide at least five total specimens for testing. One thickness, flexural strength, and flexural modulus shall be conducted in accordance with ASTM F1216, ASTM D790, and ASTM D2290 for each segment. The material must meet the initial strength requirements of ASTM F1216, Table 1.

4. These samples will be tested to verify compliance with the installed material specifications and shall be paid for through the testing allowance on the bid form. The CONTRACTOR shall produce these test samples for each pipe segment installed, defined as a contiguous length of insertion. Liners which do not pass these material tests will be rejected. The cost for sample collection shall be included in the bid price for the cured in place pipe.

5. Test specimens shall be marked in indelible ink with the appropriate lateral or main section, work order number, date of installation, and orientation to the top of the pipe (direction of up) so the

results can be correlated to the field work performed. All test results shall use this designated labeling as a reference.

6. The extraction and labeling of test specimens shall be done in the presence of the ENGINEER. The ENGINEER and CONTRACTOR shall, upon completion of sample extraction and labeling, both sign a chain-of-custody form that shall subsequently accompany the sample at all times and shall ultimately be received and signed at the testing laboratory. Test reports shall include a copy of the chain-of-custody form with all signatures to ensure that reported test results are for the correct sample.

7. The flexural properties must meet or exceed the values specified herein.

8. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743.

9. Visual inspection of the CIPP shall be by closed-circuit television.

PART 3 -- EXECUTION

3.01 CLEANING/SURFACE PREPARATION

A. It shall be the responsibility of the CONTRACTOR to clean the pipeline and to remove all internal debris out of the pipeline in accordance with the Special Note for Pipe Cleaning.

3.02 JOINT, CRACK, ANNULAR SPACE, AND LINER END CHEMICAL SEALING

A. Prior to cured-in-place liner installation, all active leaks of a magnitude to compromise the integrity of the liner shall be stopped using chemical grout, at no additional cost to the ENGINEER.

B. Materials used on this Project shall have the following properties: react quickly to form a permanent watertight seal; resultant seal shall be flexible and immune to the effects of wet/dry cycles; non-biodegradable and immune to the effects of acids, and alkalis; component packaging and mixing compatible with field conditions and worker safety; extraneous sealant left inside pipe shall be readily removable; and shall be compatible with the CIPP liner resin system utilized. The chemical sealing materials shall be acrylic resin type and shall be furnished with activators, initiators, inhibitors and any other materials recommended by the manufacturer for a complete grout system. Sealing grout shall be furnished in liquid form in standard manufacturer's containers. Sealing grout shall be AV-100 manufactured by Avanti International or approved equal.

C. The Contractor shall modify his equipment as necessary to seal the leaks, however both his equipment and sealing method must meet the approval of the ENGINEER prior to use. Extreme caution shall be utilized during leak sealing (pressure) operations in order to avoid damaging the already weakened sewer pipe. If any damage occurs, it shall be repaired at the CONTRACTOR’s cost and to the satisfaction of the ENGINEER. Excessive pumping of grout which might plug a service lateral shall be avoided. Any service laterals blocked by the grouting operation shall be cleared immediately by the Contractor.

3.03 FLOW CONTROL

A. Flow control shall be exercised as required to ensure that no flowing water comes into contact with sections of pipe under repair.

3.04 LINER INSTALLATION FOR MAIN LINES AND LATERALS

A. In presence of ENGINEER, perform a pre-lining CCTV inspection immediately prior to CIPP lining to demonstrate that the pipe is clean and free of roots, grease, sand, rocks, sludge, PACP runners or gushers, pockets of water, or structural impediments that would affect long-term viability of the pipe liner. Obtain ENGINEER's approval of the acceptability of the existing pipe condition prior to installation of CIPP.

B. The CONTRACTOR shall present to the ENGINEER, for review, a description of his methods for avoiding liner stoppage due to conflict and friction with such points as the manhole entrance and the bend into the pipe entrance. He shall also present plans for dealing with a liner stopped by snagging within the pipe. This information shall be rendered to the ENGINEER in a timely fashion prior to the preconstruction conference.

C. The CONTRACTOR shall immediately notify the ENGINEER of any construction delays taking place during the insertion operation. Such delays shall possibly require sampling and testing by an independent laboratory of portions of the cured liner at the ENGINEER's discretion. The cost of such test shall be born by the CONTRACTOR and no extra compensation will be allowed. Any failure of sample tests or a lack of immediate notification of delay shall be automatic cause for rejection of that part of the work at the ENGINEER's discretion.

D. On site wet out (if applicable) - The CONTRACTOR shall designate a location where the tube will be impregnated with resin prior to installation. The CONTRACTOR shall allow the ENGINEER and/or ENGINEER to inspect the materials and the "wet-out" procedure.

E. The materials and processes must be reasonably available for pre-installation, installation and post-installation inspections. Areas which require inspection include, but are not limited to, the following:

1. Product materials should exhibit sufficient transparency to visually verify the quality of resin impregnation.

2. Temperature sensing devices, such as thermocouples, shall be located between the existing pipe and the CIPP to ensure the quality of the cure of the wall laminate.

3.05 LINER INSTALLATION FOR MAIN LINES

A. (Heat cured) After the inversion is complete, the CONTRACTOR shall supply a suitable heat source throughout the pipeline. The equipment shall be capable of delivering hot water or steam throughout the pipeline to uniformly raise the temperature to a level required to effectively cure the resin. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply or steam. Another such gage shall be placed between the tube and the host pipe at the termination end at or near the bottom to determine the temperatures during cure. Water temperature or steam in the pipe during the cure period shall be as recommended by the resin manufacturer.

B. Initial cure shall be deemed complete when the exposed portions of the tube appear to be hard and sound and the temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer and may require continuous recirculation of the water to maintain the temperature. The CONTRACTOR shall have on hand at all times, for use by his personnel and the ENGINEER, a digital thermometer or other means of accurately and quickly checking the temperature of exposed portions of the liner.

C. CIPP installation shall be in accordance with ASTM F1216, Section 7, ASTM F1743, Section 6 or ASTM F2019, with modifications as listed herein.

D. Resin Impregnation: The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of

resin through cracks and irregularities in the original pipe wall. A vacuum impregnation or approved equal process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction. After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.

E. Tube Insertion: The wetout tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

F. Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

G. Curing shall be in accordance with the manufacturer's recommended cure schedule.

H. Cooldown: The CONTRACTOR shall cool the hardened pipe to a temperature below 100 F before relieving the hydrostatic head. Cooldown may be accomplished by the introduction of cool water into the inversion standpipe to replace water being pumped out of the manhole. Care should be taken in release of static head so that vacuum will not be developed that could damage the newly installed liner.

I. Finish: The new pipe shall be cut off in the manhole at a suitable location. The finished product shall be continuous over the length of pipe reconstructed and be free from dry spots, delamination and lifts. Pipe entries and exits shall be smooth, free of irregularities, and watertight. No visible leaks shall be present and the CONTRACTOR shall be responsible for grouting to remove leaks or fill voids between the host pipe and the liner. During the warranty period, any defects which will affect the integrity or strength of the product shall be repaired at the CONTRACTOR's expense, in a manner mutually agreed upon by the ENGINEER and the CONTRACTOR.

3.06 FIELD QUALITY CONTROL

A. Field acceptance of the liner shall be based on the ENGINEER’s evaluation of the installation including TV video and a review of certified test data for the installed pipe samples.

1. Groundwater infiltration of the liner shall be zero.
2. There shall be no evidence of splits, cracks, breaks, lifts, kinks, delaminations or crazing in the liner.
3. If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to the ENGINEER.

3.07 ACCEPTANCE

A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. No pinholes, cracks, thin spots, dry spots, or other defects in the liner will be permitted. There shall be no visible infiltration through the liner or from behind the liner at manholes and service connections. Cut-ins and attachments at service connections shall be neat and smooth.

B. Defects, which, in the opinion of the Engineer, will affect the liner's structural integrity, strength, hydraulic performance, future maintenance access, and overall line performance, shall be repaired or the sewer replaced at the Contractor's expense. Any lined section of segment (from manhole to manhole) exhibiting these defects will be rejected for payment until such time repairs have been made to the defective liner to the satisfaction of the Engineer. The following methods of repair shall be implemented by the Contractor to resolve defects unless otherwise approved by the Engineer:

Defects	**Repair Method**
Annular space or infiltration at lateral opening	Re-seal with structural grout or point repair
Damaged lateral caused by overly ground tap	Repair with structural grout or point repair
Annular space or infiltration at manhole wall and liner termination	Re-grout liner termination
Cracked, missing pipe or voids caused by the cleaning operation	Repair with structural grout, thicken liner, or point repair
Dropped pipe or shape loss caused by the cleaning operation	Point repair
Wrinkles or ridges in liner greater than 5% of the pipe diameter	Grinding allowed if not part of structural component of liner. If grinding would require removal of structural component, then Contractor must make point repair
Re-installed bulkheaded tap or inactive service connection	Re-seal with structural grout or point repair
Lined over debris	Point repair
Soft spots or lifts in the liner	Point repair
Final liner thickness less than required thickness bid	Replace inadequate liner

3.08 WET-OUT AND CURE REPORT

A. The CONTRACTOR shall submit "wet out" and "cure" reports documenting the specific details of the liner's vacuum impregnation and saturation with resin and the CIPP installation of the liner. A report shall be generated for each liner installation. A copy of all "wet out" and "cure" records shall be made available to the ENGINEER upon request, and shall be turned over to the ENGINEER on a weekly basis and prior to request for payment. If the "wet out" and "cure" reports are not presented prior to a payment request for a repair work order, payment for the work will not be made and the request will be rejected. At a minimum, this report shall include, in addition to CONTRACTOR and Contract identification:

1. Line identification and location
2. Wet-out date
3. Sample identification(s) and technician
4. Installation (in sewer) date
5. Host sewer pipe inside diameter

6. Liner thickness
7. Liner length
8. Liner and resin batch numbers
9. Resin type
10. Wet out length
11. Roller spacing
12. Vacuum setting
13. Quantity of resin and catalyst utilized
14. Wet out technicians
15. Time wet out started and completed
16. Applicable remarks
17. (Heat cure) Boiler and liner heating fluid pressure and temperature versus time log during cure period
18. (UV cure) Pressure and temperature versus time log and light train speed during cure period.
19. Cool down report

3.09 CLEANUP

A. After the liner installation has been completed and accepted, the CONTRACTOR shall cleanup the entire project area and return the ground cover to the original or better condition. All excess material and debris not incorporated into the permanent installation shall be disposed of by the CONTRACTOR.

3.10 TELEVISION SURVEY

A. Television survey, including Preconstruction Survey, Post Construction Survey, and Warranty Survey, shall be in accordance with Special Note for CIPP Acceptance Testing. Television survey shall be done for all cured-in-place lining, and shall be completed within 2 weeks of liner installation.

PART 4 – PAYMENT

Payment for Cured-in-Place Pipe Liners will be made per linear foot as CURE IN PLACE PIPE LINER 15 IN, CURE IN PLACE PIPE LINER 18 IN, AND CURE IN PLACE PIPE LINER". Lined storm sewer pipes 15 inch will be paid as CURE IN PLACE PIPE LINER 15 IN. Lined storm sewer pipes 18 inch will be paid as CURE IN PLACE PIPE LINER 18 IN. All other pipes required to be lined will be paid the price bid per linear foot for CURE IN PLACE PIPE LINER. Payment for CURE IN PLACE PIPE LINER 15 IN, CURE IN PLACE PIPE LINER 18 IN, and CURE IN PLACE PIPE LINER will be considered full compensation for all work, equipment, and incidentals necessary to install the pipe liners in accordance with this note.

SPECIAL NOTE FOR PIPE CLEANING

PART 1 -- GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to clean all pipes, as specified herein.

B. Cleaning shall include the proper high pressure water jetting, rodding, snaking, bucketing, brushing and flushing of pipes prior to inspection by closed circuit television, pipeline rehabilitation, and testing operations.

C. Cleaning shall dislodge, transport and remove all sludge, mud, sand, gravel, rocks, bricks, grease, roots, sticks, and all other debris from the interior of the sewer pipe and structures as required for pipeline rehabilitation.

PART 2 -- PRODUCTS

2.1 MATERIALS

A. Hydraulically propelled Sewer Cleaning Equipment

1. Hydraulically propelled sewer cleaning equipment shall be the movable dam type constructed such that a portion of the dam may be collapsed during cleaning to prevent flooding of the sewer.

2. The movable dam shall be the same diameter as the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure total removal of grease.

3. Contractor shall take precautions against flooding prior to using sewer cleaning balls or other such equipment that cannot be collapsed instantly.

B. High Velocity Hydro-Cleaning Equipment shall have the following:

1. A minimum of 500-ft of high pressure hose.

2. Two or more high velocity nozzles capable of producing a scouring action from 15 to 45 degrees in all size lines to be cleaned.

3. A high velocity gun for washing and scouring manhole walls and floor.

4. Capability of producing flows from a fine spray to a long distance solid stream.

5. A water tank, auxiliary engines and pumps and a hydraulically driven hose reel.

6. Equipment operating controls located above ground.

C. Mechanical cleaning equipment for sewer mains shall be either power buckets or power rodders by the Sewer Equipment Company of America or equal.

1. Bucket machines
   a. Be furnished with buckets in pairs
   b. Use V-belts for power transmission or have an overload device. No direct drive machines will be permitted.
   c. Be equipped with a take up drum and a minimum of 500-ft of cable.
   d. Have sufficient dragging power to perform the work efficiently.

2. Power rodding machine
   a. Either sectional or continuous.
   b. Hold a minimum of 750-ft of rod.
   c. The machine shall have a positive rod drive to produce 2000 pounds of rod pull.

PART 3 -- EXECUTION

3.1 PERFORMANCE

A. Selection of cleaning equipment shall be based on the conditions of the structures and lines at the time the work commences based on the pre-construction CCTV inspection to be conducted by the Contractor under this Contract.

B. Use properly selected equipment to remove all dirt, grease, rock and other deleterious materials, and obstructions.

C. Protect existing lines from damage caused by improper use of cleaning equipment.

D. Take precautions to avoid damage or flooding to public or private property being served by the line being cleaned.

F. Removal of Materials

1. Remove all solids and semi-solids at the downstream opening of the section being cleaned.

2. Passing material from one section of a line to another will not be permitted; unless access to any one section of line cannot be achieved.

G. Remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation.

H. No cleaning shall take place in a particular segment until all upstream pipe segments have been cleaned. If cleaning is done in a downstream pipe segment in order to facilitate overall cleaning operations, the segment shall be re-cleaned at no additional cost, after all pipes upstream of that segment have been cleaned.

3.2 FIELD QUALITY CONTROL

A. Acceptance of this portion of the work shall be dependent upon the results of the television inspection. Lines not acceptably clean as to permit television inspection and rehabilitation shall be re-cleaned and re-inspected at no additional cost to the Owner

B. Following cleaning, the Contractor shall inspect each section in accordance with the Special Note for CIPP Acceptance Testing.

C. Upon the Engineer’s final structure to structure inspection of the system, if any foreign matter is still present in the system, clean the sections and portions of the lines as required.

PART 4 – PAYMENT

Payment for cleaning of the pipes as detailed in the Pipe Drainage Summary will be incidental to the Cured-In-Place Pipe Liner bid item requiring the cleaning. Payment for the Cured-In-Place Pipe Liner bid item will be considered full compensation for all work, equipment, and incidentals necessary to clean the pipe in accordance with this note.

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. 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.

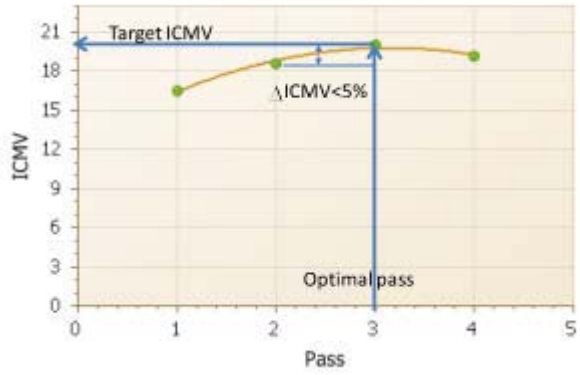
5. All acceptance testing shall be as outlined in Standard Specifications section 400.

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, laptop computer, transmission of electronic data files, 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.

Code	Pay Item	Pay Unit
24781EC	Intelligent Compaction for Asphalt	TON

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 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 ± 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.

Code	Pay Item	Pay Unit
24891EC	PAVE MOUNT INFRARED TEMP EQUIPMENT	SQFT

STATE OF KENTUCKY

SPECIAL PROVISION

REGARDING

PORTABLE QUEUE WARNING ALERT SYSTEM

1.0 Description

This item shall consist of furnishing, installing, relocating, operating, servicing, and removing various components of a portable, quickly deployable, real-time automated ITS queue warning alert system (PQWAS), in accordance with the standard specifications and this special provision. The Contractor shall also provide the maintenance of the complete system for the duration of the project or as directed by the Project Engineer.

2.0 Materials

Materials shall be in accordance as follows:

All materials used shall meet the manufacturer's specifications and recommendations.

All PQWAS materials installed on the project shall be provided by the Contractor in excellent quality condition, shall be corrosion resistant and in strict accordance with all of the details show within Contractor's Plans approved by KYTC. The Contractor shall maintain an adequate inventory of parts and replacement units to support maintenance and repair of the PQWAS. Pre-deployment is a condition of the system's acceptance and is based on the successful performance demonstration for a (5) day continuous period in accordance to this specification and as set forth in the plans. Ensure compliance to all FCC and Department specifications.

The Contractor shall maintain this system and shall be locally available to service and maintain system components, move portable devices as necessary and respond to emergency situations. The Contractor has oversight responsibility for directing placement of devices in the project area. The Contractor is to be accessible seven (7) days a week and twenty-four (24) hours a day while the system is deployed. The Contractor shall provide contact information for the system's coordinator and others responsible for maintenance of the system prior to installation of the system. Furnish a System Coordinator for monitoring the PQWAS throughout all periods of deployment.

A. General Capabilities and Performance Requirements

1. Overall PQWAS capabilities and performance requirements include the following:

a. Furnish a system capable of providing advance traffic information to motorists when there is a queueing of traffic due to congestion resulting from lane reductions, emergency events or other conditions. The condition-responsive notification to the motorist occurs with the use of Portable Changeable Message Signs (PCMS) in accordance to the below capabilities and performance requirements, activated through real-time traffic data collected downstream of the PCMS locations. This equipment must be a packaged system, pre-programmed and operates as a stand-alone PQWAS meeting this specification. Conditions might exist that

require relocation of the portable sensors at any given time, the sensors shall be portable and shall not require re-calibration in the field for fast and easy deployments. Due to the potential need to replace damaged sensors or to change the position of one or more sensors at any given time, sensors must be interchangeable and re-locatable by an unskilled laborer. The system must continue to function if as many as half the sensors fail to function.

b. Provide a PQWAS that consists of the following field equipment: portable radar sensors and portable changeable message signs (PCMS). Provide a system capable of withstanding inclement weather conditions while continuing to provide adequate battery power. The portable radar sensor battery, in a stand-alone state and without a solar panel for recharging, shall be capable of keeping power and capable of sending data for (10) consecutive days or longer. The system shall notify drivers of real-time queue events via specifically placed PCMS units up stream of the work zone. All predetermined/preprogrammed messages are to be approved by KYTC. The number and location of portable radar sensors and PCMS units are defined in the plans (see attachment-A) or as directed by the Project Engineer. The decision to deploy or relocate field equipment is made by the Project Engineer and instrumented through the System Coordinator. The decision for equipment removal is made by the Project Engineer after work is complete. The sensors and PCMS units shall be identifiable via global positioning system (GPS) and shall contain an accelerometer to detect and alert of unauthorized movement.

c. The portable radar sensor shall be capable of collecting traffic speed data. The processed data is used to remotely control PCMS units to display user definable, Engineer approved and locally stored messages. The message trigger state thresholds for slow and stopped speeds shall be user configurable and revisable in less than (1) hour from the Project Engineer's request. Weekly Traffic Data Reports shall be presented to the Project Engineer and shall include speed data per sensor location, travel times, and queue lengths in graphical and numerical formats. In the event the Project Engineer requires a report, other than a weekly report, for any reason; then the Contractor shall provide report within (48) hours of request. Unlimited data reports shall be included within price of system. Sensors shall require no calibration or adjustments in the field. It should take no longer than (30) minutes to apply (1) Type-1 queue warning system and no more than (45) minutes to apply (1) Type-2 queue warning system (see attachment-A below). Sensor should begin transmitting data within (30) seconds of being turned on. If sensor loses cellular communication, then network functions shall automatically utilize satellite communications until cell communication is reconnected. Contractor shall identify the most trustworthy cellular provider within the project area.

d. Data shall be accessible through a website and the Contractor shall provide a username and password for protection. The website shall be accessible seven (7) days a week and twenty-four (24) hours a day. The website shall provide historical & real-time data in graphical and numerical formats and shall have the capability of being integrated within the Department's Traffic Management Center (if requested). The website should be compatible to most hand held devices. Data shall be saved on the manufacturer's network for up to (5) years from the deployment date of system and shall be provided at the request of the Department at any time within the (5) year window. The use of the website shall be included within the price of system.

e. Warning Alerts: queue events, low battery voltage warnings, sensor movement alerts, high and low speed alerts shall be provided via cellular text messaging and/or via email messaging at the request of select Contractor personnel and KYTC officials.

f. The PQWAS system shall have the capabilities to provide alternate route messaging on specifically placed portable changeable message units and/or fixed Variable Message Systems (VMS). The intent of this service is to provide alternate route messaging to motorists before entering the project limits from all directions and giving them appropriate time to adjust their routes. Alternative routes shall be predefined and approved by KYTC. Additional PCMS units may be required for alternate route messaging and will be paid separately from the PQWAS pay item. KYTC's Traffic Management Center will provide detour messages via fixed VMS units during the term of the project.

B. Portable Radar Sensor Capabilities and Performance Requirements

The PQWAS shall include portable radar sensors (PRD) to monitor and detect queue events.

1. The Radar Sensor shall be FHWA accepted to meet NCHRP 350 test requirements
2. The Radar Sensor shall be locatable at all times via an internal Global Positioning System (GPS) and shall be capable of Cellular & Satellite Communications
3. The Radar Sensor shall have a dry-cell battery capable of powering the system for (10) consecutive days or longer
4. The Radar sensor shall be K-Band technology and have a line of sight up to 200 linear feet without obstruction
5. The Radar sensor shall have the ability to be charged in the field through adaptable solar recharging technology in the case the sensor is utilized for more than 10 consecutive days

C. PCMS Capabilities and Performance Requirements

The PQWAS shall include portable changeable message signs (PCMS) designated to relay automated messaging of queue events, alternate route messages, and caution for the work area defined by the project limits. PCMS placements shall meet the requirements set forth by the Cabinet in each direction of the National Highway System (NHS) – see **attachment-A** for specified PCMS & Sensor quantities below.

1. The PCMS unit shall be a Full Matrix 24 rows x 50 columns and shall be capable of 1 line, 2 line or 3 line messages
2. The PCMS unit shall be legible from a distance over twelve hundred feet (1200')
3. The height and size of characters shall be 18" to 58"
4. The PCMS shall be capable of storing up to 199 pre-programmed messages and up to 199 user-defined messages
5. The PCMS shall have a weather tight control cabinet with back lit LCD handheld controller.
6. The PCMS shall utilize a hydraulic lift to raise the unit to display height
7. The PCMS unit shall include solar recharging ports to allow for recharging of the portable radar sensors when they are not deployed.
8. The PCMS shall be NTCIP compliant and shall have an active Modem with active cellular service to be included within the price of the PQWAS System.

9. The user shall have the ability to communicate and override the PCMS remotely in the event of an emergency, Amber Alert, etc.
10. The PCMS unit shall have a docking station to include safety rails that allow a commercial safety strap to tie down the portable radar sensors while in transport. The docking station shall hold-up to (4) sensors safely and securely at all times.

3.0 Construction Requirements

All communication costs include cellular telephone services, FCC licensing, wireless data networks, satellite and internet subscription charges, and battery charging and maintenance. Additional to these requirements, the Contractor shall assume all responsibility for any and all damaged equipment due to crashes, vandalism, and adverse weather that may occur during the contract period.

The PQWAS shall operate continuously (24 hours / 7 Days) when deployed on the project. The system is in a constant "data collection" mode when deployed. The Contractor shall provide technical support for the PQWAS for all periods of operation.

In the event communication is lost with any component of the PQWAS, provide a means and staff to manually program a PCMS message. If communication is lost for more the 10 consecutive minutes, the system shall revert to a fail-safe ROADWORK/# MILES/AHEAD message displayed on the PCMS units until communication is restored.

System Operator, local control function and remote management operation must be password protected.

The PQWAS shall be capable of acquiring traffic information and selecting messages automatically without operator intervention after system utilization. The lag time between changes in threshold ranges and the posting of the appropriate PCMS message(s) shall be no greater than (60) seconds. The system operation and accuracy must not be appreciably degraded by inclement weather or degraded visibility conditions including precipitation, fog, darkness, excessive dust, and road debris.

The system shall be capable of storing ad-hoc messages created by the System Coordinator and logging this action when overriding any default or automatic advisory message.

The PQWAS communication system shall incorporate an error detection/correction mechanism to insure the integrity of all traffic conditions data and motorists information messages. Any required configuration of the PQWAS communication system shall be performed automatically during system initialization.

The system's acceptance is based on the successful performance demonstration of PQWAS for a (5) day continuous period in accordance to this specification and as set forth in the plans. Ensure compliance to all FCC and Department specifications.

4.0 Equipment Maintenance.

Maintain system components in good working condition at all times. Repair or replace damaged or malfunctioning components, at no cost to the Department, as soon as possible and within (12) hours of notification by the Engineer. Periodically clean PCMS units if necessary.

5.0 Method of Measurement.

Portable Queue Warning Alert System includes portable radar sensors, PCMS units, cellular/SAT communications, all supporting field equipment, website, and unlimited data reports will be measured by Type-1 or Type-2 queue warning plan for the PQWAS installed, maintained and removed. See plan Types 1 & 2 for specific number of radar sensors and PCMS units required for this project (see attachment-A). Specific Plan Type will be identified within proposal and/or project plans.

6.0 Basis of Payment.

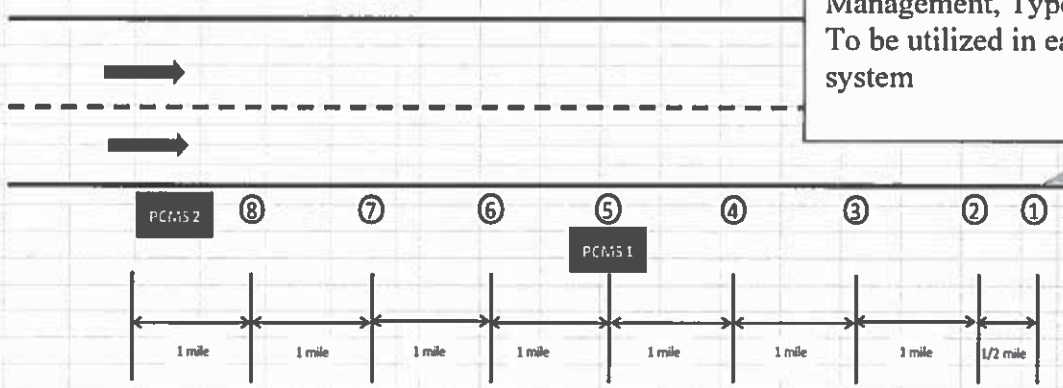
Portable Queue Warning Alert System includes portable radar sensors, PCMS units, Cell/SAT communications, all supporting field equipment, website, and unlimited data reports for the term of the project will be paid for at the contract unit price per PQWAS system as defined as a Type-1 or Type-2 Queue Warning plan (see attachment-A for specified PCMS & sensor quantities). Price and payment shall include furnishing of all labor, equipment, and materials for the installation, maintenance, and relocation of sensors and supporting field equipment.

PCMS Units are included

Payment will be made under:

Pay Item	Pay Unit Symbol
Control System for Incident Management	Lump Sum

Attachment-A: Control System for Incident Management, Type-2 Queue Detection Plan
To be utilized in each direction on Interstate system



PCMS Operations Rules: Deployment Plan 1 (Max Design Quue ≤ 7.5 Miles)

PCMS 2 Message	PCMS 1 Message	Last 5-Minute Average Speed V (mph)							
		⑧	⑦	⑥	⑤	④	③	②	①
WATCH YOUR SPEED	ROAD WORK AHEAD	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0
WATCH YOUR SPEED	SLOW TRAFFIC 3 MILES	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	40 ≤ V < 55
WATCH YOUR SPEED	SLOW TRAFFIC 2 MILES	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	40 ≤ V < 55	V > 40 OR V = 0.0
WATCH YOUR SPEED	SLOW TRAFFIC 1 MILE	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	40 ≤ V < 55	V > 40 OR V = 0.0	V > 40 OR V = 0.0
WATCH YOUR SPEED	SLOW TRAFFIC AHEAD	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	40 ≤ V < 55	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0
WATCH YOUR SPEED	STOPPED TRAFFIC 3 MILES	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	0.0 ≤ V < 40
WATCH YOUR SPEED	STOPPED TRAFFIC 2 MILES	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	0.0 ≤ V < 40	Any value
WATCH YOUR SPEED	STOPPED TRAFFIC 1 MILE	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	0.0 ≤ V < 40	Any value	Any value
WATCH YOUR SPEED	STOPPED TRAFFIC AHEAD	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	0.0 ≤ V < 40	Any value	Any value	Any value

PCMS 2 Message	PCMS 1 Message	Last 5-Minute Average Speed V (mph)							
		⑧	⑦	⑥	⑤	④	③	②	①
SLOW TRAFFIC 3 MILES	LANE CLOSED 3 MILES	V > 55 OR V = 0.0	V > 55 OR V = 0.0	V > 55 OR V = 0.0	40 ≤ V < 55	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0
SLOW TRAFFIC 2 MILES	LANE CLOSED 3 MILES	V > 55 OR V = 0.0	V > 55 OR V = 0.0	40 ≤ V < 55	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0
SLOW TRAFFIC 1 MILE	LANE CLOSED 3 MILES	V > 55 OR V = 0.0	40 ≤ V < 55	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0
SLOW TRAFFIC AHEAD	LANE CLOSED 3 MILES	40 ≤ V < 55	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0
STOPPED TRAFFIC 3 MILES	LANE CLOSED 3 MILES	V > 40 OR V = 0.0	V > 40 OR V = 0.0	V > 40 OR V = 0.0	0.0 ≤ V < 40	Any value	Any value	Any value	Any value
STOPPED TRAFFIC 2 MILES	LANE CLOSED 3 MILES	V > 40 OR V = 0.0	V > 40 OR V = 0.0	0.0 ≤ V < 40	Any value	Any value	Any value	Any value	Any value
STOPPED TRAFFIC 1 MILE	LANE CLOSED 3 MILES	V > 40 OR V = 0.0	0.0 ≤ V < 40	Any value	Any value	Any value	Any value	Any value	Any value
STOPPED TRAFFIC AHEAD	LANE CLOSED 3 MILES	0.0 ≤ V < 40	Any value	Any value	Any value	Any value	Any value	Any value	Any value

① *Non-Intrusive Traffic Speed Detector*

PCMS *Portable Changeable Message Sign*

Note: Location of the sensors and the PCMS can be adjusted slightly based on site conditions (ramp locations, other static signing, overpasses, etc.)

LANE CLOSURE MONITORING SYSTEM PLAN 2

DN.: - LR/MT		SHEET 1 of 1			
CK.: -					
DW.: - DN					
STATE DIST.	FED. REGION	FEDERAL AID PROJECT			SHEET
D-11	TBD	TBD			
COUNTY		CONTROL	SEC	JOB	HIGHWAY
Laurel					NHS I-75

SPECIAL NOTE FOR TEMPORARY BARRIER WALL
I-75 ROCKCASTLE COUNTY
ITEM No. 8-6.20

Temporary Barrier wall installation will NOT be allowed prior to March 1, 2018. Engineer may allow prior installation based on District's choosing.

INTERSTATE 75 WIDENING PROJECT
M.P. 60.1 TO M.P. 64.5
ITEM # 8-6.20
PUBLIC INFORMATION PLAN

The primary goal of the Public Information Plan (PIP) is to inform the motoring public and area stakeholders of project information including Maintenance of Traffic (MOT) which includes lane closures. The KYTC District 8 Public Information Officer (PIO) will coordinate and disseminate to stakeholders and the media appropriate information regarding the construction plans.

LOCAL STAKEHOLDERS

- Elected Officials
  - State Representative Jonathan Shell – (859) 792-4161; Jonathan.Shell@lrc.ky.gov
  - State Senator Jared Carpenter – (502) 564-8100; Jared.Carpenter@lrc.ky.gov
  - Rockcastle Co. Judge Executive Doug Bishop – (606) 256-2856; rockcastlejudge@windstream.net
  - Rockcastle Co. Sheriff Mike Peters – (606) 256-2032; rocksheriffdept@alltel.net

- Local Agencies
  - Rockcastle Co. Emergency Management – Howell Holbrook, Jr. – (606) 256-8436; holbrookhh@windstream.net

- State & Federal Agencies
  - KSP London Post – Lloyd Cochran – (606) 878-6622; Lloyd.Cochran@ky.gov
  - Kentucky Transportation Operations Center – (502)-564-2080
  - KY Overweight/Over-Dimensional Permits – owod.dmc@ky.gov

- Utility Companies
  - Not Applicable

TRUCKING FIRMS AND OUT OF STATE STAKEHOLDERS

Information will be distributed electronically to trucking firms via Rick Taylor at the Department of Vehicle Regulation (502-564-4540; rick.taylor@ky.gov). Information will also be posted on the GoKY website (http://goky.ky.gov).

PRESENTATIONS

A project description including anticipated schedule will be provided to the media, stakeholders and other emergency service agencies via e-mail prior to construction. Information will be provided to these groups via traffic advisories, press releases and the District 8 website.

MEDIA RELATIONS

The District PIO will prepare an initial news release regarding the contract award for the project. The PIO will conduct interviews with the media throughout the project duration to keep the public informed of construction progress. Traffic advisories will be submitted to the media when a change in the MOT occurs. The contractor must provide to the PIO via the Resident Engineer notification of any change in the MOT at least three (3) days prior to the change.

Special Note for Crushed Stone Base - Modified

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

1.0 DESCRIPTION: Follow the Standard Specifications for Crushed Stone Base, sections 302 and 805, except the gradation and any payment reductions shall follow the table below. Contractor must remove and replace any material falling outside the reduction chart values.

GRADATION - CRUSHED STONE BASE - MODIFIED (1)							
Payment Reduction	Sieve Size-Percent passing						
	2 1/2 inch	1 1/2 inch	3/4 inch	3/8 inch	No. 4	No. 30	No. 200
0%	100	90-100	60-95	30-70	15-45	5-20	0-5
10%		88-99	58-59	28-29		3-4	
10%	98-99		96-97	71-72		21-22	
20%		86-87	56-57	26-27	14	1-2	
20%	96-97		98	73	46	23	
30%		84-85	54-55	24-25	13	0	
30%	95		99	74	47	24	
50%		83	53	23	12		
50%	94		100	75	48	25	6

(1) Gradation to be performed by wet sieve KM 64-620 or AASHTO T 11/27.

2.0 PAYMENT. The Department will pay for Crushed Stone Base - Modified as per the standard specifications for Crushed Stone Base, section 302, except the pay item will be as follow:

Code	Pay Item	Pay Unit
24965EC	CRUSHED STONE BASE - MODIFIED	TON

SPECIAL NOTE FOR FIXED COMPLETION DATE, INCENTIVE PAYMENT AND LIQUIDATED DAMAGES I-75 ROCKCASTLE COUNTY ITEM No. 8-6.20

Fixed Completion Date

This project has a Fixed Completion Date of June 1, 2020. This project will also have additional incentive/disincentive for specific items of work to be completed as listed below.

Incentive

An incentive of $500,000 will be awarded if the project meets all of the following requirements:

- All work completed by November 1, 2019
- Constructed and completed in accordance with the Standard Specifications for Road and Bridge Construction and the requirements of the plans and proposal

All Work Not Completed by November 1, 2019

If all work is not completed by November 1, 2019, the contractor shall have the following work completed by November 1, 2019:

- All pavement base courses placed
- All traffic lanes, shoulders and ramps in their final configuration opened to traffic
- All safety appurtenances installed and operational

If the project is not completed through the items listed above by November 1, 2019 a $10,000 per day disincentive will be applied. Contrary to Section 108.09, the $10,000 per day disincentive will be charged during the months of December through March if the work items listed above are not complete.

The remaining work and pavement surface shall be placed prior to June 1, 2020. Any pavement surface placed after November 1, 2019, shall be placed during night lane closures only. No daytime or peak hour lane closures will be permitted during this time.

Contrary to Section 108.07.04 of Standard Specifications, **No time extension will be allowed for any reason including, but not limited to, weather, change orders, etc.**

Liquidated Damages

Contrary to Section 108.09, Liquidated Damages of $5,000 per calendar day will be assessed for each day work remains uncompleted beyond the specified completion date. Contrary to Section 108.09, Liquidated damages per the standard specifications will be charged during the months of December through March for all work that is not complete.

SPECIAL NOTE FOR PIPELINE INSPECTION

1.0 DESCRIPTION. The Department will perform visual inspections on all pipe on the project. A video inspection will be required on projects having more than 250 linear feet of storm sewer and/or culvert pipe and on routes with an ADT of greater than 1,000 vehicles. Conduct video inspections on all pipe located under the roadway and 50 percent of the remaining pipe not under the roadway. Storm sewer runs and outfall pipes not under the roadway take precedence over rural entrance pipes. Contractors performing this item of work must be prequalified with the Department in the work type J51 (Video Pipe Inspection and Cleaning). Deflection testing shall be completed using a mandrel in accordance with the procedure outlined below or by physical measurement for pipes greater than 36inches in diameter. Mandrel testing for deflection must be completed prior to the video inspection testing. Unless otherwise noted, Section references herein are to the Department's 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	AASHTO Nominal Diameter	Max. Deflection Limit	
		5.0%	10.0%
(inches)	(inches)	(inches)	
15	14.76	14.02	13.28
18	17.72	16.83	15.95
24	23.62	22.44	21.26
30	29.53	28.05	26.58
36	35.43	33.66	31.89
42	41.34	39.27	37.21
48	47.24	44.88	42.52
54	53.15	50.49	47.84
60	59.06	56.11	53.15

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

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

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

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

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

4.2 Record and submit all data.

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

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

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

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

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

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

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

SPECIAL NOTE

For Tree Removal

Rockcastle County
WIDEN I-75 TO 6 LANES FROM 1.1 MILES N US-25 I-CHNG AT MT. VERNON N TO 1.85 MILES N GREEN HILL ROAD O-PASS
Item No. 8-6.2

NO CLEARING OF TREES 5 INCHES OR GREATER (DIAMETER BREAST HEIGHT) FROM AUGUST 16 – NOVEMBER 14.

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 Tree Removal

Rockcastle County
WIDEN I-75 TO 6 LANES FROM 1MI N SAND HILL ROAD UNDERPASS N TO 1.1 MILES N OF THE US-25 I-CHNG AT MT. VERNON
Item No. 8-6.1

NO CLEARING OF TREES 5 INCHES OR GREATER (DIAMETER BREAST HEIGHT) FROM AUGUST 16 – NOVEMEBER 14.

ADDITIONALLY, no trees shall be removed beyond 10 feet of project disturb limits.

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.

COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Matthew G. Bevin
Governor

Greg Thomas
Secretary

Asbestos Inspection Report

To: Andre Johannes

District: Central Office

Date: January 24, 2017

Conducted By: O'Dail Lawson

Report Prepared By: O'Dail Lawson

Project and Structure Identification

Project Number: Rockcastle 8 - 6.10

Structure ID: 102B00038L

Structure Location: I-75 over US 25 at Milepost 58

Sample Description: The samples collected were negative for asbestos.

Inspection Date: January 10, 2017

Results and Recommendations

The results of the samples collected were negative for the presence of asbestos above 1%. No abatement is required at this time.

It is recommended that this report accompany the 10-Day Notice of Intent for Demolition (DEP7036 Form) which is to be submitted to the Kentucky Division of Air Quality prior to abatement, demolition, or renovation of any building or structure in the Commonwealth.

MRS, INC. *MRS, Inc. Analytical Laboratory Division*
332 West Broadway, Suite 613
Louisville, Kentucky 40202
(502) 495-1212
Fax: (502) 491-7111

BULK SAMPLE ASBESTOS ANALYSIS

Analysis N # # 01216
Client Name: KYTC
Sampled By: O'Dail Lawson
Address: Rockcastle: 8-610 102B00038L

				% FIBROUS ASBESTOS				% NON-ASBESTOS FIBERS			
Number	Color	Layered	Fibrous	Chrysotile	Amosite	crocidolite	Others	Cellulose	Fiberglass	Syn. Fiber	Other/Mat.
38 - 1	Black	Yes	No				None				100%

Methodology : EPA Method 600/R-93-116
Date Analyzed : 21-Jan-17
Analyst : Winterford Mensah
Reviewed By: Winterford Mensah
Signature

AIHA # 102459
AJHA #1 02459

Chain of Custody Record

Kentucky Transportation Cabinet

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

O'Dail Lawson o'dail.lawson@ky.gov KYTC Address: 200 Mero Street Frankfort KY Phone: 502-782-5020 Fax: 502-564-5655 PO#:	**Client Information** KY TRANSPORTATION CABINET Results Code: I-75 over US. 25 @ mm 58 ND = None Detected FTD = Filter Tampering or Damaged N/A = Not Applicable
Project or Subject Reference Rockcastle 8-6.10 102B00038L	Samplers (signature): O'Dail Lawson

Sample ID	Sample Description	Collected Date	Collected Time	Analysis Requested	Matrix	Color	Cont. Type	Preservative
38-1	Joint Compound	1/10/17	12:20	Asbestos Bulk	Bitumen	Blk		N/A

Relinquished By:	Date/Time:
Received By: Kimberly Mercer	Date/Time: 01/11/17
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-071116-00630

O'Dail Lawson

has on 07-11-2016, 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: 1301 Kentucky Mills Drive, Louisville, KY

Expiration Date: 07-11-2017

Name – Training Manager

Name - Instructor

COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Matthew G. Bevin
Governor

Greg Thomas
Secretary

Asbestos Inspection Report

To: Andre Johannes

District: Central Office

Date: January 24, 2017

Conducted By: O'Dail Lawson

Report Prepared By: O'Dail Lawson

Project and Structure Identification

Project Number: Rockcastle 8 - 6.20

Structure ID: 102B00037L

Structure Location: I-75 over US 25

Sample Description: The samples collected were negative for asbestos.

Inspection Date: January 10, 2017

Results and Recommendations

The results of the samples collected were negative for the presence of asbestos above 1%. No abatement is required at this time.

It is recommended that this report accompany the 10-Day Notice of Intent for Demolition (DEP7036 Form) which is to be submitted to the Kentucky Division of Air Quality prior to abatement, demolition, or renovation of any building or structure in the Commonwealth.

MRS, INC. *MRS, Inc. Analytical Laboratory Division*
332 West Broadway, Suite 613
Louisville, Kentucky 40202
(502) 495-1212
Fax: (502) 491-7111

BULK SAMPLE ASBESTOS ANALYSIS

Analysis N # # 01215
Client Name: KYTC
Sampled By: O'Dail Lawson
Address: Rockcastle: 8-620 102B00037L

				% FIBROUS ASBESTOS				% NON-ASBESTOS FIBERS			
Number	Color	Layered	Fibrous	Chrysotile	Amosite	crocidolite	Others	Cellulose	Fiberglass	Syn. Fiber	Other/Mat.
37 - 1	Black	Yes	No				None				100%

Methodology : EPA Method 600/R-93-116
Date Analyzed : 21-Jan-17
Analyst : Winterford Mensah
Reviewed By: Signature

AIHA # 102459
AJHA #1 02459

Chain of Custody Record

Kentucky Transportation Cabinet

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

O'Dail Lawson o'dail.lawson@ky.gov KYTC Address: 200 Mero Street Frankfort KY Phone: 502-782-5020 Fax: 502-564-5655 PO#:	**Client Information** KY TRANSPORTATION CABINET Results Code: I-75 over U.S. 25 ND = None Detected FTD = Filter Tampering or Damaged N/A = Not Applicable Samplers (signature): O'Dail Lawson
Project or Subject Reference Rockcastle 8-6.20 102B000387L	

Sample ID	Sample Description	Collected Date	Collected Time	Analysis Requested	Matrix	Color	Cont. Type	Preservative
37-1	Joint Compound	1/10/17	12:10	Asbestos bulk	bitumin/ue	black		N/A

Relinquished By:	Date/Time:
Received By: Kimberly Meredith	Date/Time: 01/11/17
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-071116-00630

O'Dail Lawson

has on 07-11-2016, 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: 1301 Kentucky Mills Drive, Louisville, KY

Expiration Date: 07-11-2017

Name – Training Manager

Name - Instructor

COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Matthew G. Bevin
Governor

Greg Thomas
Secretary

Asbestos Inspection Report

To: Andre Johannes

District: Central Office

Date: January 24, 2017

Conducted By: O'Dail Lawson

Report Prepared By: O'Dail Lawson

Project and Structure Identification

Project Number: Rockcastle 8 - 6.20

Structure ID: 102B00036L

Structure Location: I-75 over KY 2793

Sample Description: The samples collected were negative for asbestos.

Inspection Date: January 10, 2017

Results and Recommendations

The results of the samples collected were negative for the presence of asbestos above 1%. No abatement is required at this time.

It is recommended that this report accompany the 10-Day Notice of Intent for Demolition (DEP7036 Form) which is to be submitted to the Kentucky Division of Air Quality prior to abatement, demolition, or renovation of any building or structure in the Commonwealth.

MRS, INC. *MRS, Inc. Analytical Laboratory Division*
332 West Broadway, Suite 613
Louisville, Kentucky 40202
(502) 495-1212
Fax: (502) 491-7111

BULK SAMPLE ASBESTOS ANALYSIS

Analysis N # #01214 Address: Rockcastle: 8-620 102B00036L
Client Name: KYTC
Sampled By: O'Dail Lawson

				% FIBROUS ASBESTOS				% NON-ASBESTOS FIBERS			
Number	Color	Layered	Fibrous	Chrysotile	Amosite	crocidolite	Others	Cellulose	Fiberglass	Syn. Fiber	Other/Mat.
36-1	Black	Yes	No				None				100%

Methodology : EPA Method 600/R-93-116
Date Analyzed : 21-Jan-17
Analyst : Winterford Mensah Reviewed By: Winterford Mensah
Signature

AIHA # 102459 AJHA #1 02459

Chain of Custody Record

Kentucky Transportation Cabinet

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

O'Dail Lawson o'dail.lawson@ky.gov
KYTC
Address: 200 Mero Street
Frankfort KY
Phone: 502-782-5020 Fax: 502-564-5655
PO#:

Client Information KY TRANSPORTATION CABINET

I-75 over 2793.

Results Code:
ND = None Detected
FTD = Filter Tampering or Damaged
N/A = Not Applicable

Samplers (signature): O'Dail Lawson

Project or Subject Reference: Rockcastle 8-6.20 102B00036L

Sample ID	Sample Description	Collected Date	Collected Time	Analysis Requested	Matrix	Color	Cont. Type	Preservative
36-1	Joint Compound	1/10/17	11:55	Asbestos bulk	bituminous	black		N/A

Relinquished By: Date/Time:

Received By: Kristopher Record Date/Time: 01/11/17

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-071116-00630

O'Dail Lawson

has on 07-11-2016, 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: 1301 Kentucky Mills Drive, Louisville, KY

Expiration Date: 07-11-2017

Name – Training Manager

Name - Instructor

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

TC 62-226
Rev. 01/2016
Page 1 of 1

RIGHT OF WAY CERTIFICATION

☒ Original ☐ Re-Certification

RIGHT OF WAY CERTIFICATION

ITEM #	COUNTY	PROJECT # (STATE)	PROJECT # (FEDERAL)
08-6.10	Rockcastle	FD52 102 0075 055-061	NH 0752 (066)

PROJECT DESCRIPTION

Widen I-75 to 6 lanes from 1 mile N Sand Hill Road Underpass N to 1.1 miles N of the US 25 Interchange at Mt. Vernon

☒ **No Additional Right of Way Required**

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

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

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

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

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

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

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

		EXCEPTION (S) Parcel #	ANTICIPATED DATE OF POSSESSION WITH EXPLANATION
Total Number of Parcels on Project	0		
Number of Parcels That Have Been Acquired			
Signed Deed	0		
Condemnation	0		
Signed ROE	0		

Notes/ Comments (Use Additional Sheet if necessary)

LPA RW Project Manager	
Printed Name	
Signature	
Date	

Right of Way Supervisor	
Printed Name	Charles Hale
Signature	Charles Hale
Date	December 8, 2017

Right of Way Director	
Printed Name	DEAN Log
Signature	Dean Long by Rick Edwards
Date	12/8/17

FHWA	
Printed Name	David Whitworth
Signature	David Whitworth
Date	12/8/17

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

TC 62-226
Rev. 01/2016
Page 1 of 1

RIGHT OF WAY CERTIFICATION

☒ Original ☐ Re-Certification

RIGHT OF WAY CERTIFICATION

ITEM #	COUNTY	PROJECT # (STATE)	PROJECT # (FEDERAL)
08-6.20	Rockcastle	FD52 C102 65670 05R	IM NH 75-2 (66)

PROJECT DESCRIPTION

Widen I-75 from 1.0 Mile North of Sand Hill Road Underpass in Rockcastle Co. to the KY 421 Interchange at Berea

☐ **No Additional Right of Way Required**

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

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

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

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

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

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

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

		EXCEPTION (S) Parcel #	ANTICIPATED DATE OF POSSESSION WITH EXPLANATION
Total Number of Parcels on Project	12		
Number of Parcels That Have Been Acquired		12	
Signed Deed	11		
Condemnation	1		
Signed ROE	0		

Notes/ Comments (Use Additional Sheet if necessary)

LPA RW Project Manager		Right of Way Supervisor	
Printed Name		Printed Name	Charles Hale
Signature		Signature	Charles Hale
Date		Date	9/13/2017
Right of Way Director		**FHWA**	
Printed Name	DM/BY Tim Kay	Printed Name	David Whitworth
Signature	Tim Kay	Signature	David Whitworth
Date	13SEP17	Date	9/13/2017

UTILITIES AND RAIL CERTIFICATION NOTE

ROCKCASTLE COUNTY, NHPP IM 0753 (097)
FD52 102 0075 060-065
Interstate 75
Item No. 08-6.10

GENERAL PROJECT NOTE ON UTILITY PROTECTION

Utility coordination efforts determined that no significant utility relocation work is required to complete the project. Any work pertaining to these utility facilities is defined in the bid package and is to be carried out as instructed by the Kentucky Transportation Cabinet. The contractor will be responsible for any coordination or adjustments that are discussed or quantified in the proposal.

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

Kentucky Utilities has an aerial transmission line that crosses over the project disturb limit south of the US -25 bridge on I-75 but the poles are locate outside the disturbance area.

Windstream has aerial lines that crosses over the project disturb limit north of the US -25 bridge on I-75 in the project area that are low and at in the way of construction.

City of Mt. Vernon has a 6” water line that is located along US-25 under the I-75 bridge.

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

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

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Windstream has aerial lines that crosses over the project disturb limit north of the US -25 bridge in this I-75 project area that are to low and in the way of construction.

They anticipated starting relocation to rasie their facilities by letting date and should be completed and clear of the construction area before the construction starts in this area.

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

None when applicable

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

City of Mount Vernon has one water line located within the disturb limits of this project and will be relocated by the road contract during construction and the contractor to be used to relocated these lines for the city must be one of the contractors from the list of City of Mount Vernon approved water line contractors included in the road contract proposal.

UTILITIES AND RAIL CERTIFICATION NOTE

ROCKCASTLE COUNTY, NHPP IM 0753 (097)
FD52 102 0075 060-065
Interstate 75
Item No. 08-6.10

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

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

UNDERGROUND FACILITY DAMAGE PROTECTION – BEFORE YOU DIG

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.

SPECIAL CAUTION NOTE – PROTECTION OF UTILITIES

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

UTILITIES AND RAIL CERTIFICATION NOTE

ROCKCASTLE COUNTY, NHPP IM 0753 (097)
FD52 102 0075 060-065
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The utility facilities as noted in the previous section(s) have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, a result of S.U.E., field inspections, and/or reviews of record drawings. The facilities defined may not be inclusive of all utilities in the project scope and are not Level A quality, unless specified as such. It is the contractor's responsibility to verify all utilities and their respective locations before excavating.

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

UTILITIES AND RAIL CERTIFICATION NOTE

ROCKCASTLE COUNTY, NHPP IM 0753 (092)
FD52 102 0075 064-069
Interstate 75
Item No. 08-6.20

GENERAL PROJECT NOTE ON UTILITY PROTECTION

Utility coordination efforts determined that no significant utility relocation work is required to complete the project. Any work pertaining to these utility facilities is defined in the bid package and is to be carried out as instructed by the Kentucky Transportation Cabinet. The contractor will be responsible for any coordination or adjustments that are discussed or quantified in the proposal.

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

Kentucky Utilities has an aerial electric service line located within the project disturb limit along Holt Drive just south of I-75 Ramp C.

Windstream has an aerial telephone line located within the project disturb limit along Holt Drive just south of I-75 Ramp C.

Rockcastle County Board of Education has an aerial fiber communication line located within the project disturb limit along Holt Drive just south of I-75 Ramp C.

Spectrum cable Company has an aerial cable line located within the project disturb limit along Holt Drive just south of I-75 Ramp C.

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

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

Kentucky Utilities has an aerial electric service line located within the project disturb limit along Holt Drive just south of I-75 Ramp C it will be moved or removed from the disturb limits of this project. They anticipated starting relocation of their electric facilities by October 01, 2017 and should be completed and clear of the construction area along Holt Road by the letting Date.

Windstream has an aerial telephone line located within the project disturb limit along Holt Drive just south of I-75 Ramp C it will be moved or removed from the disturb limits of this project. They anticipated starting relocation of their facilities by letting date and should be completed and clear of the construction area along Holt Road before the construction starts in this area.

Rockcastle County Board of Education has an aerial fiber communication line located within the project disturb limit along Holt Drive just south of I-75 Ramp C and it will be moved or removed from the disturb limits of this project. They anticipated starting relocation of their Fiber facilities by the letting date and should be completed and clear of the construction area along Holt Road before the construction starts in this area.

UTILITIES AND RAIL CERTIFICATION NOTE

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Spectrum cable Company has an aerial cable line located within the project disturb limit along Holt Drive just south of I-75 Ramp C and it will be moved or removed from the disturb limits of this project. They anticipated starting relocation of their facilities by the letting date and should be completed and clear of the construction area along Holt Road before the construction starts in this area.

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

None when applicable

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

City of Mount Vernon has one water line and a sewer line located within the disturb limits of this project and will be relocated by the road contract during construction and the contractor to be used to relocated these lines for the city must be one of the contractors from the list of City of Mount Vernon approved water line contractors included in the road contract proposal.

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

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

UTILITIES AND RAIL CERTIFICATION NOTE

ROCKCASTLE COUNTY, NHPP IM 0753 (092)
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UNDERGROUND FACILITY DAMAGE PROTECTION – BEFORE YOU DIG

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.

SPECIAL CAUTION NOTE – PROTECTION OF UTILITIES

The contractor will be responsible for contacting all utility facility owners on the subject project to coordinate his activities. The contractor will coordinate his activities to minimize and, where possible, avoid conflicts with utility facilities. Due to the nature of the work proposed, it is unlikely to conflict with the existing utilities beyond minor facility adjustments. Where conflicts with utility

UTILITIES AND RAIL CERTIFICATION NOTE

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facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and Resident Engineer. The Kentucky Transportation Cabinet maintains the right to remove or alter portions of this contract if a utility conflict occurs.

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

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

ROCKCASTLE COUNTY
NHPP IM 0753 (097)

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:

City of Mt. Vernon Water
P.O. Box 1465
Mt. Vernon, KY 40456

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

When the list of approved subcontractors for the utility work is not provided in these general notes, the utility work can be completed by the prime contractor. If the prime contractor chooses to subcontract the work, the subcontractor shall be prequalified with the KYTC Division of Construction Procurement in the work type of "Utilities" (I33). Those who would like to become prequalified may contact the Division of Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

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

SUBMITTALS AND CORRESPONDENCE

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

ENGINEER

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

INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

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

NOTICE TO UTILITY OWNERS OF THE START OF WORK

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

UTILITY SHUTDOWNS

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

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

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

CUSTOMER SERVICE AND LATERAL ABANDONMENTS When temporary or permanent abandonment of customer water, gas, or sewer services or laterals are necessary during relocation of utilities included in the contract, the utility contractor shall perform these abandonments as part of the contract as incidental work. No separate payment will be made for service line and lateral abandonments. The contractor shall provide all labor, equipment and materials to accomplish the temporary or permanent abandonment in accordance with the plans, specifications and/or as directed by the engineer. Abandonment

may include, but is not limited to, digging down on a water or gas main at the tap to turn off the tap valve or corporation stop and/or capping or plugging the tap, digging down on a sewer tap at the main and plugging or capping the tap, digging down on a service line or lateral at a location shown on the plans or agreeable to the engineer and capping or plugging, or performing any other work necessary to abandon the service or lateral to satisfactorily accomplish the final utility relocation.

STATIONS AND DISTANCES

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

RESTORATION

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

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

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

MATERIAL

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

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

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

SECURITY OF SUPPLIED MATERIALS

ROCKCASTLE COUNTY
NHPP IM 0753 (097)

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.

ROCKCASTLE COUNTY
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List of contractors to choose from for the City of Mt. Vernon relocation project

Akins Excavating Company, Inc.
Contact Person:
Tim Akins
Contact Address:
182 Busy Lane
Corbin, KY 40701
Phone: (606) 528-9144
Email: tbranson@akinsexc.com

Martin Contracting
Contact Person:
Shawn Martin
Contact Address:
2371 Irvine Rd.
Richmond, KY 40475
Phone: (859) 623-0112
Email: shawn.martin@martincontracting.net

Weddle Enterprises, Inc.
Contact Person:
Eric Weddle
Contact Address:
25 Shanes Lane
Somerset, KY 42501
Phone: (606) 678-4057
Email: eric@weddleenterprisesinc.com

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 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:

City of Mt. Vernon Water
P.O. Box 1465
Mt. Vernon, KY 40456

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

When the list of approved subcontractors for the utility work is not provided in these general notes, the utility work can be completed by the prime contractor. If the prime contractor chooses to subcontract the work, the subcontractor shall be prequalified with the KYTC Division of Construction Procurement in the work type of "Utilities" (I33). Those who would like to become prequalified may contact the Division of Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

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

SUBMITTALS AND CORRESPONDENCE

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

ENGINEER

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

INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

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

NOTICE TO UTILITY OWNERS OF THE START OF WORK

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

UTILITY SHUTDOWNS

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

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

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

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

STATIONS AND DISTANCES

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

RESTORATION

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

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

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

MATERIAL

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

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

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

SECURITY OF SUPPLIED MATERIALS

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

List of contractors to choose from for the City of Mt. Vernon relocation project.

Akins Excavating Company, Inc.
Contact Person:
Tim Akins
Contact Address:
182 Busy Lane
Corbin, KY 40701
Phone: (606) 528-9144
Email: tbranson@akinsexc.com

Martin Contracting
Contact Person:
Shawn Martin
Contact Address:
2371 Irvine Rd.
Richmond, KY 40475
Phone: (859) 623-0112
Email: shawn.martin@martincontracting.net

Weddle Enterprises, Inc.
Contact Person:
Eric Weddle
Contact Address:
25 Shanes Lane
Somerset, KY 42501
Phone: (606) 678-4057
Email: eric@weddleenterprisesinc.com

Standard Water Bid Item Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

W PIPE This description shall apply to all PVC, ductile iron, and polyethylene/plastic pipe bid items of every size and type to be used as water main, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, sanitizing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed 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 were both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway.
Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

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

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

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

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

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

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

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

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

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

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

KENVIRONS

TECHNICAL SPECIFICATIONS

I-75/US 25 EXIT RAMP UTILITY RELOCATION
KYTC ITEM NO. 8-6.10

CITY OF MT. VERNON
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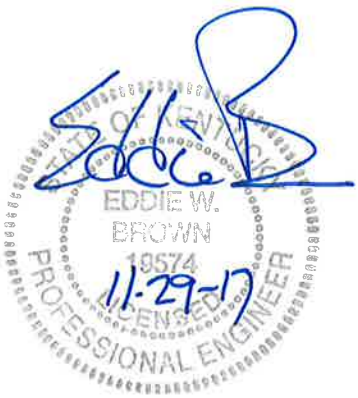
125 RICHMOND STREET
MT. VERNON, KENTUCKY 40456

Prepared By:

Kenvirons, Inc.
452 VERSAILLES ROAD
FRANKFORT, KENTUCKY 40601

PROJECT NO. 2017186

NOVEMBER 2017



SECTION 15100

WATER LINES

1.0 GENERAL

The CONTRACTOR shall furnish all labor, materials and equipment to install the water lines as shown on the plans and as specified herein.

The water lines may either be pressure-rated plastic pipe (PVC), municipal plastic pipe (MPVC) or ductile iron (DI), all as specified hereinafter. The bid documents and plans shall show the amounts of each type and class of pipe to be provided by the CONTRACTOR.

The OWNER will obtain all rights-of-way for operations through private property. It will also secure building permits and the permits for all pipe laid in highway rights-of-way. **Any charges for inspections or other fees required will be the responsibility of the CONTRACTOR since the amounts of these are dependent upon the operation of the CONTRACTOR.**

1.1 DEPARTMENT OF TRANSPORTATION BONDING

The Kentucky Department of Transportation will require that the OWNER post a bond for all work accomplished on their right-of-way. Each contract on which work is to be performed will be a separate application and will require a separate bond. Each permit will have conditions attached and these conditions will vary depending on the area where work is to be performed. In areas where traffic control may pose a problem, working hours may be limited. A copy of the encroachment permit will be provided to the CONTRACTOR. The CONTRACTOR will be responsible for knowledge of the permit's content and conditions in order that the construction may be accomplished in accordance with the specified requirements.

Should any additional bonds or requirements be imposed by the Kentucky Department of Transportation, the OWNER shall also be responsible for the bonding of the additional requirements.

2.0 PIPE AND FITTINGS

2.1 POLYVINYL CHLORIDE RIGID PIPE AND FITTINGS

This specification covers rigid, pressure-rated, polyvinyl chloride pipe and fittings, hereinafter called PVC pipe and PVC fittings, for sizes 1/2 inch through 12-inch. Pipe shall be as manufactured by North American, Diamond, J-M or approved equal.

2.1.1 PVC Pipe. PVC pipe shall be extruded from Type 1, Grade 1, polyvinyl chloride material with a hydrostatic design stress of 2,000 psi for water at 73.4°F, designated as PVC 1120, meeting ASTM Specifications D-1784 for material and D- 2241 for pipe, latest revisions. Pipe shall also meet all applicable provisions of the Product Standards and shall bear the National Sanitation Foundation (NSF) seal of approval in compliance with NSF Standard No. 14. PVC pipe having a maximum hydrostatic working pressure of 160 psi (SDR26), 200 psi (SDR21), 250 psi (SDR17), or 315 psi (SDR13.5) shall be used as shown in the Bid Documents and Plans.

Samples of pipe and physical and chemical data sheets shall be submitted to the ENGINEER for review and determination of compliance with these specifications before pipe is delivered to job. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects.
The workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures (ASTM D-1598), burst pressures (ASTM D-1599), flattening, extrusion quality (ASTM D-2152), marking and all other requirements of the Product Standard PS 22-70 shall be with in all respects. No pipe, 2 inches in diameter or larger, with a wall thickness less than 0.090 inches may be used.

Pipe shall be furnished in 20 feet or 40 feet lengths. The pipe shall be bell on one end. Male ends of pipe must be beveled on the outside. Pipe shall have a ring painted around the male end or ends in such a manner as to allow field checking of setting depth of pipe in the socket. This requirement is made to assist construction superintendents and inspectors in visual inspection of pipe installation.

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 must not be exposed to the direct rays of the sun for an extended period of time. If pipe is not to be installed shortly after delivery to the job site, it must be stored in a shaded location and strung as needed.

2.1.2 PVC Pipe Jointing. Pipe shall be joined with slip-type joints with rubber gaskets. Pipes with bells shall have all parts of the bell, including the gasket groove, made from the same extruded piece, integral with the pipe, and shall be thickened to meet standard dimension ratios of wall thickness to outside diameter. This manufacturing procedure shall be the normal practice of the pipe manufacturer and proven by past performance of pipe in service. The gasket groove shall be constructed such that gasket rollout will not occur. Rubber gasketing shall conform to ASTM 3139.

The pipe manufacturer shall have an experienced representative on the job for a minimum of one day at the commencement of joining and laying operations. Joint lubricant shall be of a type recommended by the manufacturer for their pipe subject to the Engineer's approval. Lubricant shall be water soluble, non-toxic and have no objectionable properties.

2.1.3 PVC Couplings. Where PVC couplings are used, they shall be of the same material as the pipe and may be of the moulded, or extruded type. PVC couplings shall have a minimum rating of 200 psi for continuous operation at 73.4 degrees F.

2.1.4 Fittings Ductile iron mechanical joint type fittings with appropriate adaptors as manufactured by Romac or approved equal, shall be used with PVC pipe. All such fittings shall be approved by the pipe manufacturer, and complete data sent to the ENGINEER, including the manufacturer's approval, for review. Fittings shall comply with AWWA C-110 or C-153 and shall be manufactured for the size and pressure class of the line on which they are used. Use of transition gaskets will not be allowed unless specifically approved by the pipe manufacturer. Coatings and lining shall be in accordance with 2.3.7.F of this section of the Specifications.

2.1.5 Service Connections. All service connections on PVC lines shall be made by means of tees, factory tapped couplings, or bronze service clamps manufactured specifically for use with PVC pipe as manufactured by Ford or approved equal. Whenever possible, corporation stops shall be installed in plastic lines before conducting hydrostatic tests.

2.2 MUNICIPAL POLYVINYL CHLORIDE (MPVC) PRESSURE PIPE

This specification covers the requirements for AWWA approved Polyvinyl Chloride Pressure Pipe for water supply and distribution systems.

2.2.1 MPVC Pipe. MPVC pipe shall meet the requirements of AWWA C900, latest revision, "Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4" through 12" for water" and shall be furnished in cast-iron pipe equivalent outside diameters with rubber-gasketed separate couplings. Pipe shall be as manufactured by Certainteed or approved equal.

MPVC pipe and couplings shall be made from Class 12454-A or Class 12454-B virgin compounds as defined in ASTM D-1784. The standard code designation shall be PVC 1120. The PVC compounds shall be tested and certified as suitable for potable water products by the NSF Testing Laboratory and shall carry the NSF approval marking.

Solvent-cement couplings or joints shall not be used. PVC joints using elastomeric gaskets shall be tested as assembled joints and shall meet the laboratory performance requirements specified in ASTM D-3139.

Pipe and couplings shall be pressure Class 100, DR 25 (Dimension Ratio), pressure Class 150, DR 18, or pressure Class 200, DR 14 as shown on the plans or the bid form.

Pipe and couplings shall be marked as follows:

a. Nominal size and OD base.
b. Material code designation (PVC 1120).
c. Dimension ratio number.
d. AWWA pressure class.
e. AWWA designation number (AWWA C900).
f. Manufacturers name or trade-mark and production record code.
g. Seal of the NSF Laboratory.

Pipe and couplings shall meet or exceed the following test requirements:

Sustained Pressure - ASTM D-1598 (1000 Hrs.)	
DR	Sustained Pressure
14	650 psi
18	500
25	350

Burst Pressure - ASTM D-1599 (60-70 seconds)	
DR	Minimum Burst Pressure
14	985
18	755
25	535

Hydrostatic Integrity - Each standard and random length of pipe shall be proof-tested at four times its rated class pressure for a minimum of 5 seconds. Bells or couplings shall be tested with pipe.

Flattening - The pipe shall not split, crack, or break when tested by the parallel-plato method as specified by ASTM D- 2241.

Extrusion quality - The pipe shall not flake or disintegrate when tested by the acetone-immersion method as specified in ASTM D-2241.

Standard length - Pipe shall be furnished in standard laying lengths of 20 ft. $\pm$ 1 in. A maximum of 15 percent of each pipe size may be furnished in random lengths of not less than 10 ft. each.

2.2.2 MPVC Pipe Jointing. Pipe shall be joined with slip-type joints with rubber gaskets. Manufacturing and installation procedures shall be as recommended by the manufacturer and as described for PVC pipe in Section 2.1.2 of this specification.

2.2.3 Fittings. Fittings for municipal PVC shall be ductile iron only. Fittings shall be mechanical joint. Fittings shall be manufactured for the size and pressure class of the line on which they are used and shall comply with AWWA C-110 or C-153. Coatings and lining shall be in accordance with subsection 2.3.7.F of this section of the Specifications. Fittings shall be as manufactured by Tyler, Clow, U.S. Pipe, Union Foundry or approved equal.

2.2.4 Service Connections. Service connections shall be made by means of bronze service clamps manufactured specifically for use with municipal PVC pipe. Clamps shall be Mueller Catalog No. H-161 or approved equal.

2.2.5 Underground Marking for PVC Pipe. Underground marking for PVC pipe shall be one of the following types. The type required for this project is specified in the notes on the Drawings.

2.2.5.1 Underground Marking Wire. At all locations where PVC pipe is utilized, a detectable underground marking wire shall be placed in the trench as shown on the miscellaneous drawings. The wire used shall be No. 12 insulated copper wire. Copper split bolt screw connectors shall be used for splice connections, see miscellaneous drawings. Extreme care shall be exercised in connecting and taping splices and joints to assure continuity. At each valve box the wire shall be looped to the surface extending 12-inches above the concrete valve box pad (see Std. Dwg. for valve). When the entire project or pipeline segment is complete, including meter installation and leak repairs, the locating wire system shall be checked for continuity.

2.2.5.2 Underground Marking Tape. At all locations where PVC pipe is utilized, a detectable underground marking tape shall be placed in the trench approximately twelve inches below the finished grade. The tape used shall be mylar encased aluminum foil with the printing "CAUTION - Buried Water Line Below". Printing shall be readable through the clear mylar and surface printing is not acceptable. Tape size shall be 2 inch width as provided by Lifeguard, Inc. or approved equal. Color of the tape shall be blue.

2.3 DUCTILE IRON PIPE

These specifications cover ductile iron pipe (3-inch diameter and greater) to be used in water transmission systems with mechanical joints, rubber ring slip type joints or flanged joints.

2.3.1 General. Ductile iron pipe shall be designed in accordance with AWWA H3 (ASA A21.50) and for pressures and conditions as stated in these specifications or called for on the plans. Ductile iron pipe shall conform to AWWA C-151 (ASA A21.51.).

2.3.2 Minimum Nominal Thickness. The specified thickness will be determined for the given internal and external loading requirements in accordance with ASA

A21.50. The class of pipe, wall thickness, and coatings required will be shown on the plans or the bid form for all ductile iron pipe installation.

2.3.3 River Crossing Pipe. River crossing pipe shall be ductile iron, Flex-Lok as manufactured by the American Cast Iron Pipe company or equal conforming to the appropriate requirements of ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.5 with a thickness class of 54.

2.3.4 Lengths. Pipe may be furnished in 12, 16, 16 1/2, 18 or 20 feet nominal laying lengths.

2.3.5 Tests. Hydrostatic and acceptance tests shall be in accordance with AWWA Specification C-106 for "Cast Iron Pipe Centrifugally Cast In Metal Molds" or C-108 for sand molds. The ENGINEER shall be provided with five (5) copies of each of the following tests for each contract involved:

a. Talbot strip test.
b. Ring and full length bursting tests.
c. Chemical analysis of pipe.
d. Certification that pipe was hydrostatically tested.

Any pipe not meeting the AWWA Specifications quoted above shall be rejected in accordance with the procedure outlined in the particular specifications.

2.3.6 Marking. The net weight, class or nominal thickness and sampling period shall be marked on each pipe.

2.3.7 Pipe Joints for Ductile Iron Pipe. Pipe joints shall be mechanical joint, rubber ring slip joint, flanged, or locked mechanical joint as shown on the plans.

A. Mechanical Joint

Mechanical joints are to be furnished according to AWWA Specifications C-111. All pipe joints must be furnished complete with all accessories. Mechanical joint bolts and nuts shall be of alloy cast iron or alloy steel (Corten type such as U.S. Alloy) or approved equal. Rubber gaskets shall be made of plain first grade rubber, free of imperfections and porosity. Hardness shall be 70 to 75 durometer.

B. Rubber Ring Slip Joint

Rubber ring slip joint shall be equal to AWWA C-111-64 or latest revision. The joints shall be of the following materials:

a. Rubber ring gasket compressed in groove in bell of pipe.

b. Beveled spigot end of pipe for initial centering into rubber gasket in bell.

C. Locked Mechanical Joint

Locked mechanical joints shall be equal to Clow Corporation's "Locked Mechanical Joint".

D. Ductile Iron Flanged Pipe and Special Coupling

a. Flanged Pipe. All ductile iron flanged pipe shall have flanges faced and drilled, 125 pound in accordance with ASA A21.10 (AWWA C-110) unless otherwise specified on the Drawings. Flanges may be cast integrally with the pipe or they may be screwed on specially designed long hub flanges, refaced across both face of flange and end of pipe. Flanged pipe shall be in accordance with ASA A21.6 (AWWA C-106) Specifications, latest revision, and be the class called for on the plans or bid forms. Where plain ends of flanged and plain end pipe fit into mechanical joint bells, centrifugally cast pipe shall be used. Flanged pipe for water service shall be cement lined and bituminous coated the same as written herein for bell-joint pipe.

b. Special Coupling. Flexible couplings for flanged pipe shall be a mechanical joint cast to a special flanged joint using a neoprene O-ring in place of the usual 1/16 inch rubber ring gasket. The mechanical bell and special flanged joint piece shall be of high grade gray cast iron (ASTM A48-56, AWWA C-100-54T) with bolt circle, bolt size and spacing according to ASA Specifications. Mechanical joint follower flange shall be of ductile iron ASTM A399 or malleable iron ASTM A47, Grade 35018 or 32510, latest revision with high strength/weight ratio design.

Bolts shall be fine grained high tensile malleable iron with malleable iron hexagon nut. Stainless steel nuts shall be used in vaults and wet wells. Where pressures may exceed 20 pounds, anchor studs shall be included with spigots of pipes connected drilled to receive ends of studs.

E. All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. Three (3) copies of such instruction shall be delivered to the ENGINEER at start of construction.

F. Coatings and Lining. All buried ductile iron pipe shall have manufacturer's outside coal tar or asphaltic base coating and a cement lining and bituminous seal coat on the inside. Cement mortar lining and a bituminous seal coat inside shall conform to ANSI A21.4 (AWWA C-104) latest revision.

All pipe and fittings housed and in vaults shall be lined and coated on the inside as specified herein for buried ductile iron pipe and fittings, but shall be left uncoated on the outside so that it may be painted without the use of tar stop.

G. Fittings for Ductile Iron Pipe. Ductile iron mechanical, rubber ring slip and flanged joints shall conform to ASA Specifications A21.10 (AWWA C-110) for centrifugally cast iron water pipe. Mechanical joints shall also conform in all respects to ASA 21.11 (AWWA C-111). All fittings shall be manufactured for the size and pressure class of the pipeline in which they are to be used. Mechanical joint type fittings with appropriate adaptors as manufactured by Megalug or approved equal, shall be used. All fittings shall be furnished complete with all joint accessories. All ductile iron pipe fittings for water, sewer, air, gas and force main service shall be bituminous coated outside and lined on the inside same as the line on which they are installed.

H. Underground Marking Tape. At all locations where Ductile Iron pipe is utilized, a detectable underground marking tape shall be placed in the trench approximately twelve inches below the finished grade. The tape used shall be mylar encased aluminum foil with the printing "CAUTION - Buried Water Line Below". Printing shall be readable through the clear mylar and surface printing is not acceptable. Tape size shall be 2 inch width as provided by Lifeguard, Inc. or approved equal. Color of the tape shall be blue.

2.4 POLYETHYLENE PIPE

This pipe is used primarily for stream crossings and other special applications in locations indicated on the DRAWINGS. The required pressure class shall be as shown on the DRAWINGS.

The pipe shall be PE 3408 high density, high molecular weight polyethylene pipe equal to DRISCOPIPE 1000 as manufactured by Phillips Driscopipe, Inc. The pipe shall meet or exceed the following specifications:

a. ASTM 3350 having a cell classification of PE34534C
b. ASTM F714 - Dimensions and Workmanship
c. AWWA C901 - Potable Water Pipe
d. ASTM D1248 - Type III, Class C, Category 5, Grade P34
e. ASTM D3261 - Fittings Standard
f. NSF - Listed, Standard #14

The pipe shall be joined by the butt fusion technique utilizing controlled temperatures and pressures to produce a fused, leak-free joint that has equal or greater strength than the pipe itself in both tension and hydrostatic loading. The joining system shall be equal to Phillips butt fusion joint system.

Transitions to the continuing pipeline shall be made with the appropriate fittings to maintain the integrity of the piping system as recommended by the pipe manufacturer.

Drawings showing details of the installation shall be submitted to the ENGINEER for approval prior to installation.

3.0 HAULING AND STORAGE

The CONTRACTOR shall notify the ENGINEER when pipe will be received on the job so that proper arrangements may be made for inspecting the unloading and stringing, as well as inspecting and examining the pipe materials.

All pipe shall be covered with tarpaulin during hauling from the manufacturer to the job site. It is acceptable for the front end only to be covered. The intent is to prevent diesel exhaust residue from coating the pipe and/or contaminating the gaskets.

The CONTRACTOR will be required to deliver all equipment and other materials and place same as and where required for installation. 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, or 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 other castings may be distributed at places that will not interfere with other building operations and unloaded, or yarded and distributed as required, as the CONTRACTOR may elect.

Valves, castings, fabricated metal, reinforcing steel, etc. shall be yarded or housed in some convenient location by the CONTRACTOR and delivered on the ground as required. All equipment and materials subject to damage from the weather, dampness, changes in temperature, or exposure shall be protected by a dry, weatherproof enclosure until ready for installation or use. The cost of all hauling, handling, and storage shall be included in the prices bid for equipment and materials in place. The OWNER takes no risk or responsibility for fire, flood, theft, or damage until after the final acceptance of the work.

4.0 LINES AND GRADES

The CONTRACTOR will be required to accomplish any detailed layout, including that required for establishing the grade of the pipe line.

5.0 TRENCH EXCAVATION

5.1 GENERAL

This section describes the acceptable methods of trenching for the installation of pressure pipe and casing pipe in an open trench.

Trenching may be accomplished by means of a backhoe, trenching machine or by hand depending on the construction area.

At the CONTRACTOR'S option, trenching, by a trenching machine or by backhoe is acceptable except as noted below:

Where the pipe line is being constructed close to other utilities, structures, building, or large trees, and it is reasonable to anticipate possible damage from the use of a backhoe, then trenching shall be made by hand methods.

The CONTRACTOR shall include in his unit price bid, all trenching necessary for installation of all pipelines as planned and specified. Trenching shall include all clearing and grubbing, including all weeds, briars, small trees, stumps, etc. encountered in the trenching. The CONTRACTOR shall dispose of any such material by burning, burial, or hauling away (or as noted on the drawings), at no extra cost to the OWNER. It shall be the CONTRACTOR'S responsibility to notify the appropriate State and local Air Pollution Control agencies when he conducts open burning of refuse. Ornamental shrubs shall be removed, protected, and replanted. Trenching also includes such items as minor 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.

The CONTRACTOR shall protect existing facilities against danger or damage while pipeline is being constructed and backfilled, or from damage due to settlement of this backfill. 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 structures will be in as good condition and serve its purpose as completely as before and such restoration and repair shall be done without extra cost to the OWNER. The use of trench- digging machinery will be permitted except where its operations will cause damage to trees, buildings or existing structures above or below the ground. At such locations hand methods shall be employed to avoid such damage. All excavated material shall be piled in a manner that will not endanger the work and will avoid obstructing sidewalks and driveways. Gutters shall be kept clear or other satisfactory provisions made for street drainage.

All excavation shall be open trenches, except where the drawings call for tunneling, boring, or jacking under structures, railroads, sidewalks and roads.

The construction procedure for these types of excavation is described elsewhere in these specifications.

All trench excavation shall be termed unclassified and costs shall be included in the unit price bid for the pipe.

5.2 CLEARING

The CONTRACTOR shall accomplish all clearing and/or grubbing as required for the construction under this contract. Clearing and grubbing shall include the cutting and removal of threes, stumps, brush, roots, logs, fences and other loose or projecting material and natural obstructions which, in the opinion of the ENGINEER, must be removed to properly prosecute the construction and operate the facilities upon completion of construction. Trees, unless designated otherwise on the plans, shall remain and be properly protected. Ornamental shrubs, plantings, fences, walls, etc. shall be removed and replanted or replaced or protected from the construction activity. Clearing and/or grubbing shall be incidental to the various bid items and no additional compensation will be paid for same.

5.3 TRENCH DEPTH

Trenches shall be excavated to the line and grade required for the installation of pipe at the elevations indicated on the plans. The minimum depth of cover shall be 30 inches above the top of the pipe, unless shown otherwise on the plans or on the Standard Details. When the pipe is laying in or on solid rock, the minimum depth of cover shall also be 30 inches above the top of the pipe. No additional compensation will be made for extra depth where required by the plans or due to CONTRACTOR error. Excavation, except as required for exploration, shall not begin until the proposed work has been staked out. Materials which are not required for backfill and site grading shall be removed and disposed of as directed by the ENGINEER. Hauling, bedding, and backfilling shall be considered incidental to the various bid items and will not be paid for directly. Excavation shall be of sufficient depth to allow the piping to be laid on the standard pipe bedding in accordance with the Section 6 of this section. The trenches shall be excavated to a minimum of six (6) inches below the bottom of the pipe barrel in rock. In all cases where lines are under traffic a minimum cover of forty-two (42") inches shall be provided. Should it be necessary to avoid existing utilities, culverts, outlets, or other structures, the water line shall be carried deeper at no additional expense to the OWNER.

Where the plans call for extra trench depth, this extra depth shall be provided at no extra cost.

5.4 TRENCH WIDTH

Trench widths shall exceed the minimum width that will provide free working space on each side of the pipe and to permit proper backfilling around the pipe

as shown in the accompanying table and unless specifically authorized by the ENGINEER, shall not be excavated to wider than two (2) feet plus the nominal diameter of the pipe at the top of the trench. Before laying the pipe, the trench shall be opened far enough ahead to reveal any obstruction that may necessitate changing the line and grade of the pipe. Should the CONTRACTOR fail to accomplish this, and changes are required, they shall be at his sole expense. In rock, all ledge rocks, boulders and large stones shall be removed to provide six (6) inches of clearance on each side and below all pipe and fittings.

MINIMUM TRENCH WIDTH

Size	Width	Size	Width
Up to 4" Pipe	2'-0"	15" Pipe	2'-8"
6" Pipe	2'-0"	16" Pipe	2'-8"
8" Pipe	2'-0"	18" Pipe	3'-0"
10" Pipe	2'-4"	20" Pipe	3'-2"
12" Pipe	2'-6"	21" Pipe	3'-4"
14" Pipe	2'-6"	24" Pipe	3'-8"

5.5 SHORING, SHEETING AND BRACING OF EXCAVATION

Where unstable material is encountered, or where the depth of the excavation in earth exceeds five (5) feet, the sides of the trench or excavation shall be supported by substantial sheeting, bracing, or shoring. The design and installation of all sheeting, sheet piling, bracing or shoring shall be based on computations of pressure exerted by the materials to be retained under retaining conditions. Adequate and proper shoring of all excavations will be the entire responsibility of the CONTRACTOR. The Standards of the Federal Occupational Safety and Health Act and the Kentucky Department of Labor shall be followed.

The ENGINEER will not be responsible for determining requirements for bracing or sheeting.

5.6 REMOVAL OF WATER

The CONTRACTOR shall provide for adequate removal of all water and the prevention of surface water from entering the excavation. The CONTRACTOR shall maintain dry conditions within the excavations until the backfill is placed. No additional compensation will be paid for replacement and/or stabilization of prepared excavations due to flooding and/or deterioration from extended exposure. All water pumped or drained from the excavation shall be disposed of in a suitable manner without damage to adjacent property or to other work under construction.

5.7 PAVEMENT REMOVAL

Pavement removal shall be as indicated on the plans or directed by the ENGINEER. When so required, or when directed by the ENGINEER, only one-half (1/2) of the street crossings or road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such a manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property OWNERS abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the ENGINEER. Pavement replacement shall be in accordance with Section 15102 of these specifications. Excavated materials shall be disposed of so as to cause the least interference and in every case the disposition of excavated materials shall be satisfactory to the ENGINEER.

5.8 TRAFFIC MAINTENANCE

The CONTRACTOR must "red light" and guard all open trenches or obstructions placed on the streets or sidewalks. The lights must be burning from sunset to sunrise in order to effectually warn and safeguard the public against dangers connected with open trenches, excavations and other obstructions. The CONTRACTOR shall be held responsible for any damage that may occur to persons or property by reason of the failure of the CONTRACTOR to properly "red light" and guard all open trenches or obstructions along the routes of the water lines. This CONTRACTOR at his own expense shall also maintain warning signs, barricades and a watchmen or flagmen to control traffic at such times as his work would interfere with the flow of traffic. No excavation shall begin that may present a safety hazard unless the signs, barricades, lights, etc. are available to protect the open excavation at the conclusion of the day. The CONTRACTOR will comply with all Federal and State Occupational Safety and Health requirements for this type of construction. The CONTRACTOR shall also comply with all local and Kentucky Department of Highways requirements for signing and traffic control.

5.9 LINE LOCATION

The location of pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before construction on any line is started that would indicate desirable changes in location. In such cases, 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 can be excavated by machine.

6.0 BEDDING OF PIPELINE

In all cases the foundation for pipe shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. The bells of the pipe shall not carry any of the load of the backfill. The CONTRACTOR should refer to the Standard Details for pipe bedding shown in the plans. The bedding specifications shall govern the backfill from the bottom of the trench up to the centerline or spring line of the pipe.

6.1 STABLE EARTH FOUNDATION

On all PVC pipelines, the trench bottoms shall be smooth and free of frozen material, clodded dirt and stones over 1/2" diameter. Bottom dirt left by trenching equipment will usually provide adequate material to level the trench bottom and provide bedding support for the pipe barrel. If the trench bottom is free of dirt, soft material may be shoveled off the side walls or shoveled under the pipe to insure proper pipe barrel bedding. In areas where the trench bottom is hard, a layer of soft backfill must be provided to insure the pipe barrel is properly cushioned. See the plans for proper bedding material depth.

If the foundation is good firm earth the pipe may be laid directly on the undisturbed earth provided the pipe barrel is supported for its full length.

Bedding of No. 9 stone, fine gravel, sand or compacted finely graded select earth shall be used to correct irregularities in the subgrade. Where bell and spigot is involved, bell holes shall be excavated to prevent the bells from being supported on undisturbed earth.

As an alternative to the above method, excavation in earth may be undercut to a depth below the required invert elevation that will permit laying the pipe on a bed of granular material or finely graded select earth to provide continuous support for the pipe barrel. Bedding depth shall be as shown on the plans.

The bedding is not a separate pay item and shall be included as incidental expense in the unit price for the pipe bid per foot of pipe.

6.2 TRENCHES IN ROCK

All installation in rock will utilize the undercutting method. Bedding will be with 6 inches crushed stone as shown in the Standard Details.

6.3 UNSTABLE TRENCHES

If unstable material is encountered which may not provide a suitable foundation for the pipe, the unstable material will be removed and an adequate layer of encasement concrete or other special bedding shall be placed for the pipe foundation in accordance with the Standard Details in the plans. Such "special

pipe foundation" shall only be installed if directed by the ENGINEER in writing or on the plans.

All ductile iron pipe shall be installed in accordance with Standard ANSI/AWWA C150/A21.50 Laying Condition Type 3 unless otherwise noted.

7.0 PIPE LAYING

7.1 GENERAL

Proper instruments, tools and facilities satisfactory to the ENGINEER shall be provided and used by the CONTRACTOR for the safe and convenient prosecution of the work. Each pipe manufacturer shall have an experienced representative on the job for at least one day at the commencement of jointing and laying operations.

Before any length of pipe is placed in the trench, a careful inspection shall be made of the interior of the pipe to see that no foreign material is in the pipe. In order to properly remove any foreign materials, a swab of necessary length is to be available at all times.

All pipe shall be lowered carefully into the trench, properly aligned and properly jointed by use of suitable tools and equipment, in such a manner as to prevent damage to water line materials and protective coatings and linings. Excessive scratching of the exterior surface of the pipe will be cause for rejection of the pipe.

Under no circumstances shall pipeline materials be dropped or dumped into the trench. The pipe and fittings shall also be inspected for the purpose of determining if they are sound and free from cracks. Laying of pipe shall be commenced immediately after excavation is started. Pipe shall be laid with bell ends facing in the direction of laying.

When pipe laying is not in progress, the open ends of pipe shall be closed by approved means to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and re-laid as directed by the ENGINEER. No pipe shall be laid in water or on frozen trench bottom, or whenever the trench conditions or the weather are unsuitable for such work.

If any defective pipe and fittings shall be discovered after the pipeline is laid, they shall be removed and replaced with a satisfactory pipe or fitting without additional charge to the OWNER. Open ends of unfinished pipe lines shall be securely plugged or closed at the end of each day's work or when the line is left temporarily at any other time.

7.2 LAYING DUCTILE IRON PIPE

Ductile iron bolted joint, rubber ring slip joint, and ball and socket river crossing pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the manufacturer. Three (3) copies of instructions shall be furnished the ENGINEER and one (1) copy shall be available at all times at the site of the work. The lining inside ductile iron pipe must not be damaged by handling.

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 present as nearly true, straight lines and grades as is practical, and all curves and changes in grades must be laid in such a manner that the manufacturer's recommended maximum deflection is not exceeded at any joint.

Cutting of pipe may be done by wheeled pipe cutters or saws, or by hammer and chisel, as the CONTRACTOR may elect, but the CONTRACTOR will be held responsible for breakage or damage caused by careless cutting or handling.

All ductile iron pipe shall be installed with Standard ANSI/AWWA C150/A21.50 Laying Condition Type 3 unless otherwise noted, six (6) inches crushed stone bedding shall be used in rock. Sufficient space (limited to 2 feet longitudinally) shall be left out of 4 or 6 inch cushion for tightening of bolts where bolted joints are used. No pipe shall be laid resting on rock, blocking, or other unyielding objects. Jointing before placing in trench, and subsequent lowering of more than one section jointed together may be allowed, subject to the ENGINEER'S approval and direction.

When using pipe with push-on joints care must be exercised to make certain that the correct gasket is being used for the type of joint installed and that the gasket faces the proper direction. Before inserting the gasket, the groove and bell socket should be carefully cleaned of all dirt. If sand or dirt is permitted to remain in the groove, leaks may occur. Lubricant must be applied to bell socket, gasket and plain- end of pipe as required by manufacturer. Plain-end must be beveled before joint is made. Deflection required at the joint shall be obtained after the joint is made.
Cut pieces of ductile iron pipe 18 inches or more in length, shall be used in fitting to special conditions, and valves and fitting changes in grade and alignment, provided cutting is even enough to make first class joints and no cracks are evident.

7.3 LAYING PLASTIC PIPE

The trench bottom must be smooth and uniform and the alignment must conform with the plans. Bedding and cover as specified herein and shown in the Standard Details is required.

To make a clean and unobstructed joint, it is necessary to wipe the ring, groove and pipe spigot free from all foreign materials at the time of assembly (welded joints will be allowed only in special cases and will be required as shown on the plans). The ring must be positioned properly in the fitting to receive the pipe by a worker who is not in contact with the lubricant. In general, the lubricant is applied to the spigot (not the ring or groove). However, the manufacturer's instructions are to be followed in all cases. Only an approved lubricant may be used in accordance with the manufacturer's recommendations. All plastic pipe shall be joined by hand.

Where good bedding conditions are attained PVC pipe smaller than 4 inches may be assembled outside the trench in longer sections (as conditions allow) and then lowered into the trench. At any time when improper bedding is discovered or the pipe is severely deflected the pipe will be removed from the trench and the condition corrected. Pipe in sizes 4 inch and above may be assembled outside the trench but must be lowered into the trench as each joint is assembled. Regardless of installation methods all couplings must be inspected after laying in trench for proper insertion and alignment. Field cuts and bevels will be allowed in accordance with the manufacturer's recommendations for these operations. A new reference mark shall be installed before joining any field cut pipe. The same requirements for clearance from rock or other objects, thrust blocking and deflections shall apply to PVC pipe as for other pipe materials.

Municipal PVC pipe of all sizes must be assembled in the trench in strict accordance with the manufacturer's requirements.

7.4 INSTALLATION OF RIVER CROSSING PIPE

The ball joint pipe shall be assembled and installed in accordance with manufacturer's recommendations. Installation shall be made at time of low flow, using cofferdams as necessary to divert stream flow. The ball joint pipe shall be laid and allowed to settle before joining to the pipe on each side of the stream. The ball and joint pipes shall be tested separately once in place to detect any leaks or bad joints. After connecting to the land pipe, it shall be tested the same as specified for the other water mains. See the DRAWINGS for additional installation requirements.

8.0 BACKFILLING

Backfilling must be started as soon as practicable after pipe has been laid and joints hardened sufficiently, and jointing and alignment approved. Spading of crushed rock, sand, or mechanical tamping of earth, around pipe (as specifically required) between joints shall be the usual procedure as the laying progresses. This is in order to avoid danger or misalignment from slides, flooding or other causes. The ENGINEER shall be given a minimum of 24 hours for inspection before backfilling. The backfill shall be crushed rock, sand, or finely divided

earth free from debris, organic material and stones, places simultaneously on both sides of pipe to the same level by hand.

In backfilling of the lower part of the trench beginning at the top of the bedding, the backfill material shall be carefully and solidly tamped by hand or approved mechanical methods in 6" layers around the pipe and up to a point 8 inches higher than the top of the pipe. For PVC only the backfill shall be select material and may be walked-in. Walking or working on the completed pipe line, except as necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a point one diameter higher than the top of the pipe. The filling of the trench and the tamping of the backfill shall be carried on simultaneously on both sides of the pipe in such a manner that the completed pipe line will not be disturbed and injurious side pressures do not occur.

After the above specified backfill is hand placed, rock may be used in the backfill in pieces no larger than 18 inches in any dimension and to an extent not greater than one-half (1/2) the 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 between rocks may be filled with earth. Above the hand placed backfill, machine backfilling may be employed without tamping, (if not contrary to specified conditions for the location) provided caution is used in quantity per dump and uniformity of level of backfilling. Backfill material must be uniformly ridged over trench and excess hauled away, with no excavated rock over 1-1/2 inch in diameter or pockets of crushed rock or gravel in top 6 inches of backfill. Ridged backfill shall be confined to the width of the trench and not allowed to overlap onto firm original earth and its height shall not be in excess of needs for replacement of settlement of backfill. All rock, including crushed rock or gravel from construction, must be removed from yards and fields. Streets, roadways and walks shall be swept to remove all earth and loose rock immediately following backfilling.

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 machine tamped in not over 4-inch layers, measured loose in accordance with the standard details. Where backfill is under paved driveways, streets, highways, railroads, sidewalks, paved parking areas and other areas where settlement is not allowed, crushed stone or coarse sand backfill only shall be used up to the paving surface. Crushed stone shall be Kentucky Department of Highways Standard Specification No. 78 or finer. Coarse sand backfill shall be spread in layers not over 4 inches thick and thoroughly compacted. Sand may be moistened to aide compaction. Tunnels shall be backfilled in not over 3-inch layers, measured loose, with selected material suitable for mechanically tamping. If material suitable for tamping cannot be obtained, sand, gravel or crushed rock (No. 78) shall be blown, packed or sluiced to complete fill all void spaces.

Where local conditions permit, pavement shall not be placed until 30 days have passed since placing backfill. Crushed stone is specified for roads and parking areas and sidewalks or their bases, shall be placed and compacted to the top of

trench. Backfills shall be maintained easily passable to traffic at original ground level, until acceptance of project or replacement of paving or sidewalks.

Where the final surfacing is to be crushed stone, compacted earth backfill may be used in the trench to within 6 inches of the top as shown in the Standard Details.
Railroad Company and Highway Department requirements in regard to backfilling will take precedence over the above general specification where they are involved.

Excavated materials from trenches and tunnels in excess of quantity required for trench backfill shall be disposed as shown on the plans or as directed by the ENGINEER.

The CONTRACTOR shall protect all sewer, gas, electric, telephone, water and drain pipes or conduits, power and telephone poles and guy wires from danger of damage while pipelines are being constructed and backfilled, or from danger due to settlement of his backfill.

In case of damage to any such 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 uncovering and such restoration and repair shall be done without extra charge.

No extra charge shall be made for backfilling of any kind, except as provided in the Bid. Backfilling shall be included as a part of the unit price bid for which it is subsidiary. No extra charge shall be made for supplying outside materials for backfill.

Before completion of contract, all backfills shall be reshaped, holes filled and surplus material hauled away, and all permanent walks, street, driveway and highway paving, and sod, replaced (if such surface replacement items are included in the contract) and reseeding performed.

The line CONTRACTOR shall be responsible for clean-up, grading, seeding, sodding or otherwise restoring all areas that he disturbs within the work limits of other CONTRACTORS on this project.

Any deficiency in the quantity of material for backfilling the trenches or for filling depressions caused by settlement, shall be supplied by the CONTRACTOR.

9.0 TIE-INS TO EXISTING PIPELINES

This work shall consist of connecting new water pipes to the existing system where shown on the plans and shall include the necessary fittings, tapping sleeves, valves and necessary equipment and material required to complete the connection.

Knowledge of pipe sizes in the existing system may not be accurate, therefore, it is recommended that the CONTRACTOR check outside diameters of existing pipe and types of pipe prior to ordering the required accessories. No additional payment will be allowed for matching pipe and/or accessories when the proper size is not ordered.

Neither the OWNER nor the ENGINEER can guarantee the location of the existing lines. The CONTRACTOR shall verify the location of all existing water mains and valves pertaining to the proposed improvements before excavation is started.

The necessary regulation or operation of the valves on existing mains, to allow for the connections being made, shall be supervised by the ENGINEER. Before shutting down an existing water main or branch main for a proposed connection, prior approval for a specific time and time interval shall be obtained from a representative of the OWNER. At no time shall an existing main be shut down without the OWNER'S knowledge and permission.

Excavation to existing water mains shall be carefully made, care being exercised not to damage the pipe. The excavation shall not be of excessive size or depth beneath the pipe. The sides of the excavation shall be as nearly vertical as possible.

The CONTRACTOR shall be responsible for any damage to the existing system and any such damage shall be repaired to the satisfaction of the ENGINEER at the CONTRACTOR'S expense.

The CONTRACTOR shall verify, by field inspection, the necessary sizes, lengths and the types of fittings needed for each inter-connection. Typical connections are shown on the plans and any modifications or changes shall be subject to the approval of the ENGINEER. The exact length of the proposed water main needed for this work shall also be determined by field measurement as required.

The probing required to locate existing mains is not a separate pay item.

10.0 PIPE ENTERING STRUCTURES

Ductile iron, steel or PVC pressure pipe, 4-inch diameter or larger, entering structure below original earth level, unsupported by original earth for a distance of more than six (6') feet, shall be supported by Class B concrete, where depth of such support does not exceed three (3') feet, and by Class B Concrete piers where depth exceeds three (3') feet in accordance with the Standard Details. All other pressure pipe entering buildings or basins below original earth level, which have more than 3 feet span between wall and original earth and having a cover of more than 24 inches of earth, or under roadway, shall be supported as shown on Standard Detail drawings, in order to prevent breakage from settlement of backfill about the structure. Concrete and reinforcing steel for such supports are

to be included in the unit price of work to which it is subsidiary, and not as extra concrete, in order to discourage excessive excavation outside the limits of structures. Pipe entering structures shall have flexible joint within 16 inches of exterior of structure.

11.0 OWNERSHIP OF OLD MATERIALS

Pipe - Unless otherwise indicated, all existing pipe that is to be abandoned that interferes with construction or is easily removed shall become the property of the CONTRACTOR. All pipe that is not easily removed or not required to be removed as a result of the new construction, shall be abandoned in place by this CONTRACTOR.

Pipe Line Fittings and Appurtenances - All pipe line fittings, valves, hydrants and other like appurtenances that are removed as a result of new construction shall be removed by this CONTRACTOR but shall become the property of the OWNER. All such fittings and appurtenances shall be delivered to a point by the CONTRACTOR. Said point shall be on the OWNER'S property and shall be designated by the ENGINEER.

Other Materials - All other materials or items that are to be removed, demolished, or abandoned as a part of this contract shall become the property of the CONTRACTOR and shall be disposed of by him.

12.0 THRUST BLOCKS AND ANCHORAGE

Thrust blocks shall be installed whenever the pipe line changes direction, as at tees, bends, crosses, stops, as at a dead end; or at valves. The locations of thrust blocks depend on the direction of thrust and type of fitting. Their size and type depends on pressure, pipe size, kind of soil, and the type of fitting. Where thrusts act upward (as at vertical curves) the weight of the pipe, the water in the pipe and the weight of the soil over the pipe should be determined to make certain that the total weight is sufficient to resist upward movement. If there is not enough soil or if it will not compact over the pipe or it is too soft and mushy to resist movement, then ballast or concrete may be placed around the pipe in sufficient weight and volume to counteract the thrust. Where a fitting is used to make a vertical bend, the fitting may be anchored to a concrete thrust block designed to key in to undisturbed soil and to have enough weight to resist upward and outward thrust, since the new placed backfill may not have sufficient holding power.

Thrust blocks shall be constructed of not less than Class B concrete conforming to KTC Specification 601 and placed between the fitting and the trench wall. It is important to place the concrete so it extends to undisturbed (freshly cut) trench wall.

13.0 MAINTENANCE OF FLOW OF DRAINS AND SEWERS

Adequate provision shall be made for the flow of sewers, drains and water courses encountered during construction. Any structures which are disturbed shall be satisfactorily restored by the CONTRACTOR.

14.0 INTERRUPTION OF UTILITY SERVICES

No valve, switch or other control on any existing utility system shall be operated for any purpose by the CONTRACTOR without approval of the ENGINEER and the Utility. All consumers affected by such operations shall be notified by the CONTRACTOR as directed by the ENGINEER and utility before the operation and advised of the probable time when service will be restored.

15.0 FENCING

Where water supply line is being constructed in fields where stock is being grazed, CONTRACTOR shall provide temporary fence as approved by the ENGINEER around open trenches to prevent stock from falling in trenches. Where trenching operations should isolate grazing stock from their source of water, CONTRACTOR will either provide temporary bridging over trench or else provide water for such stock.

Where trench crosses near sound existing corner posts and existing fence is in good condition, fence may be taken loose, rolled back and stored until pipe line is completed at this point, then replaced by stretching tightly and thoroughly stapling. Additional posts will be provided and additional new fence shall be provided when it is necessary to place the fence crossed by the water line in a condition equal to existing fence before water line was constructed.

Where it is necessary to cut existing fence, new end posts shall be installed on each side of the water line and the old fence thoroughly stapled to these new posts before cutting. After pipe line is completed at this point, a new fence of galvanized wire (No. 9 gauge with No. 11 filler wires) shall be stretched between these new end posts and thoroughly stapled to existing posts and any new intermediate posts necessary to provide a good fence. Replacement of fences shall be on a replacement in-kind basis, and shall be considered incidental to laying of the lines and any additional cost shall be included in the unit price bid per lineal foot of pipe. Contractor shall notify property owner prior to cutting fence.

16.0 PROTECTION OF ADJACENT LANDSCAPE

Reasonable care shall be taken during construction of the water lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the

appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

In the course of construction, the CONTRACTOR may deflect horizontal alignment of the water line to avoid trees and to keep from damaging their roots. The CONTRACTOR shall be fully responsible for settling all claims by private property owners concerning damage to trees and shrubs.

17.0 COORDINATION WITH UTILITIES

The Plans show the general location of existing utilities, such information having been determined from the utilities. However, such information shall be considered general and is not guaranteed by OWNER, ENGINEER or the UTILITY.

Prior to construction, the CONTRACTOR shall arrange to meet with representatives of all utilities, and provide them with his anticipated work schedule. The CONTRACTOR shall have the utilities make their best determination of utility locations in the areas in which he is working. Throughout the progress of the work, such field markings of utilities shall be kept current.

Repairs to any utilities damaged by the CONTRACTOR shall normally be performed by the utility at the CONTRACTOR'S expense, unless the CONTRACTOR and the utility negotiate other understandings and/or procedures.

18.0 BLASTING AND ROCK EXCAVATION

The CONTRACTOR shall make his own investigation as he deems necessary to ascertain the sub-surface conditions to be encountered in the work.

All blasting operations shall be conducted in accordance with municipal ordinances, state and federal laws and Section 9, Explosives, of the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc. Soil particle velocity shall not exceed limit set by Kentucky law. All explosives shall be stored in conformity with said ordinances, laws and safety regulations. No blasting shall be done within five feet of any water mains, sewer lines, natural or manufactured gas lines, liquid petroleum product lines or other utilities. Any damage done by blasting is the responsibility of the CONTRACTOR and shall be promptly and satisfactorily repaired by him.

The CONTRACTOR shall use delay caps or other approved methods to reduce earth vibrations and noise. Mud capping, as defined in the above manual, will not be permitted as a method of breaking boulders. No blasting shall be permitted on Sundays or after dark.

Prior to commencing with the work, the CONTRACTOR shall, during a preconstruction conference with the OWNER and ENGINEER, state clearly his

approach to performing the excavations on the project. He shall be familiar with the laws and ordinances covering blasting and shall also give consideration to the use of hydraulically operated rock breaking devices in lieu of blasting where considered necessary. If blasting is not handled in an expert manner at all times, the ENGINEER reserves the right to suspend blasting and require the work to proceed without it.

Prior to blasting, the CONTRACTOR shall make his own detailed pre-blast survey of adjacent walks, curbs, retaining walls, house foundations, etc. to determine conditions prior to the work. Such a file of information, including photographs, may be certified in such a manner as the CONTRACTOR believes necessary since this information that may stand in his defense.

19.0 MEASUREMENT AND PAYMENT

Payment for supplying, transporting and storing pipe, trenching, standard bedding, pipe installation, fittings, thrust- blocking, pipe locating wire or tape, testing, backfilling, disinfection, seeding, crop damage, regular stream crossings, clean-up, tie-ins to other structures and other incidental items in this section shall be made on the basis of the unit price per lineal foot for the type and size of pipe installed. Payment will include all those items not specifically covered by another proposal. Pipe will be measured along the centerline of the pipe as installed with no deduction for valves and fittings. Clean-up is not a separate pay item.

SECTION 15101

WATER LINE ACCESSORIES

1.0 GENERAL

The CONTRACTOR is to supply and install all valves, hydrants, blow-off assemblies and other equipment at the locations shown on the plans in complete accordance with these specifications.

2.0 GATE VALVES

All gate valves shall be the resilient seat-type, iron body, non-rising steam, fully bronze mounted, and suitable for working water pressures of not less than 200 psi for installations on PVC pipe and not less than 250 psi for installations on DI pipe. Valves shall be of standard manufacture and of the highest quality both of materials and workmanship and shall conform to the latest revision of AWWA C-509 Standard. Valves shall be furnished with flanged connections for exposed piping and push-on or mechanical joint connections for buried service. Gate valves shall have a clear water way equal to the nominal diameter, and shall be opened by turning counter-clockwise. The operating nut or wheel shall have an arrow cast in the middle, indicating the direction of opening. Each valve shall have the maker's initials, pressure rating and the year in which manufactured, cast on the body. Prior to shipment from the factory each valve shall be tested by hydraulic pressure of at least 300 pounds per square inch.

Underground valves shall be nut operated, unless otherwise shown on the plans. Valve supplier shall furnish two standard stem iron wrenches for turning nut operated valves. All underground valves which have nuts deeper than thirty inches (30") below the top of valve box shall have extended stems with nuts located within two feet (2') of valve box cap. Buried service valves shall have either epoxy-coated or tar-coated exteriors.

The valve maker is to supply the ENGINEER, through the bidder, within one week after award is made, complete catalogs or other material giving complete details and dimensions of valves and accessories.

Gate valves installed in underground piping systems may be installed in the vertical position for sizes to 12-inch. Gate valves 14-inch and larger shall be installed in the horizontal position with bevel gear operators unless otherwise noted on the drawings. Gear operators shall be the totally enclosed type, oil filled and designed for buried and submerged service. Gear housing shall be ductile iron. Gears shall be steel. Pinion shafts shall be stainless steel. Shaft bearings shall be Teflon with "O"-Ring bearings.

3.0 FIRE HYDRANTS

3.1 WORK INCLUDED

Under this Item, the CONTRACTOR shall provide all labor, tools, equipment and materials to furnish and install hydrants with gate valves as shown on the plans and as directed by the ENGINEER.

3.2 MATERIALS

All fire hydrants shall have a six inch bell connection, shall have two hose outlets and one pumper connection, shall be designed for 250 pounds working pressure or 300 pounds hydrostatic pressure and shall conform to the latest specifications of the AWWA C502. All working parts shall be bronze. Both hose outlets shall be 2 1/2 inch with NST threads and the pumper outlet shall be 4 1/2 inch with NST thread. Hydrants shall be designed so that no water will be lost when they are broken off and so they can be repaired with a repair kit. 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 a 3 1/2 foot bury depth. Working drawings and full description of hydrants shall be submitted to the ENGINEER before ordering. All hydrants shall have a 5 1/4 inch valve opening against pressure. The hydrants shall be Mueller or Kennedy brand or approved equal. All hydrant extensions will be the responsibility of the CONTRACTOR.

3.3 PAINT

Hydrants shall be painted one coat of red paint and two finish coats of approved paint of color directed by the ENGINEER. All hydrants are to receive the final coat of paint after field installation.

3.4 INSTALLATION

Hydrants shall be set at such elevations that the connecting pipe will have the same depth of cover as the distribution main. The back of the hydrant opposite the pipe connection shall be firmly wedged against one and one-half square feet or enough of the vertical face of the trench with concrete to prevent the hydrants from blowing off the line. In addition, all fittings, valves and hydrants shall be joined by the use of all-thread rods, nuts and "DUC-LUG" offsets as shown on the attached drawing to prevent movement of the hydrant. If the character of the soil is such, in the opinion of the ENGINEER, that the hydrant cannot be securely wedged, bridle rod collars shall be used which shall be not less than three-fourths inch stock and shall be protected by a coat of acid resistant paint.

Not less than seven cubic feet of No. 9 stone shall be placed around the base of the hydrant to insure drainage. Before the No. 9 stone is placed and before it is

backfilled the drain hole shall be inspected and thoroughly cleaned if necessary. The backfill around the hydrant shall be thoroughly compacted to the grade line in a manner satisfactory to the ENGINEER. Hydrants shall have the interior cleaned of all foreign matter before installation.

All hydrants will be installed with the pumper connection facing the main access road or as directed by the ENGINEER.

Stuffing boxes shall be tightened and the hydrants shall be inspected in open and closed position to see that all parts are in working condition.

4.0 AIR VALVES

4.1 AIR RELEASE VALVES

A valve designed to allow exhaust of small pockets of air from the water main while in use shall be installed where shown on the plans or where directed by the ENGINEER. The air release valve shall have a 3/4" iron pipe thread inlet, cast iron body construction, bronze trim, with all internal parts of stainless steel. The valve shall have a minimum orifice size of 3/32". Valves shall be suitable for a working water pressure of 150 PSIG. The air release valve shall be mounted on 3/4" bronze riser pipe. The riser pipe shall be connected to the water main by use of a service clamp and a corporation stop. The riser shall also have a 3/4" bronze ball valve with stainless steel handle and be suitable for a 150 PSIG working water pressure. Air release valves shall be as manufactured by APCO Models 65 or 50, or approved equal.

Air release valves will be installed in the same type of box used for meter installation. The box must allow for adequate cover over the pipe at the installation.

In locations where the air release valve cannot be placed directly above the water main, such as roadway drainage ditches, then a section of service tubing shall be used to locate the valve as directed by the ENGINEER. The service tubing shall be installed with a continuous upward slope to eliminate air pockets. Additional payment for the tubing shall be made based on the linear foot bid for service tubing. Tubing shall also be rodded through the box to support the valve. No additional payment will be made for the tubing supports.

5.0 VALVE BOXES

All valves (gate, air release, check, etc.) installed underground shall be installed in an approved valve box. Each gate valve shall be installed in a vertical position with a valve box. Valve boxes shall be of a cast iron, two or three-piece, slip-type consisting of a base, a center section and a top section with a cover marked "water". Where valve box is constructed in a paved area the box

shall be a screw type box. The entire assembly shall be adjustable for elevation and shall be set vertically and be properly adjusted so that the cover will be in the same plane as the finished street surface (no more than 1/2" above ground in yards or pastures or 2" in unsodded areas). The assembly must provide for the required cover over the pipe at the installation site and shall rest on concrete pads as shown in the Standard Details.

6.0 BLOW-OFF ASSEMBLIES

Blow-off assemblies shall be installed in accordance with the details and the specifications at locations shown on the plans and in other locations as directed by the ENGINEER. The CONTRACTOR should refer to the Standard Details for blow-off installation.

The blowoff pipe from the main to the flush valve shall be connected to the main by means of a tee. Do not use a corporation stop for this assembly. The blow-off assembly shall include a resilient seal gate valve in conformance with AWWA C509.

7.0 TAPPING SLEEVE AND VALVE

Tapping sleeves shall be as manufactured by Ford Meter Box Company, Inc., Model FTSC, or approved equal, and shall be rated for a minimum working water pressure of 150 psi. CONTRACTOR shall ascertain the type and size of pipe to which the connection is to be made prior to selection. The valve shall be as specified under section 2.0 of this specification.

8.0 TIE IN CONNECTIONS

All tie in connections shall include any fittings suitable to make the required connection. The fittings shall be mechanical joint, ductile iron type as specified in other sections.

9.0 MEASUREMENT AND PAYMENT

Payment for gate valves, check valves and other special valves installed underground shall include all work necessary for a complete installation and shall include all valve stem boxes or other valve boxes and box covers. Payment will be made at the unit price bid for the type and size of valve installation.

Blow-off assemblies and air release valves will be paid for under their respective bid price and is to include box and six feet (6') of pipe for blow-offs only. Excess pipe will be paid under bid price for pipe installed.

SECTION 15102

SPECIAL ITEMS OF CONSTRUCTION IN WATERLINE INSTALLATION

1.0 GENERAL

These specifications govern special crossings, installations and construction procedures required to deal with unusual construction items or special requirements of governing agencies. This project takes place within subdivision(s) inside the city limits, thus may be subject to work stoppages due to homeowners', traffic issues, weather conditions or sequencing of tie-ins and project alternates as controlled by the Owner and/or Engineer. The Contractor shall be given additional time if a work stoppage is requested and approved by the Owner and Engineer.

2.0 STATE HIGHWAY CROSSINGS

In all cases, these crossings will be made in compliance with the requirements of the State Highway Department. Such requirements will normally be described by the appropriate District Highway Office. In general, unless otherwise shown on the plans or directed otherwise by the ENGINEER, the crossing of all State Highways shall be accomplished by boring under the roadway. In addition, the crossing of service lines 1-1/2 inches and greater under rigid and flexible surfaced paved roads shall be accomplished by boring and jacking a casing pipe under said roadway. In certain cases, as shown on the plans, service lines of all sizes will require casing pipe installed with the crossing.

2.1 OPEN TRENCH CROSSINGS

The trench shall be excavated to a minimum width that will allow the pipe installation. The trench walls shall be kept as nearly vertical as possible. The minimum specified cover above the pipe shall be maintained. The Standard Details section shows the requirements for open trench crossings.

The backfill in the trench under any roads, driveways, or parking areas where the open trench method is used shall be of the type shown in the Standard Details and shall be deposited and compacted in uniform layers not to exceed the depth shown in the Standard Details.

The surface of the road, driveway, or parking area shall be replaced with the same type of material as specified under pavement replacement.

2.2 BORING AND JACKING

The work is herein defined as the operations in which both the boring by auger and the jacking of the casing pipe are done mechanically and in which the diameter of the casing pipe is too small to permit hand working at the heading of the casing pipe. Two basic methods are; (1) pushing the casing pipe into the fill or earth simultaneously as the boring auger drills out the ground; and (2) drilling the hole through the fill or earth and pushing the casing or carrying pipe into the hole after the drill auger has completed the bore.

A suitable approach trench shall be opened adjacent to the slope of the embankment, or adjacent to point of bored and jacked section as shown on the plans. The approach trench shall be long enough to accommodate the selected working room. Guide timbers or rails for keeping the casing pipe on line and grade shall be accurately set and maintained in the bottom of the approach trench and with heavy timber back-stop supports installed at the rear of the approach trench to adequately take thrust of the jacks without any movement or distortion. It is paramount to the securing of acceptable tolerance limits of workmanship in the boring and jacking operation that extreme care be taken in the setting of all guides, rails and jacks to the end that the casing pipe in final position be within the limits of acceptability for the placing and laying of the carrier pipe. The minimum cover of 36 inches under the roadway must be maintained. Additional depth may be required as shown on the plans.
In general, the diameter, thickness, style, joints and materials selected for casing pipe shall be as shown on the plans and shall be considered as "minimum" requirements, all subject to prior approval of the ENGINEER. In all cases, the approval for construction by agreement with the private company and/or construction permit issued by the State, County, or Municipal agency will be required before construction starts.

Steel casing pipe for road and railroad crossings using the boring and jacking method shall be steel, plain end, uncoated and unwrapped, and shall be furnished in at least 18-foot lengths. Steel pipe shall meet the requirements of ASTM Specification A-120 and AWWA C200. Pipes up to and including 4 inches in diameter shall be Schedule 40. Pipe larger than 4 inches shall have a wall thickness equal to or greater than 0.312 inches under railroads and 0.250 for all other uses. The inside diameter of all casing pipes shall be a minimum of four (4") inches greater than the largest outside diameter of the carrier pipe, joint or coupling.

The steel casing pipe shall be bored and/or jacked in place at the locations as shown on the plans or as directed by the ENGINEER. All joints between lengths shall be solidly welded with a smooth non-obstructing joint inside. Any field welding shall be performed by a certified welder and shall be in accordance with AWWA C206. The casing pipe may be extended beyond the boring limits by open trenching as shown in the Standard Details. This would apply when the

casing is required from right-of-way to right-of-way or ditch line to ditch line. Open trenching at jacked or bored locations will be allowed no closer than 3 feet from edge of pavement.

Positioning guides (insulators) shall be utilized on all carrier pipe which is within the casing pipe. Positioning shall be accomplished by the use of prebuilt spacers such as those manufactured by CALPICO or an approved equal. The CONTRACTOR shall submit the type of position guide proposed for use for the approval of the ENGINEER. Spacing of the positioning guides shall be in accordance with the Standard Drawings.

The ends of the casing pipe shall be plugged and made watertight in a manner acceptable to the ENGINEER prior to backfilling. Casing seals as manufactured by Pipeline Seal & Insulator, Inc. (PSI), Advance Products & Systems, Inc. (APS) or equal shall be used.

Where road crossings are made using plastic pipe or copper, the location of joints under the roadway should be avoided by using lengths of adequate dimension for the crossing. This principle also applies to other types of pipe where sufficiently long lengths are available.

3.0 RAILROAD CROSSINGS

At all railroad crossings, cover pipe (casing) for water lines (carrier pipe) shall be jacked or pushed beneath tracks and the carrier pipe jointed and pushed through the cover pipe. Detailed drawings of railroad crossings including the length of casing and depth below track are shown in the plans. CONTRACTOR shall obtain and pay for services of a representative of the railroad to direct the CONTRACTOR's operations while on the railroad property when required by the railroad.

4.0 STREAM CROSSINGS

4.1 NO-FLOW CONDITION

Where required on the plans or instructed by the ENGINEER, the CONTRACTOR shall construct a special creek crossing as shown in the Miscellaneous Drawings. Crossings shall be scheduled for construction in times of no flow or very low flow, if practicable, otherwise the stream shall be directional bored. Concrete shall not be placed under water and CONTRACTOR shall provide suitable pumps to keep water out of trench excavation during stream crossing construction. Special creek crossings shall be designated as Type A or Type B as contained in the Standard Drawings.

4.2 NORMAL EARTHEN STREAM CROSSING

Where the stream crossing is made in earth or other beds which are stable (no casing or anchorage required), then the pipe will be laid in a narrow trench at the depth specified in the Standard Details to maintain the required cover between pipe and stream bed. Initial backfill will be mechanically compacted. Trench backfill in any stream crossing area from one (1) foot above the top of the pipe shall consist of trench excavated rock, if available. No extra payment will be made above normal construction for this type of creek crossing.

4.3 BLUE LINE STREAM CROSSINGS

All crossing of streams that appear as a blue line on a USGS 7.5 minute topographical map shall be accomplished in accordance with:

GENERAL CERTIFICATION
NATIONWIDE PERMIT #12
UTILITY LINE BACKFILL AND BEDDING

This document is bound in front of the specifications. The Contractor shall read, understand and comply with the requirements and procedures.

Stream size, for purposes of this specification, is differentiated as large or small. A stream is classified as small when the distance across the stream channel at top of banks is 15 L.F. or less. A stream is classified as large when this measurement is greater than 15 L.F.

It is the intent of the plans to identify a stream crossing at each blue line stream. Small stream crossings may frequently be accomplished by trenching when the stream is in a no-flow condition. If the stream is in a flow condition, irregardless of the size classification, the crossing shall be accomplished by directional boring or other method that complies with the General Certification and is approved by the Engineer. Specific details for stream crossings are contained in the Miscellaneous Drawings.

See Section 14 for Basis of Payment.

5.0 RIVER OR LAKE CROSSINGS

Crossings in rivers or lakes where the pipe cannot be laid in a trench shall normally be made with ductile iron pipe having ball and socket joints or polyethylene pipe or directional bored as indicated on the DRAWINGS. Details for any required installations of this type including pipe required; number, size and location of anchors; and, installation technique are shown in the plans and Miscellaneous Drawings. See Section 15100 for installation requirements.

6.0 BRIDGE CROSSINGS

Wherever possible bridges will not be utilized for stream crossings. However, where it is necessary for the water line to be attached to bridges, the pipe shall be securely fastened to bridge stringers or beams using supports as dimensioned and located in the plans. The carrier pipe shall be insulated with Vermiculite or other approved material to prevent freezing. Expansion joints to allow for movement of the bridge will be required as shown on the plans.

7.0 WATER LINE AND SEWER LINE SEPARATION

7.1 GENERAL

Wherever sewer lines cross, or are adjacent to, each other, special precautions shall be taken.

7.2 PARALLEL WATER AND SEWER LINES

Water lines must, if possible, be located a minimum lateral distance of 10 feet from any existing or future sewer lines measured from outside diameters. Where water lines and sewer lines must be placed in the same trench, the water line must be located on a shelf, 2 feet above and 2 feet to the side of the sewer line. Whenever this condition cannot be met, and upon direction from the ENGINEER, the water line shall be uncovered and encased with concrete per the standard encasement detail.

7.3 CROSSING WATER AND SEWER LINES

Wherever sewer lines and water lines cross, it is desirable, if practical, that the sewer line be at least 24 inches below the water line.

Where it is not practical to provide such a separation, care shall be taken to ascertain that the existing water line or existing sewer line is in good sound condition and that no evidence of joint leakage is known in that vicinity. If any such evidence does exist, the existing line shall be exposed by the CONTRACTOR at least 10 feet each side of the new pipe crossing, carefully examined and any defects positively corrected. The OWNER will arrange for examining and correcting any defects in the existing lines, but the CONTRACTOR shall cooperate in every way possible.

When the water line must be below or less than 2 feet above the sewer line, the CONTRACTOR shall encase the water line 5 feet in each direction from the crossing as directed by the ENGINEER. This encasement should only be accomplished when directed by the ENGINEER and shall be accomplished in accordance with the details shown on the drawings. The encasement is a separate pay item.

8.0 CLEANUP, SEEDING AND SODDING

8.1 GENERAL

Upon completion of the installation of the work, the CONTRACTOR shall remove all debris and surplus construction materials resulting from the work. The CONTRACTOR shall fine grade all the disturbed surfaces around the area of the work in a uniform and neat manner leaving the construction area in a condition as near as possible to the original ground line or to the lines as directed by the ENGINEER. The Contractor shall provide effective cleanup of the work as it progresses. Procrastination of cleanup will not be to berated.

8.2 ROUGH GRADE WORK AND CLEANUP

Rough Grade Work and Cleanup (Rough Cleanup) shall be defined to include the final backfill and windrowing of the ditch line, disposal of excess excavated material, level grading of the disturbed areas adjacent to the ditch line, filling and leveling street and driveway cuts, cleaning up and removal of rubbish, repair of fences and structures, and any other such work that may be required to result in a neat, orderly project area. **Rough Cleanup shall be performed as construction progresses and must be completed each day throughout the entirety of the project.**

Rough Cleanup is not a separate pay item. The cost for this work shall be included in the unit bid price for water lines. If Rough Cleanup is not performed as specified, the OWNER, after notification to the CONTRACTOR, will refuse payment for additional pipeline installation until the Rough Cleanup is accomplished.

8.3 FINAL CLEANUP

Final cleanup, grade work and seeding shall be performed on each line when backfilled trenches have had adequate time to settle, but at least within **30 days** from the date each line is constructed. Final grade work and seeding on Kentucky Transportation Cabinet rights-of-way shall be done in accordance with said Cabinet's specifications and the permit granted to the OWNER specifically for this project.

Where work was performed on private property in lawns, earth of good quality, free from rock shall be spread over the disturbed area and graded and compacted to match adjacent ground contours. The graded and seed bed area shall be prepared with a power landscape rake and further hand raked if necessary, until smooth and free from rock, potholes, and bumps. **The disturbed area shall then be seeded with the seed variety used on the original lawn (e.g., a bluegrass lawn shall be reseeded with bluegrass seed).** In the case of no preference by the OWNER, the mixture of grasses shall

consist of one-third (1/3) Rye grass, one-third (1/3) Kentucky Fescue and one-third (1/3) Kentucky Bluegrass by weight and shall be applied in accordance with the supplier's recommendations. The area shall be fertilized with 12-12-12 fertilizer applied at a rate of 6 pounds per 1,000 square feet of area. After the seed and fertilizer have been applied, the CONTRACTOR shall then lightly cover the seed by use of a drag or other approved device. The seeded area shall then be covered with clean straw to a depth of approximately one (1) inch.

Where work was performed on private property and not in lawns the trench line shall be graded and filled if necessary to match adjacent contours. All rock larger than 1-1/2" in diameter shall be removed from the disturbed area. In general, pasture and fallow land shall be fertilized and seeded with Kentucky 31 Fescue and plowed fields shall be left unseeded, however, the desire of each property owner shall govern regarding seeding. The entire pipeline length that is seeded shall be strawed.

In all cases on private property the rate of seed and fertilizer application shall be that recommended by the material supplier or the University of Kentucky Cooperative Extension Service for new plantings of the variety of grass seed used.

If the trench line settles following final grade work or if grass seed fails to germinate within a reasonable time, the CONTRACTOR shall regrade or reseed the area in question as specified above and as directed by the ENGINEER.

Final cleanup is a separate pay item and an allowance has been established in the Bid Form.

9.0 PAVEMENT AND OTHER STRUCTURE REPLACEMENT

The CONTRACTOR shall replace all pavement cut or disturbed, with pavement similar in all respects to existing pavement in accordance with the Standard Details and at those locations approved by the ENGINEER. Every effort shall be made to avoid cutting the pavement. In restoring pavement, new pavement is required, except that granite paving blocks, sound brick or sound asphalt paving blocks may be reused. No permanent paving shall be placed within thirty (30) days after the backfilling has been completed. All concrete and asphalt paving materials shall be in conformance with the Standard Details shown in the plans. The pipeline trench through all paved areas (parking lots, driveways, roads, etc.) shall be fully backfilled with crushed stone.

9.1 CLASSIFICATIONS OF PAYMENTS

A. Concrete Pavement Replacement - This pavement replacement shall be Portland cement concrete construction in accordance with the requirements shown in the Standard Details. It shall include all

pavement replacement on concrete surfaced roads, concrete driveways, concrete sidewalks and concrete parking areas, both public and private.

B. Heavy-Duty Bituminous Pavement Replacement - This type of asphalt pavement replacement shall be bituminous concrete surface over concrete base in accordance with the details. This type of pavement replacement shall be used on all heavily trafficked roads having an existing pavement greater than 2", whether public or private, or in other locations as directed by the ENGINEER.

C. Light-Duty Bituminous Pavement Replacement - This type of pavement replacement shall be bituminous concrete constructed in accordance with the details. This item shall include all light-duty bituminous concrete roadways, bituminous driveways and bituminous parking lots, both public and private.

D. Crushed Stone Surface Replacement - This type of surface replacement shall include all graveled roadways, driveways, parking areas, or other gravel surfaced areas, both private and public. This type of surfacing may also be required as a base course for other pavement replacement.

9.2 MATERIALS

The crushed stone backfill as noted on the drawings shall be dense graded aggregate per Kentucky Department of Highways Specifications or as noted on the Drawings. The CONTRACTOR shall continuously be responsible for the maintenance of the aggregate and the surface of the trenches until the pavement replacement is completed.

Portland cement concrete for pavement replacement shall contain a minimum of 6 sacks of cement per cubic yard, the maximum free water content shall be 6 gallons per sack of cement, the slump shall be between 2 and 4 inches, and the concrete shall have minimum 28-day compression strength of at least 3,500 PSI. Cement, aggregate and water shall be described in these specifications for Class "A" concrete. A set of cylinders shall be made and tested for each 25 cubic yards of concrete placed, or fraction thereof, to supply representative sampling and testing of the concrete, upon the direction of the ENGINEER. The CONTRACTOR shall produce a broomed, or burlaped uniformly smooth and nonskid surface, consistent with the existing pavement.

Bituminous materials and mixes shall be consistent with the recommended practice of the asphalt institute and it shall conform to the requirements of the Kentucky Department of Highways for prime coat and Class 1 bituminous

concrete. The bituminous concrete shall consist of a binder or base course and a surface course.

9.3 INSTALLATION OF PAVEMENT REPLACEMENT

The CONTRACTOR shall cut back the surfacing adjacent to the trench for 12 inches on both sides of the trench and shall cut down the dense graded aggregate he has placed to a depth required for either type of pavement replacement. The resulting surface shall be rolled to yield a smooth, dense surface and a uniform depth.

The concrete shall be placed in accordance with standard practice, with the welded wire mesh if required in proper position and thoroughly vibrated into place. The CONTRACTOR shall produce a surface consistent with the existing pavement. The CONTRACTOR shall apply a liquid curing component, sprayed on the surface of the concrete, and shall provide adequate protection to the pavement until it has set.

For bituminous concrete, the CONTRACTOR shall clean and broom the prepared surface, then apply the prime coat at the rate of 0.20 to 0.25 gallons per square yard, with a pressure distributor or approved pressure spray method. When the prime coat has become tacky but not dry and hard, the bituminous binder course, or base course, whichever applies, shall be placed and compacted. The CONTRACTOR shall then apply the surface course. It is recommended, but not required, that the base course remain in place for approximately one week before placing the surface course. The finished course shall be compacted and the completed surface shall match the grades and slopes of the adjacent existing surfacing and be free of offsets, depressions, raised places and all other irregular surfaces.

9.4 SEASONAL AND WEATHER LIMITATIONS FOR PAVEMENT REPLACEMENT

In the event the progress and scheduling of the work is such that the bituminous pavement replacement would occur in the winter months, during adverse cold weather and/or during such times the asphalt plants are not in operation, then the final pavement replacement shall be postponed until favorable weather occurs in the spring and the asphalt plants resume normal operations. No bituminous concrete shall be laid when the temperature is below 40° F except by written permission of the ENGINEER.

Concrete pavement shall not be placed when the temperature is such that the pavement placed will freeze before it has had adequate time to set and shall be placed in conformance with the temperature conditions specified in Section 3 of these specifications.

The CONTRACTOR shall be responsible for replacement of pavement which he has placed which has been damaged by cold weather or freezing without additional compensation.

In the meantime, the CONTRACTOR will be required to maintain the temporary surfacing until the permanent pavement is placed. Such labor, materials and equipment as is required for temporary maintenance of the streets, roadways and driveways shall be provided at the CONTRACTOR'S expense and is not a pay item. The CONTRACTOR will be required to use a cold mix asphaltic concrete as a temporary surface for trenches under heavy traffic use.

9.5 GUARANTEE

The one year guarantee as specified in the contract documents is also applicable to trench settlement and pavement replacement.

10.0 SIDEWALK AND DRIVEWAY REPLACEMENT

Sidewalks and driveways will be replaced if damaged by the CONTRACTOR in any way. Payment will be made for those pavements necessarily damaged by the line installation in accordance with the Standard Details. No pavements are to be replaced over a backfilled trench for at least 30 days after filling. Pavements damaged otherwise are to be replaced immediately at the CONTRACTOR'S expense.

Materials and dimensions are to be at least equal to existing pavement and are to conform to the Standard Details.

11.0 PAYMENT FOR WATER

All water used from the UTILITY shall be metered with meters supplied by the CONTRACTOR. The CONTRACTOR shall pay for such water monthly at the rates published by the water utility. Unmetered water lost through water line breakage shall also be paid at the rates published by the water utility. The quantity lost shall be computed on the basis of a discharge velocity of 7 feet/second, the diameter of the line, and the estimate duration of free uncontrolled discharge.

12.0 FINAL CLEAN-UP

The CONTRACTOR shall provide effective cleanup of the work as it progresses. Procrastination of cleanup will not be tolerated. At the time of final inspection, no trenches shall show any undue evidence of the previous construction. All areas shall be left free of ruts due to construction equipment and shall have a clean and neat appearance without rubble or debris. The areas shall not be mounded up and shall be completely restored, and all yards and fields shall be reseeded

so land may be cultivated, mowed, etc. Straw and fertilizing shall accompany the seeding in accordance with Item 8 - Cleanup, Seeding and Sodding of this section. If necessary to hasten proper restoration of terraces, principally along ditch lines, the CONTRACTOR shall sod such areas at the ENGINEER'S direction. For all line segments, final cleanup shall be performed within 30 days from day of installation.

13.0 PROTECTION OF ADJACENT LANDSCAPE

Reasonable care shall be taken during construction of the water lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

In the course of construction, the CONTRACTOR may deflect horizontal alignment of the water line to avoid trees and to keep from damaging their roots. The CONTRACTOR shall be fully responsible for settling all claims by private property owners concerning damage to trees and shrubs.

14.0 MEASUREMENT AND PAYMENT

14.1 Payment for crushed stone, black top and concrete pavement replacement will not be based on the quantities purchased by the CONTRACTOR. Payment for surfacing will be paid on the basis of linear feet installed in accordance with the STANDARD DRAWINGS with a maximum width of pipe diameter plus 24 inches. Crushed stone or concrete sub-grade under paving and crushed stone trench backfill shall be included in paving price and not paid for separately. Any additional cost estimated by the CONTRACTOR must be included in the cost of pipe in place.

14.2 STREAM CROSSINGS

14.2.1 No-Flow Crossings. Payment for no-flow stream crossings delineated on the plans (excluding directional bores) will be at the unit price bid per lineal foot for that item and shall include encasement pipe, crushed stone, concrete, solid rock excavation and all other work necessary for a satisfactory installation. The carrier pipe installed in the casing shall be paid separately under the unit price bid for pipe installed.

14.2.2 Directional Bores. Payment shall be "Lump Sum" for specific individual Bid Items for Directional Bores of large stream crossings and/or some streams classified as small where the physical crossing characteristics differ significantly from the other small streams in the project. Determination of the required length to accomplish the bore is the responsibility of the Contractor.

Payment shall be "Each" for directional bores of small stream crossings with the exception of individual small streams covered in a specific bid item. All small stream crossings in the project shall be considered the same for payment regardless of width (up to 15 L.F.) or depth. It is the responsibility of the Contractor to determine an average unit price that will be used for payment in each instance a blue line stream is crossed. Small stream crossings may be added, for extended lines beyond those shown on the plans, at the same unit price providing the crossings are reasonably similar to those in the initial project. Stream crossings may be deleted, without affecting the unit price, if a line is deleted or shortened.
Payment shall include the directional bore, encasement pipe if specified on the plans, the carrier pipe as specified on the plans and the transition fittings. Payment limits are shown on the Miscellaneous Drawing for Directional Bore for Stream Crossings.

14.3 Additional costs for normal earth creek crossings shall be included in the unit price bid for pipe installation and no special payment will be made for these crossings.

14.4 Casing pipe unit price bids shall include the cost of boring or jacking under railroads and highways and shall include the cost of steel casing pipe. Carrier pipe will be paid for under the unit price bid for installing lines as described in Article 2.2 of this section.

14.5 Sidewalk /driveway crossings when included as a bid item shall include the extra cost of free-boring or the removal and disposal of existing pavement and replacement with new construction. Payment for pavement replacement will be on the basis of linear feet installed. Width for payment for a standard trench crossing is shown in the Standard Details. When sidewalk/driveway crossings or replacement are not included as a bid item, their costs shall be considered subsidiary to the bid for pipe installation.

14.6 Where required by the Special Provisions or the Bid Proposal, the cost of pavement replacement, boring, crossings of all types and other incidental construction shall be included in the unit price bid for pipe line installation and shall comprise total compensation for all such work.

SECTION 15103

SWABBING, PRESSURE TESTING AND STERILIZATION OF POTABLE WATER PIPELINES

1.0 SWABBING

1.1 GENERAL

Swabbing of the pipeline shall be done when directed in the General Notes on the Drawings.

1.2 EXECUTION

The CONTRACTOR shall insert a flexible polyurethane foam "swab" (2 lb. per cubic foot density) complete with rear polyurethane drive seal into the first section of pipe. The "swab" shall remain in its initial position until construction of the specific pipeline segment is completed. Cleaning and flushing shall be accomplished by propelling the "swab" down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear.

The maximum operational distance for each individual "swab" shall not exceed 1.0-1.5 miles.

Pressure testing and sterilization, as stipulated in this section of the specifications, shall follow cleaning and flushing.

1.3 MATERIALS

The "swab" shall be Aqua-Swab as manufactured by GIRARD Industries or approved equal.

2.0 TESTING

2.1 After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure test of at least 1.5 times the working pressure at the point of testing, but in no case less than that required by other sections herein. In addition, a leakage test shall be conducted concurrently with the pressure test.

2.2 PRESSURE TEST

2.2.1 Test pressure shall:

2.2.1.1 Not be less than 1.25 times the working pressure at the highest point along the test section.

2.2.1.2 Not exceed pipe or thrust restraint design pressures at the lowest point along the test section.

2.2.1.3 Be of at least six (6) hour duration unless otherwise stipulated by owner.

2.2.1.4 Not vary by more than plus or minus 5 psi.

2.2.1.5 Not exceed twice the rated pressure of the valves or hydrants when the pressure of the test section includes closed gate valves or hydrants.

2.2.1.6 Not exceed the rated pressure of resilient seat butterfly valves when used.

2.2.2 Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the ENGINEER.

2.2.3 Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged, or left in place at the discretion of the ENGINEER.

2.2.4. All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the ENGINEER.

2.3 LEAKAGE TESTING

2.3.1 Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

2.3.2 No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = ND(P \text{ exp } 1/2)/7400$$

in which L is the allowable leakage, in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

2.3.2.1 Allowable leakage at various pressures is shown in TABLE K-1.

2.3.2.2 When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in of nominal valve size shall be allowed.

2.3.2.3 When hydrants are in the test section, the test shall be made against the closed hydrant.

2.3.3 Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified in Section 2.3.2 the contractor shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance.

2.3.3.1 All visible leaks are to be repaired regardless of the amount of leakage.

TABLE K-1
ALLOWABLE LEAKAGE PER 1,000 FT. OF PIPELINE (gph)

Avg. Test Pressure	Nominal Pipe Diameter (Inches)								
psi	2	3	4	6	8	10	12	14	16
450	0.32	0.48	0.64	0.95	1.27	1.59	1.91	2.23	2.55
400	0.30	0.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40
350	0.28	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25
300	0.26	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08
275	0.25	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99
250	0.24	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90
225	0.23	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80
200	0.21	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70
175	0.20	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59
150	0.19	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47
125	0.17	0.25	0.34	0.50	0.67	0.84	0.01	1.18	1.34
100	0.15	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20

Avg. Test Pressure psi	Nominal Pipe Diameter (Inches)							
	18	20	24	30	36	42	48	54
450	2.87	3.18	3.82	4.78	5.73	6.69	7.64	8.60
400	2.70	3.00	3.60	4.50	5.41	6.31	7.21	8.11
350	2.53	2.81	3.37	4.21	5.06	5.90	6.74	7.58
300	2.34	2.60	3.12	3.90	4.68	5.46	6.24	7.02
275	2.24	2.49	2.99	3.73	4.48	5.23	5.98	6.72
250	2.14	2.37	2.85	3.56	4.27	4.99	5.70	6.41
225	2.03	2.35	2.70	3.38	4.05	4.73	5.41	6.03
200	1.91	2.12	2.55	3.19	3.82	4.46	5.09	5.73
175	1.79	1.98	2.38	2.98	3.58	4.17	4.77	5.36
150	1.66	1.84	2.21	2.76	3.31	3.86	4.41	4.97
125	1.51	1.68	2.01	2.52	3.02	3.53	4.03	4.53
100	1.35	1.50	1.80	2.25	2.70	3.15	3.60	4.05

3.0 STERILIZATION

3.1 GENERAL

It is the intent of this section to present essential procedures for disinfecting new and repaired water mains. The section is patterned after AWWA C651. The basic procedure comprises:

3.1.1 Preventing contaminating materials from entering the water mains during construction or repair and removing by flushing materials that may have entered the water main.

3.1.2 Disinfecting any residual contamination that may remain.

3.1.3 Determining the bacteriologic quality by laboratory test after disinfection.

3.2 PREVENTIVE MEASURES DURING CONSTRUCTION

3.2.1 Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. When pipe laying is not in progress, as, for example, at the close of the day's work, all openings in the pipe line shall be closed by water tight plugs. Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

If dirt, that, in the opinion of the ENGINEER, will not be removed by the flushing operation (ARTICLE 3.3) enters the pipe, the interior of the pipe shall be cleaned

and swabbed as necessary, with a five (5%) percent hypochlorite disinfecting solution.

3.2.2 Gaskets and Joints - No contaminated material or any material capable of supporting prolific growth of micro-organisms shall be used for sealing joints. Gaskets shall be handled in such a manner as to avoid contamination. Gasket packing materials must conform to AWWA standards. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in enclosed containers and shall be kept clean.

3.3 PRELIMINARY FLUSHING

The main shall be swabbed and flushed prior to disinfection. It is recommended that the flushing velocity be not less than 2.5 ft/sec. The rate of flow required to produce this velocity in various diameters is shown in Table K-2. No site for flushing should be chosen unless it has been determined that drainage is adequate at the site.

TABLE K-2
REQUIRED OPENINGS TO FLUSH PIPELINES
(40-psi Residual Pressure)

Pipe Size (in)	Flow Required to Produce 2.5 fps Velocity (gpm)	Orifice Size (in)	Hydrant Outlet Nozzles Size Number	(in)
4	100	15/16	1	2 1/2
6	220	1 3/8	1	2 1/2
8	390	1 7/8	1	2 1/2
10	610	2 5/16	1	2 1/2
12	880	2 13/16	1	2 1/2
14	1,200	3 1/4	2	2 1/2
16	1,565	3 5/8	2	2 1/2
18	1,980	4 3/16	2	2 1/2

3.4 FORM OF CHLORINE FOR DISINFECTION

The most common forms of chlorine used in the disinfecting solutions are liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules, sodium hypochlorite solutions.

3.4.1 Liquid Chlorine

3.4.1.1 Use: Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is

properly trained and equipped to handle any emergency that may arise. Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.

NOTE: The preferred equipment consists of a solution fed chlorinator in combination with a booster pump for injecting the chlorine-gas water mixture into the main to be disinfected. Direct feed chlorinators are not recommended because their use is limited to situations where the water pressure is lower than the chlorine cylinder pressure.

3.4.2 Hypochlorites

3.4.2.1 Calcium Hypochlorite: Calcium hypochlorite contains seventy (70%) percent available chlorine by weight. It is either granular or tabular in form. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water. Calcium hypochlorite is packaged in containers of various types and sizes ranging from small plastic bottles to one hundred (100) pound drums.

A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

3.4.2.2 Sodium Hypochlorite: Sodium hypochlorite is supplied in strengths from five and one-quarter (5.25%) to sixteen (16%) percent available chlorine. It is packaged in liquid form in glass, rubber, or plastic containers ranging in size from one (1) quart bottles to five (5) gallon carboys. It may also be purchased in bulk for delivery by tank truck.

The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

3.4.2.3 Application: The hypochlorite solutions shall be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. For small applications, the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

3.5 METHODS OF CHLORINE APPLICATION

3.5.1 Continuous Feed Method: This method is suitable for general application.

3.5.1.1 Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipe line. The water shall receive a dose of chlorine, also fed at a constant,

measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/l available chlorine. To assure that this concentration is maintained, the chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of Standard Methods and AWWA M12--Simplified Procedures for Water Examination.

NOTE: In the absence of a meter, the rate may be determined either by placing a pitot gauge at the discharge or by measuring the time to fill a container of known volume.

TABLE K-3 gives the amount of chlorine residual required for each one hundred (100) feet of pipe of various diameters. Solutions of one (1%) percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately one (1) pound of calcium hypochlorite in eight and five tenths (8.5) gallons of water.

TABLE K-3
CHLORINE REQUIRED TO PRODUCE 50 Mg/l CONCENTRATION
IN 100 FT. OF PIPE (BY DIAMETER)

Pipe Size (in)	100 Percent Chlorine (lb)	1 Percent Chlorine Solutions (gal)
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

3.5.1.2 During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least twenty-four (24) hours during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this twenty-four (24) hour period, the treated water shall contain no less than 25 mg/l chlorine throughout the length of the main.

3.5.2 Slug Method: This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.

3.5.2.1 Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate (see ARTICLE

3.5.1.1) into the newly laid pipe line. The water shall receive a dose of chlorine also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipe line is maintained at no less than 300 mg/l. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least three (3) hours. The application shall be checked at a tap near the upstream end of the line by chlorine residual measurements.

3.5.2.2 As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated as to disinfect appurtenances.

3.6 FINAL FLUSHING

3.6.1 Clearing the Main of Heavily Chlorinated Water. After the applicable retention period, the heavily chlorinated water shall not remain in prolonged contact with the pipe. This water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/l. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipe line.

3.6.2 Disposing of Heavily Chlorinated Water. The environment into which the chlorinated water is to be discharged shall be inspected. If there is any possibility that the chlorinated discharge will cause damage to the environment, then a neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See Appendix B of ANSI/AWWA C651-92 for neutralizing chemicals.) Federal, state, provincial, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

3.7 BACTERIOLOGIC TESTS

3.7.1 After final flushing, and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriologic quality and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least one sample shall be collected from chlorinated supplies where a chlorine residual is maintained throughout the new main. From unchlorinated supplies at least two samples shall be collected at least twenty-four (24) hours apart. **The Contractor is responsible for all bacteriologic testing expenses.**

3.7.2 Samples for bacteriologic analysis shall be collected in sterile bottles treated with sodium thiosulphate. No hose or fire hydrant shall be used in collection of samples. A suggested sampling tap consists of a standard

corporation cock installed in the main with a copper tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed, and retained for future use.

3.8 REPETITION OF PROCEDURE

If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. The tablet method cannot be used in these subsequent disinfections. When the sample tests indicate that disinfection has been effective, the main may be placed in service.

3.9 PROCEDURE AFTER CUTTING INTO OR REPAIRING EXISTING MAINS

The procedures outlined in this Article apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

3.9.1 Trench "Treatment": When an old line is opened, either by accident or by design, the excavation will likely be wet and may be badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

3.9.2 Main Disinfection: The following procedure is considered as a minimum that may be used.

3.9.2.1 Swabbing With Hypochlorite Solution: The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a five (5%) percent hypochlorite solution before they are installed.

3.9.2.2 Flushing: Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.

3.9.2.3 Slug Method: Where practicable, in addition to the procedures of ARTICLE 3.9.2.1, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in ARTICLE 3.5.2, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as one-half (1/2) hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.

3.9.3 Sampling: Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.

4.0 PAYMENT

Payment for swabbing, pressure testing and sterilization of pipelines shall be included in the unit price for pipeline installation unless otherwise itemized on the Bid Schedule. Pipeline swabbing may be included in the Bid Schedule as a separate Bid Item.

SECTION 15104

METER SERVICES

1.0 GENERAL

The CONTRACTOR shall furnish all labor, tools, equipment and materials for installing water services as shown on the plans and as directed.

2.0 WATER METER SETTINGS

2.1 MATERIALS

Meters shall include meter box and cover, coppersetter (including cut-off valve), four feet of pipe, saddle and corporation stop iron pipe or rod to hold meter plumb, plus two feet of pipe and plug or cap on the customer's side of meter. (This latter item is to prevent the customer or his plumber from disarranging or loosening the meter after the CONTRACTOR has already set the meter in its proper position.) Where the main line is in the highway right-of-way, meters shall be set as close to the right-of-way fence as practicable but no meter on the same side of the road as the main line shall be set with more than 6 feet of service line unless prior approval has been obtained from the ENGINEER or his representative or as directed on the plans. The standard details show the required meter setting.

2.2 CORPORATION STOPS, SETTERS AND SADDLES

The corporation stops shall be equal to Ford F-Series. The meter setter shall be equal to the Ford 170-Series Coppersetter VB-HH-72-7W 44-33 with seven inch rise. A tandem coppersetter to accommodate a pressure reducer and meter shall be used where specified. Saddles shall be equal to Ford S70 Series for PVC and 202 Series for Ductile Iron Pipe.

Service line connections are to be made with compression fittings only.

2.3 METERS

The meters for this project shall be Sensus SR II with AMR RadioRead transmitter.

2.4 METER BOXES

Meter boxes for 5/8" x 3/4" meters shall be 24-inch and equal to AMETEC meter box combo (box, lid and 6" riser) No. 17105 with locking device and meter reading lid. Extensions shall be equal to AMETEC and utilized as necessary.

2.5 INSTALLATION

Meters shall be set in a workmanlike manner with backfill neatly compacted in place. In yards, pastures and other grassed areas, top of meter box may be placed no higher than 1/2 inch above original ground and no lower than flush with original ground. Boxes in sidewalks or other concrete areas shall be flush with surface. In areas which have not been sodded top of box shall be 2 inches above grade. The service line must meet the same cover requirements as the main line as described in these specifications except that the service line may be brought up to a depth of approximately 24 inches within 5 feet of each side of the meter installation when a 24-inch deep meter box is used. In all other cases the service pipe will be brought up to a depth which accommodates installation at the bottom of the meter box in accordance with the Standard Details. As shown in the Details, after 5 feet from box, service pipe must return to 30 inch cover (36 inches in traffic). If meter box area is subject to traffic a deeper box will be required to maintain 36 inches of cover over the service pipe.

2.6 METER RECONNECT

This item covers meter settings, which can remain in place, but need to be connected to a new water line. The Contractor shall supply all items to connect the meter to the new line with minimal disruption of service to the customer. The Unit Price Bid for Meter Reconnect shall constitute full compensation for reconnecting the existing meter setting to the new waterline.

2.7 NEW METER SERVICE

The Unit Price Bid shall constitute full compensation for furnishing and installing the new meter, radio read transmitter, saddle, corporation stop, meter box, cover, meter setter and valve, holding rod, and service tubing extension as shown and specified. Installation of the meters will be done by the Contractor.

3.0 SERVICES

3.1 GENERAL

Service lines up to four (4) feet on the inlet side of the meter and two (2) feet on the customer side is included in the meter setting. Additional service pipe is an extra pay item and must be approved by the ENGINEER or designated Construction Representative.

3.2 SERVICE LINES NOT CROSSING A ROAD

Unless indicated otherwise on the plans, all Service Lines shall be 3/4" Type K Copper Tubing, or polyethylene plastic tubing using a corporation stop in accordance with the Standard Details. Service pipe shall meet all AWWA Specifications with a minimum pressure rating of 200 psi. Polyethylene service tubing shall be ultra high density type equal to DRISCOPIPE Series 5100, CTS.

3.3 SERVICE LINES CROSSING A COUNTY ROAD OR CITY STREETS

Same as above, except that in general all pipe shall be jacked beneath certain paved or blacktopped city streets or county roads, unless solid rock prevents using this method in which case, the open trench method may be used. The open trench method generally will be used on all unpaved city streets, county roads and private driveways. In general, blacktopped and concrete private driveways shall also be jacked under. In all cases where lines are under traffic, a minimum cover of thirty-six (36") inches shall be provided. All backfill shall be compacted by air tampers in layers no greater than 6-inch depth. In cases of open trench construction, crushed stone, blacktop and concrete paving shall be replaced according to the Standard Drawings.

3.4 SERVICE LINES CROSSING A STATE HIGHWAY

Same as Section 3.3 except the pipe shall be jacked or pushed under paving. If solid rock is encountered, the crossing may be relocated to permit boring or jacking. No additional compensation will be made for relocation of service crossing.

Where required and specifically noted on the DRAWINGS, service pipe shall be encased under highways. Schedule 40 steel pipe shall be used as casing pipe unless otherwise indicated by the plans. Polyethylene pipe will normally be encased. Where permitted rigid PVC pipe will not be encased but soft connections with polyethylene pipe will be required on either side of the boring length.

3.5 PAYMENT.

The Unit Price bid for the specific service pipe size shall constitute full compensation for all materials, equipment and labor for installing the service pipe. There shall be no distinction between service pipe bored, pushed or trenched. There shall be no extra compensation for replacement of crushed stone, blacktop or concrete paving.

4.0 INDIVIUAL METER PRESSURE REDUCING VALVES

4.1 Pressure Reducing Valves will be installed for individual services only where shown by notes on PLANS.

4.2 These valves shall be a Mueller, Model No. H-9001, three-fourths (3/4") inch Regulator No. 3 or approved equal complete with a bronze strainer. Wilkins and Watts are also acceptable. Each regulator to have an adjustable pressure range of 60-125 psi and is to be set at 70 psi. These regulators shall be installed on the customer inlet side of the service meter using a tandem coppersetter. Burying the PRV or installing in a separate meter box will not be permitted.

4.3 PAYMENT

Payment for individual pressure reducing valves shall be included in the Bid Item for "Meter Setting with Individual Pressure Reducing Valves" and shall constitute full compensation for furnishing and installing the saddle, corporation stop, holding rods, service tubing extension, pressure regulator, meter box and lid, unions, fittings and isolation valves complete and operative. Meters will be installed by the utility.

KENVIRONS

TECHNICAL SPECIFICATIONS

I-75/KY 461 EXIT RAMP UTILITY RELOCATION

CITY OF MT. VERNON
P.O. BOX 1465
125 RICHMOND STREET
MT. VERNON, KENTUCKY 404560067

Prepared By:

Kenvirons, Inc.
452 VERSAILLES ROAD
FRANKFORT, KENTUCKY 40601

PROJECT NO. 2017172

AUGUST 2017

SECTION 01001

GENERAL SPECIFICATIONS

1.0 DESCRIPTION OF THE WORK AND DESIGNATION OF OWNER

These Specifications and accompanying Drawings describe the work to be done and the materials to be furnished for the construction of the project entitled I-75/KY 461 Exit Ramp Utility Relocation.

All references to the Owner in these Specifications, Contract Documents and plans shall mean the City of Mt. Vernon.

2.0 AVAILABLE FUNDS

The attention of all Bidders is directed to the fact that funds will be made available for the award of the contract through local funding. Additive Alternate No. 1 will be added to the contract if funding allows.

3.0 TIME OF COMPLETION

The time allowed for the completion of this contract is thirty (30) calendar days. The time allowed for completion shall begin at midnight, local time, on the date which the Owner, or his authorized representative, the Engineer, shall instruct the Contractor in writing to start work, but no later than 10 days after Notice to Proceed.

Additional time will be allowed the Contractor to cover approved over-runs or additions to the contract in the same proportion that the said over-run or addition in net monetary value bears to the original amount; the total of said additional time to be computed to the nearest whole calendar day.

4.0 LIQUIDATED DAMAGES

It is understood that time is the essence of this contract and that the Owner will sustain damages, monetary and otherwise, in the event of delay in completion of the work hereby contracted.

Therefore, if the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part of the consideration for the awarding of these contracts, to pay to the Owner the amount specified in the contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.

The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

Liquidated damages are fixed at $800 per calendar day of over-run beyond the date set for completion or authorized extension thereof.

5.0 INSURANCE

See Section 00800, Supplementary Conditions SC-5.04 for the minimum amounts of insurance coverage to be furnished under these contracts.

6.0 PERFORMANCE AND PAYMENT BOND

The Contractor shall furnish separate performance and payment bonds issued by an approved bonding company in an amount at least equal to one hundred percent (100%) of the contract price, as security for the faithful performance of this contract and for the payment of persons performing labor and furnishing materials in connection with this contract. These bonds shall be executed by a company authorized to do business in the State of Kentucky and shall be signed or countersigned by a Kentucky resident agent. Bonds shall remain in effect for one year after date of final acceptance of the work.

7.0 SITE DIMENSIONS

All Contractors furnishing materials and equipment for this contract shall obtain exact dimensions at the site. Scale or figure dimensions on the drawings and details show the correct size under ideal conditions and shall not, under any circumstances, be so construed as to relieve the Contractor from responsibility for taking measurements at the site and furnishing materials or equipment of the correct size.

8.0 DAMAGE TO EQUIPMENT STORED AND/OR IN PLACE PRIOR TO INITIAL OPERATION

Any equipment damaged or which has been subjected to possible damage by reason of inundation, improper storage and/or protection during the construction period of project, shall be handled only as follows:

a) Be replaced with new equipment.

b) With approval of the Engineer, be returned to the manufacturer of the equipment, or his authorized repair agency, for inspection and

repair provided, however, that such repair after inspection will place the equipment in new condition, and restore the manufacturer's guarantee the same as for new equipment.

9.0 SALVAGED MATERIALS AND EQUIPMENT

All materials and/or equipment to be removed from existing structures and not specifically specified to be re-used shall remain the property of the Owner. Such materials and/or equipment shall be stored on sites by the Contractor as directed by the Owner.

The use of second hand and/or salvaged materials will not be permitted, unless specifically provided for in the detailed specifications. Materials and equipment shall be new when turned over to the Owner.

10.0 TEMPORARY FACILITIES

a) Construction yard shall be located on job site. Provide security and safety protection.

b) The obtaining of all utilities for construction, including power and water, shall be the responsibility of the Contractor, and he shall bear the cost of all utilities used for construction. Cost of all connections and facilities for use of utilities shall be borne by the Contractor.

c) Each Contractor shall construct and maintain, in a sanitary condition, sanitary facilities for his employees and also employees of his subcontractors. At completion of the contract work these sanitary facilities shall be properly disposed of as directed by the Engineer.

d) Temporary construction for safety measures, hoists and scaffolds shall be erected in accordance with the General Conditions.

e) The obtaining of all utilities for construction, including power and water, shall be the responsibility of the Contractor, and he shall bear the cost of all utilities used for construction. Cost of all connections and facilities for use of utilities shall be borne by the Contractor.

11.0 PROPERTY PROTECTION

Care is to be exercised by the Contractor in all phases of construction to prevent damage and injury to the Owner's or other property.

In connection with work performed on "private property" (property other than that belonging to the Owner), the Contractor shall confine his equipment, the storage of materials, and the operation of his workmen to the limits indicated on the

plans, or to lands and right-of-way provided for the project by the Owner, and shall take every precaution to avoid damage to the private property Owner's buildings, grounds and facilities.

Fences, hedges, shrubs, etc. within the construction limits shall be carefully removed, preserved, and replaced when the construction is completed. Where ditches or excavations cross lawns, the sod shall be removed carefully and replaced when the backfilling has been completed. If sod is damaged or not handled properly, it shall be replaced with new sod equal to existing sod at the Contractor's expense. Grassed areas, other than lawns, shall be graded, fertilized and seeded when construction is completed. When construction is completed the private property Owner's facilities and grounds shall be restored to as good or better condition than found as quickly as possible at the Contractor's expense.

12.0 CONFLICT WITH OR DAMAGE TO EXISTING UTILITIES AND FACILITIES

Insofar as location data is available to the Engineers, existing underground utilities (such as waterlines, sewer lines, gas lines, telephone conduits, etc.) are accurately located on the drawings. Due, however, to the approximate nature of much of this data, the location of any particular facility cannot be certified to be correct. In general, locations and elevations shown are approximate only.

Before proceeding with the work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the construction work. The purpose of the conference is to verify the location of, and possible interference with, the existing utilities that are shown on the Plans, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities that are not shown on the Plans.

13.0 CONTROL OF EROSION

The Contractor shall be responsible for control of siltation and erosion from the project work. Control shall include all necessary ditching, check dams, mulching, etc. to prevent deposition of materials in roadside ditches. The Owner shall incur no extra costs from such work.

14.0 MEASUREMENT AND PAYMENT

14.1 MEASUREMENT OF QUANTITIES

All Work completed under the Agreement will be measured by the Engineer according to United States standard measure.

14.1.1 Unless otherwise specified, measurement of concrete quantities will include only that volume within the neat lines as shown on the Plans or as altered by the Engineer to fit field conditions. The prismoidal formula will be used in computing the volumes of structures, or portions of structures, having end sections of unequal areas.

14.1.2 All items which are measured by the linear foot, such as pipe, will be measured along the centerline distance of the installed item with no allowance for connections, fittings or laps at connections.

14.1.3 In computing volumes of excavation, borrow and embankments, the average end-area method will be used. For the purpose of ascertaining quantities, it is agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of areas.

14.2 LUMP SUM

When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

14.3 PLAN QUANTITIES

When the plan quantities for a specific portion of the Work are designated as the pay quantities in the Contract Documents, they shall be the final quantities for which payment for such specific portion of the Work will be made, unless the dimensions of said portions of the Work shown on the plans are revised by the Engineer. When revised dimensions result in an increase or decrease in the quantities of such Work, the final quantities for payment will be revised in the amount represented by the authorized changes in dimensions.

14.4 ACTUAL QUANTITIES

When actual quantities for a specific portion of the Work are designated as the pay quantities in the Contract Documents, they shall be the final quantities for which payment for such specific portion of the Work will be made. The actual quantities will be determined by the difference in field measurements and cross sections before and after construction.

14.5 SCOPE OF PAYMENT

The contract unit prices whether based on lump sum, plan quantities or actual quantities for the various bid items of the Contract Documents shall be considered full compensation for all labor, materials, supplies, equipment, tools, and all things of whatever nature required for the complete incorporation of the

item into the Work the same as though the items were to read "in Plan" unless the Contract Documents provide otherwise.

14.6 PAYMENTS

Estimates for payment, partial payments and final payments shall be in accordance with and follow procedures set forth in the General Conditions and Supplementary Conditions.

15.0 ACCESS ROADS

15.1 The Contractor, Contractor's employees and all trucks delivering equipment, supplies or materials to the project shall use the access roads shown in the Plans for entering and leaving the project sites.

16.0 TESTING LABORATORY SERVICES

16.1 GENERAL

16.1.1 Work Included. From time to time during progress of the Work, the Owner may require that testing be performed to determine that materials provided for the Work meet the specified requirements; such testing includes, but is not necessarily limited to:

1) Material Compaction
2) Cast-In-Place Concrete

16.1.2 Related Work Described Elsewhere. Requirements for testing may be described in various Sections of these Specifications; where no testing requirements are described, but the Owner decides that testing is required, the Owner may require testing to be performed under current pertinent standards for testing.

16.1.3 Selection of Testing Laboratory. The Owner will select a testing laboratory.

16.1.4 Codes and Standards. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

16.1.5 Product Handling. The Contractor shall promptly process and distribute all required copies of test reports for which he is responsible and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the Work.

16.2 PAYMENT FOR TESTING SERVICES

16.2.1 Initial Services. The Contractor will pay for all initial testing services required by the Owner.

16.2.2 Retesting. When initial tests indicate non-compliance with the Contract Documents, all subsequent retesting made necessary by the non-compliance shall be performed by a testing laboratory selected by the Contractor and approved by the Engineer and the costs thereof will be paid directly by the Contractor.

16.2.3 Contractor's Convenience Testing. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

16.3 EXECUTION

16.3.1 Cooperation with Testing Laboratory. Representatives of the testing laboratory shall have access to the Work at all times. The Contractor shall provide facilities for such access in order that the laboratory may properly perform its functions.

16.3.2 SCHEDULES FOR TESTING

16.3.2.1 Establishing Schedule. By advance discussion with the testing laboratory selected by the Owner, the Contractor shall allow for the time required for the laboratory to perform its tests and to issue each of its findings. The Contractor shall allow for this time within the construction schedule.

16.3.2.2 Revising Schedule. When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the testing laboratory as required.

16.3.2.3 Adherence to Schedule. When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributed to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

16.3.3 Taking Specimens. All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the testing laboratory; all sampling equipment and personnel will be provided by the testing laboratory; and all deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

17.0 SUBMITTALS AND SUBSTITUTIONS

17.1 GENERAL

17.1.1 Work Included. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards. To insure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its review and approval or rejection by the Engineer.

17.1.2 RELATED WORK DESCRIBED ELSEWHERE.

17.1.2.1 Contractual requirements for submittals are described in the General Conditions and Supplementary Conditions. Contractor shall provide six copies of each submittal for approval by the Engineer.

17.1.2.2 Individual submittals required are described in the pertinent sections of these Specifications.

17.2 SUBSTITUTIONS

17.2.1 Engineer's Approval Required. The Agreement is based on the materials, equipment, and methods described in the Contract Documents. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Engineer to evaluate the proposed substitution. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this Work by the Engineer.

17.2.2 "Or Equal". Where the phrase "or equal" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Engineer unless the item has been specifically approved for this Work. The decision of the Engineer shall be final.

17.2.3 Availability of Specified Items. The Contractor shall verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work. In the event the specified item or items will not be so available, the Contractor shall notify the Engineer prior to receipt of Bids.

17.3 IDENTIFICATION OF SUBMITTALS

The Contractor shall completely identify each submittal and resubmittal by showing at least the following information:

1) Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.

2) Name of project as it appears in these Specifications.

3) Drawing number and Specifications Section number to which the submittal applies.

4) Whether this is an original submittal or resubmittal.

17.4 COORDINATION OF SUBMITTALS

17.4.1 General. Prior to submittal for Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:

1) Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.

2) Coordinate as required with all trades and with all public agencies involved.

3) Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.

4) Clearly indicate all deviations from the Contract Documents.

17.4.2 Grouping of Submittals. Unless otherwise specifically permitted by the Engineer, the Contractor shall make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents. The Contractor shall submit all submittals to Engineer in digital PDF format.

17.5 TIMING OF SUBMITTALS

The Contractor shall make all submittals far enough in advance of schedule dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery. In scheduling, allow at least five full working days for the Engineer's review following his receipt of the submittal.

18.0 INSTALLATION REQUIREMENTS

Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the respective manufacturers, unless otherwise specified.

19.0 PROOF OF COMPLIANCE

Whenever the Contract Documents require that a product be in accordance with Federal specification, ASTM designation, ANSI specification, or other association standard, the Contractor shall present an affidavit from the manufacturer certifying that the product complies therewith. Where requested or specified, the Contractor shall submit supporting test data to substantiate compliance.

20.0 PROJECT RECORD DOCUMENTS

20.1 As the Work progress, the Contractor shall keep a complete and accurate record of changes or deviations from the Contract Documents and the Shop Drawings, indicating the Work as actually installed. Changes shall be neatly and correctly shown on the respective portion of the affected document, using blackline prints of the Drawings affected, or the Specifications, with appropriate supplementary notes. This record set of Drawings, Shop Drawings, and Specifications shall be kept at the job site for inspection by the Engineer.

20.2 The records above shall be arranged in order, in accordance with the various sections of the Specifications, and properly indexed. Prior to application for final payment, and as a condition to its approval by the Engineer, deliver the record Drawings and Specifications, arranged in proper order, indexed, and endorsed as hereinbefore specified.

20.3 No review or receipt of such records by the Engineer or Owner shall be a waiver of any deviation from the Contract Documents or the Shop Drawings or in any way relieve the Contractor from his responsibility to perform the Work in accordance with the Contract Documents and the Shop Drawings to the extent they are in accordance with the Contract Documents.

21.0 PROJECT MEETINGS

The Contractor's Superintendent for the Work shall attend project meetings as required by either the Owner or Engineer.

22.0 VIDEO TAPE

The line Contractor, before proceeding with any work, shall make or have made a video of all areas where work is to be performed and a copy of this video

cassette shall be furnished to the Engineer to review for completeness. This video shall be utilized as backup and reference for claims and cleanup.

23.0 DAILY REPORTS

The project inspector, as designated by the Owner and/or Engineer, will keep a daily record of materials installed. This daily report will be used by the Owner and the Engineer to determine the payments due to the Contractor. The Contractor shall sign the inspector's daily report each day. Should the contractor disagree with the inspector's report, the differences shall be resolved before the end of the next day, with the Contractor signing the daily report.

24.0 FINAL ADJUSTMENT OF QUANTITIES

Upon completion of the project, a final adjusting change order will be written to reconcile the differences between the bid quantities and the actual quantities installed. This final adjusting change order will be determined based on the inspector's daily reports.

SECTION 02740

PAVEMENT REPLACEMENT

1.0 GENERAL

The Contractor shall replace all pavement cut or disturbed, with pavement similar in all respects to existing pavement in accordance with the Standard Details and at those locations approved by the Engineer. No permanent paving shall be placed within thirty (30) days after the backfilling has been completed. All concrete and asphalt paving materials shall be in conformance with the Standard Details shown in the plans. The pipeline trench through all paved areas (parking lots, driveways, roads, etc.) shall be fully backfilled with crushed stone.

1.1 CONCRETE PAVEMENT REPLACEMENT

This pavement replacement shall be Portland cement concrete construction in accordance with the requirements shown in the Standard Details. It shall include all pavement replacement on concrete surfaced roads, concrete driveways, concrete sidewalks and concrete parking areas, both public and private.

1.2 HEAVY-DUTY BITUMINOUS PAVEMENT REPLACEMENT

This type of asphalt pavement replacement shall be bituminous concrete surface over concrete base in accordance with the details. This type of pavement replacement shall primarily be used on state and federal highways or in other locations as directed by the Engineer.

1.3 LIGHT-DUTY BITUMINOUS PAVEMENT REPLACEMENT

This type of pavement replacement shall be bituminous concrete constructed in accordance with the details. This item shall include all light-duty bituminous concrete roadways, bituminous driveways and bituminous parking lots, both public and private.

1.4 CRUSHED STONE SURFACE REPLACEMENT

This type of surface replacement shall include all graveled roadways, driveways, parking areas, or other gravel surfaced areas, both private and public.

2.0 MATERIALS

The crushed stone backfill as noted on the drawings shall be dense graded aggregate per Kentucky Department of Highways Specifications or as noted on the Drawings. The Contractor shall continuously be responsible for the

maintenance of the aggregate and the surface of the trenches until the pavement replacement is completed.

Portland cement concrete for pavement replacement shall contain a minimum of 6 sacks of cement per cubic yard, the maximum free water content shall be 6 gallons per sack of cement, the slump shall be between 2 and 4 inches, and the concrete shall have minimum 28-day compression strength of at least 3,500 psi. Cement, aggregate and water shall be described in these specifications for Class "A" concrete. A set of cylinders shall be made and tested for each 25 cubic yards of concrete placed, or fraction thereof, to supply representative sampling and testing of the concrete, upon the direction of the Engineer. The Contractor shall produce a broomed, or burlaped uniformly smooth and nonskid surface, consistent with the existing pavement.

Bituminous materials and mixes shall be consistent with the recommended practice of the asphalt institute and it shall conform to the requirements of the Kentucky Department of Highways for prime coat and Class 1 bituminous concrete. The bituminous concrete shall consist of a binder or base course and a surface course.

3.0 EXECUTION

The Contractor shall cut back the surfacing adjacent to the trench for 12 inches on both sides of the trench and shall cut down the dense graded aggregate he has placed to a depth required for either type of pavement replacement. The resulting surface shall be rolled to yield a smooth, dense surface and a uniform depth.

The concrete shall be placed in accordance with standard practice, with the welded wire mesh if required in proper position and thoroughly vibrated into place. The Contractor shall produce a surface consistent with the existing pavement. The Contractor shall apply a liquid curing component, sprayed on the surface of the concrete, and shall provide adequate protection to the pavement until it has set.

For bituminous concrete, the Contractor shall clean and broom the prepared surface, then apply the prime coat at the rate of 0.20 to 0.25 gallons per square yard, with a pressure distributor or approved pressure spray method. When the prime coat has become tacky but not dry and hard, the bituminous binder course, or base course, whichever applies, shall be placed and compacted. The Contractor shall then apply the surface course. It is recommended, but not required, that the base course remain in place for approximately one week before placing the surface course. The finished course shall be compacted and the completed surface shall match the grades and slopes of the adjacent existing surfacing and be free of offsets, depressions, raised places and all other irregular surfaces.

3.1 SEASONAL AND WEATHER LIMITATIONS FOR PAVEMENT REPLACEMENT

In the event the progress and scheduling of the work is such that the bituminous pavement replacement would occur in the winter months, during adverse cold weather and/or during such times the asphalt plants are not in operation, then the final pavement replacement shall be postponed until favorable weather occurs in the spring and the asphalt plants resume normal operations. No bituminous concrete shall be laid when the temperature is below 40°F except by written permission of the Engineer.

Concrete pavement shall not be placed when the temperature is such that the pavement placed will freeze before it has had adequate time to set and shall be placed in conformance with the temperature conditions specified in this section of the specifications.

The Contractor shall be responsible for replacement of pavement which he has placed which has been damaged by cold weather or freezing without additional compensation.

In the meantime, the Contractor will be required to maintain the temporary surfacing until the permanent pavement is placed. Such labor, materials and equipment as is required for temporary maintenance of the streets, roadways and driveways shall be provided at the Contractor's expense and is not a pay item. The Contractor will be required to use a cold mix asphaltic concrete as a temporary surface for trenches under heavy traffic use.

3.2 SIDEWALKS

Sidewalks which partially or fully lie over the line may be removed to accommodate installation of lines, and they shall be replaced in a neat and workmanlike manner at the expense of the Contractor.

Throughout the work of water line installation and replacement, the Contractor shall exercise caution in providing protection to adjacent walks, pavement, curbs, gutters and related structures. Care shall be taken not to mar concrete or bituminous surfaces with equipment, and damage to such surfaces shall be properly repaired at Contractor's expense.

4.0 PAYMENT

The unit price bid per linear foot for concrete pavement replacement, heavy duty bituminous pavement replacement, and light duty bituminous pavement

replacement as measured along the main center line, shall constitute full compensation for the work.

Replacement of gravel or stone roadways, drives, etc. disturbed during construction shall be performed by the Contractor and will be incidental to the pipeline installation.

Pavement disturbed by the Contractor's equipment that is not along the main center line shall be repaired by the Contractor at his expense.

The one year guarantee as specified in the contract documents is also applicable to trench settlement and pavement replacement.

SECTION 15100

WATER LINES

1.0 GENERAL

The CONTRACTOR shall furnish all labor, materials and equipment to install the water lines as shown on the plans and as specified herein.

The water lines may either be pressure-rated plastic pipe (PVC), municipal plastic pipe (MPVC) or ductile iron (DI), all as specified hereinafter. The bid documents and plans shall show the amounts of each type and class of pipe to be provided by the CONTRACTOR.

The OWNER will obtain all rights-of-way for operations through private property. It will also secure building permits and the permits for all pipe laid in highway rights-of-way. **Any charges for inspections or other fees required will be the responsibility of the CONTRACTOR since the amounts of these are dependent upon the operation of the CONTRACTOR.**

1.1 DEPARTMENT OF TRANSPORTATION BONDING

The Kentucky Department of Transportation will require that the OWNER post a bond for all work accomplished on their right-of-way. Each contract on which work is to be performed will be a separate application and will require a separate bond. Each permit will have conditions attached and these conditions will vary depending on the area where work is to be performed. In areas where traffic control may pose a problem, working hours may be limited. A copy of the encroachment permit will be provided to the CONTRACTOR. The CONTRACTOR will be responsible for knowledge of the permit's content and conditions in order that the construction may be accomplished in accordance with the specified requirements.

Should any additional bonds or requirements be imposed by the Kentucky Department of Transportation, the OWNER shall also be responsible for the bonding of the additional requirements.

2.0 PIPE AND FITTINGS

2.1 POLYVINYL CHLORIDE RIGID PIPE AND FITTINGS

This specification covers rigid, pressure-rated, polyvinyl chloride pipe and fittings, hereinafter called PVC pipe and PVC fittings, for sizes 1/2 inch through 12-inch. Pipe shall be as manufactured by North American, Diamond, J-M or approved equal.

2.1.1 PVC Pipe. PVC pipe shall be extruded from Type 1, Grade 1, polyvinyl chloride material with a hydrostatic design stress of 2,000 psi for water at 73.4°F, designated as PVC 1120, meeting ASTM Specifications D-1784 for material and D- 2241 for pipe, latest revisions. Pipe shall also meet all applicable provisions of the Product Standards and shall bear the National Sanitation Foundation (NSF) seal of approval in compliance with NSF Standard No. 14. PVC pipe having a maximum hydrostatic working pressure of 160 psi (SDR26), 200 psi (SDR21), 250 psi (SDR17), or 315 psi (SDR13.5) shall be used as shown in the Bid Documents and Plans.

Samples of pipe and physical and chemical data sheets shall be submitted to the ENGINEER for review and determination of compliance with these specifications before pipe is delivered to job. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects.
The workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures (ASTM D-1598), burst pressures (ASTM D-1599), flattening, extrusion quality (ASTM D-2152), marking and all other requirements of the Product Standard PS 22-70 shall be with in all respects. No pipe, 2 inches in diameter or larger, with a wall thickness less than 0.090 inches may be used.

Pipe shall be furnished in 20 feet or 40 feet lengths. The pipe shall be bell on one end. Male ends of pipe must be beveled on the outside. Pipe shall have a ring painted around the male end or ends in such a manner as to allow field checking of setting depth of pipe in the socket. This requirement is made to assist construction superintendents and inspectors in visual inspection of pipe installation.

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 must not be exposed to the direct rays of the sun for an extended period of time. If pipe is not to be installed shortly after delivery to the job site, it must be stored in a shaded location and strung as needed.

2.1.2 PVC Pipe Jointing. Pipe shall be joined with slip-type joints with rubber gaskets. Pipes with bells shall have all parts of the bell, including the gasket groove, made from the same extruded piece, integral with the pipe, and shall be thickened to meet standard dimension ratios of wall thickness to outside diameter. This manufacturing procedure shall be the normal practice of the pipe manufacturer and proven by past performance of pipe in service. The gasket groove shall be constructed such that gasket rollout will not occur. Rubber gasketing shall conform to ASTM 3139.

The pipe manufacturer shall have an experienced representative on the job for a minimum of one day at the commencement of joining and laying operations. Joint lubricant shall be of a type recommended by the manufacturer for their pipe subject to the Engineer's approval. Lubricant shall be water soluble, non-toxic and have no objectionable properties.

2.1.3 PVC Couplings. Where PVC couplings are used, they shall be of the same material as the pipe and may be of the moulded, or extruded type. PVC couplings shall have a minimum rating of 200 psi for continuous operation at 73.4 degrees F.

2.1.4 Fittings Ductile iron mechanical joint type fittings with appropriate adaptors as manufactured by Romac or approved equal, shall be used with PVC pipe. All such fittings shall be approved by the pipe manufacturer, and complete data sent to the ENGINEER, including the manufacturer's approval, for review. Fittings shall comply with AWWA C-110 or C-153 and shall be manufactured for the size and pressure class of the line on which they are used. Use of transition gaskets will not be allowed unless specifically approved by the pipe manufacturer. Coatings and lining shall be in accordance with 2.3.7.F of this section of the Specifications.

2.1.5 Service Connections. All service connections on PVC lines shall be made by means of tees, factory tapped couplings, or bronze service clamps manufactured specifically for use with PVC pipe as manufactured by Ford or approved equal. Whenever possible, corporation stops shall be installed in plastic lines before conducting hydrostatic tests.

2.2 MUNICIPAL POLYVINYL CHLORIDE (MPVC) PRESSURE PIPE

This specification covers the requirements for AWWA approved Polyvinyl Chloride Pressure Pipe for water supply and distribution systems.

2.2.1 MPVC Pipe. MPVC pipe shall meet the requirements of AWWA C900, latest revision, "Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4" through 12" for water" and shall be furnished in cast-iron pipe equivalent outside diameters with rubber-gasketed separate couplings. Pipe shall be as manufactured by Certainteed or approved equal.

MPVC pipe and couplings shall be made from Class 12454-A or Class 12454-B virgin compounds as defined in ASTM D-1784. The standard code designation shall be PVC 1120. The PVC compounds shall be tested and certified as suitable for potable water products by the NSF Testing Laboratory and shall carry the NSF approval marking.

Solvent-cement couplings or joints shall not be used. PVC joints using elastomeric gaskets shall be tested as assembled joints and shall meet the laboratory performance requirements specified in ASTM D-3139.

Pipe and couplings shall be pressure Class 100, DR 25 (Dimension Ratio), pressure Class 150, DR 18, or pressure Class 200, DR 14 as shown on the plans or the bid form.

Pipe and couplings shall be marked as follows:

a. Nominal size and OD base.
b. Material code designation (PVC 1120).
c. Dimension ratio number.
d. AWWA pressure class.
e. AWWA designation number (AWWA C900).
f. Manufacturers name or trade-mark and production record code.
g. Seal of the NSF Laboratory.

Pipe and couplings shall meet or exceed the following test requirements:

Sustained Pressure - ASTM D-1598 (1000 Hrs.)	
DR	Sustained Pressure
14	650 psi
18	500
25	350

Burst Pressure - ASTM D-1599 (60-70 seconds)	
DR	Minimum Burst Pressure
14	985
18	755
25	535

Hydrostatic Integrity - Each standard and random length of pipe shall be proof-tested at four times its rated class pressure for a minimum of 5 seconds. Bells or couplings shall be tested with pipe.

Flattening - The pipe shall not split, crack, or break when tested by the parallel-plato method as specified by ASTM D- 2241.

Extrusion quality - The pipe shall not flake or disintegrate when tested by the acetone-immersion method as specified in ASTM D-2241.

Standard length - Pipe shall be furnished in standard laying lengths of 20 ft. ± 1 in. A maximum of 15 percent of each pipe size may be furnished in random lengths of not less than 10 ft. each.

2.2.2 MPVC Pipe Jointing. Pipe shall be joined with slip-type joints with rubber gaskets. Manufacturing and installation procedures shall be as recommended by the manufacturer and as described for PVC pipe in Section 2.1.2 of this specification.

2.2.3 Fittings. Fittings for municipal PVC shall be ductile iron only. Fittings shall be mechanical joint. Fittings shall be manufactured for the size and pressure class of the line on which they are used and shall comply with AWWA C-110 or C-153. Coatings and lining shall be in accordance with subsection 2.3.7.F of this section of the Specifications. Fittings shall be as manufactured by Tyler, Clow, U.S. Pipe, Union Foundry or approved equal.

2.2.4 Service Connections. Service connections shall be made by means of bronze service clamps manufactured specifically for use with municipal PVC pipe. Clamps shall be Mueller Catalog No. H-161 or approved equal.

2.2.5 Underground Marking for PVC Pipe. Underground marking for PVC pipe shall be one of the following types. The type required for this project is specified in the notes on the Drawings.

2.2.5.1 Underground Marking Wire. At all locations where PVC pipe is utilized, a detectable underground marking wire shall be placed in the trench as shown on the miscellaneous drawings. The wire used shall be No. 12 insulated copper wire. Copper split bolt screw connectors shall be used for splice connections, see miscellaneous drawings. Extreme care shall be exercised in connecting and taping splices and joints to assure continuity. At each valve box the wire shall be looped to the surface extending 12-inches above the concrete valve box pad (see Std. Dwg. for valve). When the entire project or pipeline segment is complete, including meter installation and leak repairs, the locating wire system shall be checked for continuity.

2.2.5.2 Underground Marking Tape. At all locations where PVC pipe is utilized, a detectable underground marking tape shall be placed in the trench approximately twelve inches below the finished grade. The tape used shall be mylar encased aluminum foil with the printing "CAUTION - Buried Water Line Below". Printing shall be readable through the clear mylar and surface printing is not acceptable. Tape size shall be 2 inch width as provided by Lifeguard, Inc. or approved equal. Color of the tape shall be blue.

2.3 DUCTILE IRON PIPE

These specifications cover ductile iron pipe (3-inch diameter and greater) to be used in water transmission systems with mechanical joints, rubber ring slip type joints or flanged joints.

2.3.1 General. Ductile iron pipe shall be designed in accordance with AWWA H3 (ASA A21.50) and for pressures and conditions as stated in these specifications or called for on the plans. Ductile iron pipe shall conform to AWWA C-151 (ASA A21.51.).

2.3.2 Minimum Nominal Thickness. The specified thickness will be determined for the given internal and external loading requirements in accordance with ASA

A21.50. The class of pipe, wall thickness, and coatings required will be shown on the plans or the bid form for all ductile iron pipe installation.

2.3.3 River Crossing Pipe. River crossing pipe shall be ductile iron, Flex-Lok as manufactured by the American Cast Iron Pipe company or equal conforming to the appropriate requirements of ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.5 with a thickness class of 54.

2.3.4 Lengths. Pipe may be furnished in 12, 16, 16 1/2, 18 or 20 feet nominal laying lengths.

2.3.5 Tests. Hydrostatic and acceptance tests shall be in accordance with AWWA Specification C-106 for "Cast Iron Pipe Centrifugally Cast In Metal Molds" or C-108 for sand molds. The ENGINEER shall be provided with five (5) copies of each of the following tests for each contract involved:

a. Talbot strip test.
b. Ring and full length bursting tests.
c. Chemical analysis of pipe.
d. Certification that pipe was hydrostatically tested.

Any pipe not meeting the AWWA Specifications quoted above shall be rejected in accordance with the procedure outlined in the particular specifications.

2.3.6 Marking. The net weight, class or nominal thickness and sampling period shall be marked on each pipe.

2.3.7 Pipe Joints for Ductile Iron Pipe. Pipe joints shall be mechanical joint, rubber ring slip joint, flanged, or locked mechanical joint as shown on the plans.

A. Mechanical Joint

Mechanical joints are to be furnished according to AWWA Specifications C-111. All pipe joints must be furnished complete with all accessories. Mechanical joint bolts and nuts shall be of alloy cast iron or alloy steel (Corten type such as U.S. Alloy) or approved equal. Rubber gaskets shall be made of plain first grade rubber, free of imperfections and porosity. Hardness shall be 70 to 75 durometer.

B. Rubber Ring Slip Joint

Rubber ring slip joint shall be equal to AWWA C-111-64 or latest revision. The joints shall be of the following materials:

a. Rubber ring gasket compressed in groove in bell of pipe.

b. Beveled spigot end of pipe for initial centering into rubber gasket in bell.

C. Locked Mechanical Joint

Locked mechanical joints shall be equal to Clow Corporation's "Locked Mechanical Joint".

D. Ductile Iron Flanged Pipe and Special Coupling

a. Flanged Pipe. All ductile iron flanged pipe shall have flanges faced and drilled, 125 pound in accordance with ASA A21.10 (AWWA C-110) unless otherwise specified on the Drawings. Flanges may be cast integrally with the pipe or they may be screwed on specially designed long hub flanges, refaced across both face of flange and end of pipe. Flanged pipe shall be in accordance with ASA A21.6 (AWWA C-106) Specifications, latest revision, and be the class called for on the plans or bid forms. Where plain ends of flanged and plain end pipe fit into mechanical joint bells, centrifugally cast pipe shall be used. Flanged pipe for water service shall be cement lined and bituminous coated the same as written herein for bell-joint pipe.

b. Special Coupling. Flexible couplings for flanged pipe shall be a mechanical joint cast to a special flanged joint using a neoprene O-ring in place of the usual 1/16 inch rubber ring gasket. The mechanical bell and special flanged joint piece shall be of high grade gray cast iron (ASTM A48-56, AWWA C-100-54T) with bolt circle, bolt size and spacing according to ASA Specifications. Mechanical joint follower flange shall be of ductile iron ASTM A399 or malleable iron ASTM A47, Grade 35018 or 32510, latest revision with high strength/weight ratio design.

Bolts shall be fine grained high tensile malleable iron with malleable iron hexagon nut. Stainless steel nuts shall be used in vaults and wet wells. Where pressures may exceed 20 pounds, anchor studs shall be included with spigots of pipes connected drilled to receive ends of studs.

E. All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. Three (3) copies of such instruction shall be delivered to the ENGINEER at start of construction.

F. Coatings and Lining. All buried ductile iron pipe shall have manufacturer's outside coal tar or asphaltic base coating and a cement lining and bituminous seal coat on the inside. Cement mortar lining and a bituminous seal coat inside shall conform to ANSI A21.4 (AWWA C-104) latest revision.

All pipe and fittings housed and in vaults shall be lined and coated on the inside as specified herein for buried ductile iron pipe and fittings, but shall be left uncoated on the outside so that it may be painted without the use of tar stop.

G. Fittings for Ductile Iron Pipe. Ductile iron mechanical, rubber ring slip and flanged joints shall conform to ASA Specifications A21.10 (AWWA C-110) for centrifugally cast iron water pipe. Mechanical joints shall also conform in all respects to ASA 21.11 (AWWA C-111). All fittings shall be manufactured for the size and pressure class of the pipeline in which they are to be used. Mechanical joint type fittings with appropriate adaptors as manufactured by Megalug or approved equal, shall be used. All fittings shall be furnished complete with all joint accessories. All ductile iron pipe fittings for water, sewer, air, gas and force main service shall be bituminous coated outside and lined on the inside same as the line on which they are installed.

H. Underground Marking Tape. At all locations where Ductile Iron pipe is utilized, a detectable underground marking tape shall be placed in the trench approximately twelve inches below the finished grade. The tape used shall be mylar encased aluminum foil with the printing "CAUTION - Buried Water Line Below". Printing shall be readable through the clear mylar and surface printing is not acceptable. Tape size shall be 2 inch width as provided by Lifeguard, Inc. or approved equal. Color of the tape shall be blue.

2.4 POLYETHYLENE PIPE

This pipe is used primarily for stream crossings and other special applications in locations indicated on the DRAWINGS. The required pressure class shall be as shown on the DRAWINGS.

The pipe shall be PE 3408 high density, high molecular weight polyethylene pipe equal to DRISCOPIPE 1000 as manufactured by Phillips Driscopipe, Inc. The pipe shall meet or exceed the following specifications:

a. ASTM 3350 having a cell classification of PE34534C
b. ASTM F714 - Dimensions and Workmanship
c. AWWA C901 - Potable Water Pipe
d. ASTM D1248 - Type III, Class C, Category 5, Grade P34
e. ASTM D3261 - Fittings Standard
f. NSF - Listed, Standard #14

The pipe shall be joined by the butt fusion technique utilizing controlled temperatures and pressures to produce a fused, leak-free joint that has equal or greater strength than the pipe itself in both tension and hydrostatic loading. The joining system shall be equal to Phillips butt fusion joint system.

Transitions to the continuing pipeline shall be made with the appropriate fittings to maintain the integrity of the piping system as recommended by the pipe manufacturer.

Drawings showing details of the installation shall be submitted to the ENGINEER for approval prior to installation.

3.0 HAULING AND STORAGE

The CONTRACTOR shall notify the ENGINEER when pipe will be received on the job so that proper arrangements may be made for inspecting the unloading and stringing, as well as inspecting and examining the pipe materials.

All pipe shall be covered with tarpaulin during hauling from the manufacturer to the job site. It is acceptable for the front end only to be covered. The intent is to prevent diesel exhaust residue from coating the pipe and/or contaminating the gaskets.

The CONTRACTOR will be required to deliver all equipment and other materials and place same as and where required for installation. 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, or 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 other castings may be distributed at places that will not interfere with other building operations and unloaded, or yarded and distributed as required, as the CONTRACTOR may elect.

Valves, castings, fabricated metal, reinforcing steel, etc. shall be yarded or housed in some convenient location by the CONTRACTOR and delivered on the ground as required. All equipment and materials subject to damage from the weather, dampness, changes in temperature, or exposure shall be protected by a dry, weatherproof enclosure until ready for installation or use. The cost of all hauling, handling, and storage shall be included in the prices bid for equipment and materials in place. The OWNER takes no risk or responsibility for fire, flood, theft, or damage until after the final acceptance of the work.

4.0 LINES AND GRADES

The CONTRACTOR will be required to accomplish any detailed layout, including that required for establishing the grade of the pipe line.

5.0 TRENCH EXCAVATION

5.1 GENERAL

This section describes the acceptable methods of trenching for the installation of pressure pipe and casing pipe in an open trench.

Trenching may be accomplished by means of a backhoe, trenching machine or by hand depending on the construction area.

At the CONTRACTOR'S option, trenching, by a trenching machine or by backhoe is acceptable except as noted below:

Where the pipe line is being constructed close to other utilities, structures, building, or large trees, and it is reasonable to anticipate possible damage from the use of a backhoe, then trenching shall be made by hand methods.

The CONTRACTOR shall include in his unit price bid, all trenching necessary for installation of all pipelines as planned and specified. Trenching shall include all clearing and grubbing, including all weeds, briars, small trees, stumps, etc. encountered in the trenching. The CONTRACTOR shall dispose of any such material by burning, burial, or hauling away (or as noted on the drawings), at no extra cost to the OWNER. It shall be the CONTRACTOR'S responsibility to notify the appropriate State and local Air Pollution Control agencies when he conducts open burning of refuse. Ornamental shrubs shall be removed, protected, and replanted. Trenching also includes such items as minor 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.

The CONTRACTOR shall protect existing facilities against danger or damage while pipeline is being constructed and backfilled, or from damage due to settlement of this backfill. 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 structures will be in as good condition and serve its purpose as completely as before and such restoration and repair shall be done without extra cost to the OWNER. The use of trench- digging machinery will be permitted except where its operations will cause damage to trees, buildings or existing structures above or below the ground. At such locations hand methods shall be employed to avoid such damage. All excavated material shall be piled in a manner that will not endanger the work and will avoid obstructing sidewalks and driveways. Gutters shall be kept clear or other satisfactory provisions made for street drainage.

All excavation shall be open trenches, except where the drawings call for tunneling, boring, or jacking under structures, railroads, sidewalks and roads.

The construction procedure for these types of excavation is described elsewhere in these specifications.

All trench excavation shall be termed unclassified and costs shall be included in the unit price bid for the pipe.

5.2 CLEARING

The CONTRACTOR shall accomplish all clearing and/or grubbing as required for the construction under this contract. Clearing and grubbing shall include the cutting and removal of threes, stumps, brush, roots, logs, fences and other loose or projecting material and natural obstructions which, in the opinion of the ENGINEER, must be removed to properly prosecute the construction and operate the facilities upon completion of construction. Trees, unless designated otherwise on the plans, shall remain and be properly protected. Ornamental shrubs, plantings, fences, walls, etc. shall be removed and replanted or replaced or protected from the construction activity. Clearing and/or grubbing shall be incidental to the various bid items and no additional compensation will be paid for same.

5.3 TRENCH DEPTH

Trenches shall be excavated to the line and grade required for the installation of pipe at the elevations indicated on the plans. The minimum depth of cover shall be 30 inches above the top of the pipe, unless shown otherwise on the plans or on the Standard Details. When the pipe is laying in or on solid rock, the minimum depth of cover shall also be 30 inches above the top of the pipe. No additional compensation will be made for extra depth where required by the plans or due to CONTRACTOR error. Excavation, except as required for exploration, shall not begin until the proposed work has been staked out. Materials which are not required for backfill and site grading shall be removed and disposed of as directed by the ENGINEER. Hauling, bedding, and backfilling shall be considered incidental to the various bid items and will not be paid for directly. Excavation shall be of sufficient depth to allow the piping to be laid on the standard pipe bedding in accordance with the Section 6 of this section. The trenches shall be excavated to a minimum of six (6) inches below the bottom of the pipe barrel in rock. In all cases where lines are under traffic a minimum cover of forty-two (42") inches shall be provided. Should it be necessary to avoid existing utilities, culverts, outlets, or other structures, the water line shall be carried deeper at no additional expense to the OWNER.

Where the plans call for extra trench depth, this extra depth shall be provided at no extra cost.

5.4 TRENCH WIDTH

Trench widths shall exceed the minimum width that will provide free working space on each side of the pipe and to permit proper backfilling around the pipe

as shown in the accompanying table and unless specifically authorized by the ENGINEER, shall not be excavated to wider than two (2) feet plus the nominal diameter of the pipe at the top of the trench. Before laying the pipe, the trench shall be opened far enough ahead to reveal any obstruction that may necessitate changing the line and grade of the pipe. Should the CONTRACTOR fail to accomplish this, and changes are required, they shall be at his sole expense. In rock, all ledge rocks, boulders and large stones shall be removed to provide six (6) inches of clearance on each side and below all pipe and fittings.

MINIMUM TRENCH WIDTH

Size	Width	Size	Width
Up to 4" Pipe	2'-0"	15" Pipe	2'-8"
6" Pipe	2'-0"	16" Pipe	2'-8"
8" Pipe	2'-0"	18" Pipe	3'-0"
10" Pipe	2'-4"	20" Pipe	3'-2"
12" Pipe	2'-6"	21" Pipe	3'-4"
14" Pipe	2'-6"	24" Pipe	3'-8"

5.5 SHORING, SHEETING AND BRACING OF EXCAVATION

Where unstable material is encountered, or where the depth of the excavation in earth exceeds five (5) feet, the sides of the trench or excavation shall be supported by substantial sheeting, bracing, or shoring. The design and installation of all sheeting, sheet piling, bracing or shoring shall be based on computations of pressure exerted by the materials to be retained under retaining conditions. Adequate and proper shoring of all excavations will be the entire responsibility of the CONTRACTOR. The Standards of the Federal Occupational Safety and Health Act and the Kentucky Department of Labor shall be followed.

The ENGINEER will not be responsible for determining requirements for bracing or sheeting.

5.6 REMOVAL OF WATER

The CONTRACTOR shall provide for adequate removal of all water and the prevention of surface water from entering the excavation. The CONTRACTOR shall maintain dry conditions within the excavations until the backfill is placed. No additional compensation will be paid for replacement and/or stabilization of prepared excavations due to flooding and/or deterioration from extended exposure. All water pumped or drained from the excavation shall be disposed of in a suitable manner without damage to adjacent property or to other work under construction.

5.7 PAVEMENT REMOVAL

Pavement removal shall be as indicated on the plans or directed by the ENGINEER. When so required, or when directed by the ENGINEER, only one-half (1/2) of the street crossings or road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such a manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property OWNERS abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the ENGINEER. Pavement replacement shall be in accordance with Section 15102 of these specifications. Excavated materials shall be disposed of so as to cause the least interference and in every case the disposition of excavated materials shall be satisfactory to the ENGINEER.

5.8 TRAFFIC MAINTENANCE

The CONTRACTOR must "red light" and guard all open trenches or obstructions placed on the streets or sidewalks. The lights must be burning from sunset to sunrise in order to effectually warn and safeguard the public against dangers connected with open trenches, excavations and other obstructions. The CONTRACTOR shall be held responsible for any damage that may occur to persons or property by reason of the failure of the CONTRACTOR to properly "red light" and guard all open trenches or obstructions along the routes of the water lines. This CONTRACTOR at his own expense shall also maintain warning signs, barricades and a watchmen or flagmen to control traffic at such times as his work would interfere with the flow of traffic. No excavation shall begin that may present a safety hazard unless the signs, barricades, lights, etc. are available to protect the open excavation at the conclusion of the day. The CONTRACTOR will comply with all Federal and State Occupational Safety and Health requirements for this type of construction. The CONTRACTOR shall also comply with all local and Kentucky Department of Highways requirements for signing and traffic control.

5.9 LINE LOCATION

The location of pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before construction on any line is started that would indicate desirable changes in location. In such cases, 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 can be excavated by machine.

6.0 BEDDING OF PIPELINE

In all cases the foundation for pipe shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. The bells of the pipe shall not carry any of the load of the backfill. The CONTRACTOR should refer to the Standard Details for pipe bedding shown in the plans. The bedding specifications shall govern the backfill from the bottom of the trench up to the centerline or spring line of the pipe.

6.1 STABLE EARTH FOUNDATION

On all PVC pipelines, the trench bottoms shall be smooth and free of frozen material, clodded dirt and stones over 1/2" diameter. Bottom dirt left by trenching equipment will usually provide adequate material to level the trench bottom and provide bedding support for the pipe barrel. If the trench bottom is free of dirt, soft material may be shoveled off the side walls or shoveled under the pipe to insure proper pipe barrel bedding. In areas where the trench bottom is hard, a layer of soft backfill must be provided to insure the pipe barrel is properly cushioned. See the plans for proper bedding material depth.

If the foundation is good firm earth the pipe may be laid directly on the undisturbed earth provided the pipe barrel is supported for its full length.

Bedding of No. 9 stone, fine gravel, sand or compacted finely graded select earth shall be used to correct irregularities in the subgrade. Where bell and spigot is involved, bell holes shall be excavated to prevent the bells from being supported on undisturbed earth.

As an alternative to the above method, excavation in earth may be undercut to a depth below the required invert elevation that will permit laying the pipe on a bed of granular material or finely graded select earth to provide continuous support for the pipe barrel. Bedding depth shall be as shown on the plans.

The bedding is not a separate pay item and shall be included as incidental expense in the unit price for the pipe bid per foot of pipe.

6.2 TRENCHES IN ROCK

All installation in rock will utilize the undercutting method. Bedding will be with 6 inches crushed stone as shown in the Standard Details.

6.3 UNSTABLE TRENCHES

If unstable material is encountered which may not provide a suitable foundation for the pipe, the unstable material will be removed and an adequate layer of encasement concrete or other special bedding shall be placed for the pipe foundation in accordance with the Standard Details in the plans. Such "special

pipe foundation" shall only be installed if directed by the ENGINEER in writing or on the plans.

All ductile iron pipe shall be installed in accordance with Standard ANSI/AWWA C150/A21.50 Laying Condition Type 3 unless otherwise noted.

7.0 PIPE LAYING

7.1 GENERAL

Proper instruments, tools and facilities satisfactory to the ENGINEER shall be provided and used by the CONTRACTOR for the safe and convenient prosecution of the work. Each pipe manufacturer shall have an experienced representative on the job for at least one day at the commencement of jointing and laying operations.

Before any length of pipe is placed in the trench, a careful inspection shall be made of the interior of the pipe to see that no foreign material is in the pipe. In order to properly remove any foreign materials, a swab of necessary length is to be available at all times.

All pipe shall be lowered carefully into the trench, properly aligned and properly jointed by use of suitable tools and equipment, in such a manner as to prevent damage to water line materials and protective coatings and linings. Excessive scratching of the exterior surface of the pipe will be cause for rejection of the pipe.

Under no circumstances shall pipeline materials be dropped or dumped into the trench. The pipe and fittings shall also be inspected for the purpose of determining if they are sound and free from cracks. Laying of pipe shall be commenced immediately after excavation is started. Pipe shall be laid with bell ends facing in the direction of laying.

When pipe laying is not in progress, the open ends of pipe shall be closed by approved means to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and re-laid as directed by the ENGINEER. No pipe shall be laid in water or on frozen trench bottom, or whenever the trench conditions or the weather are unsuitable for such work.

If any defective pipe and fittings shall be discovered after the pipeline is laid, they shall be removed and replaced with a satisfactory pipe or fitting without additional charge to the OWNER. Open ends of unfinished pipe lines shall be securely plugged or closed at the end of each day's work or when the line is left temporarily at any other time.

7.2 LAYING DUCTILE IRON PIPE

Ductile iron bolted joint, rubber ring slip joint, and ball and socket river crossing pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the manufacturer. Three (3) copies of instructions shall be furnished the ENGINEER and one (1) copy shall be available at all times at the site of the work. The lining inside ductile iron pipe must not be damaged by handling.

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 present as nearly true, straight lines and grades as is practical, and all curves and changes in grades must be laid in such a manner that the manufacturer's recommended maximum deflection is not exceeded at any joint.

Cutting of pipe may be done by wheeled pipe cutters or saws, or by hammer and chisel, as the CONTRACTOR may elect, but the CONTRACTOR will be held responsible for breakage or damage caused by careless cutting or handling.

All ductile iron pipe shall be installed with Standard ANSI/AWWA C150/A21.50 Laying Condition Type 3 unless otherwise noted, six (6) inches crushed stone bedding shall be used in rock. Sufficient space (limited to 2 feet longitudinally) shall be left out of 4 or 6 inch cushion for tightening of bolts where bolted joints are used. No pipe shall be laid resting on rock, blocking, or other unyielding objects. Jointing before placing in trench, and subsequent lowering of more than one section jointed together may be allowed, subject to the ENGINEER'S approval and direction.

When using pipe with push-on joints care must be exercised to make certain that the correct gasket is being used for the type of joint installed and that the gasket faces the proper direction. Before inserting the gasket, the groove and bell socket should be carefully cleaned of all dirt. If sand or dirt is permitted to remain in the groove, leaks may occur. Lubricant must be applied to bell socket, gasket and plain- end of pipe as required by manufacturer. Plain-end must be beveled before joint is made. Deflection required at the joint shall be obtained after the joint is made.
Cut pieces of ductile iron pipe 18 inches or more in length, shall be used in fitting to special conditions, and valves and fitting changes in grade and alignment, provided cutting is even enough to make first class joints and no cracks are evident.

7.3 LAYING PLASTIC PIPE

The trench bottom must be smooth and uniform and the alignment must conform with the plans. Bedding and cover as specified herein and shown in the Standard Details is required.

To make a clean and unobstructed joint, it is necessary to wipe the ring, groove and pipe spigot free from all foreign materials at the time of assembly (welded joints will be allowed only in special cases and will be required as shown on the plans). The ring must be positioned properly in the fitting to receive the pipe by a worker who is not in contact with the lubricant. In general, the lubricant is applied to the spigot (not the ring or groove). However, the manufacturer's instructions are to be followed in all cases. Only an approved lubricant may be used in accordance with the manufacturer's recommendations. All plastic pipe shall be joined by hand.

Where good bedding conditions are attained PVC pipe smaller than 4 inches may be assembled outside the trench in longer sections (as conditions allow) and then lowered into the trench. At any time when improper bedding is discovered or the pipe is severely deflected the pipe will be removed from the trench and the condition corrected. Pipe in sizes 4 inch and above may be assembled outside the trench but must be lowered into the trench as each joint is assembled. Regardless of installation methods all couplings must be inspected after laying in trench for proper insertion and alignment. Field cuts and bevels will be allowed in accordance with the manufacturer's recommendations for these operations. A new reference mark shall be installed before joining any field cut pipe. The same requirements for clearance from rock or other objects, thrust blocking and deflections shall apply to PVC pipe as for other pipe materials.

Municipal PVC pipe of all sizes must be assembled in the trench in strict accordance with the manufacturer's requirements.

7.4 INSTALLATION OF RIVER CROSSING PIPE

The ball joint pipe shall be assembled and installed in accordance with manufacturer's recommendations. Installation shall be made at time of low flow, using cofferdams as necessary to divert stream flow. The ball joint pipe shall be laid and allowed to settle before joining to the pipe on each side of the stream. The ball and joint pipes shall be tested separately once in place to detect any leaks or bad joints. After connecting to the land pipe, it shall be tested the same as specified for the other water mains. See the DRAWINGS for additional installation requirements.

8.0 BACKFILLING

Backfilling must be started as soon as practicable after pipe has been laid and joints hardened sufficiently, and jointing and alignment approved. Spading of crushed rock, sand, or mechanical tamping of earth, around pipe (as specifically required) between joints shall be the usual procedure as the laying progresses. This is in order to avoid danger or misalignment from slides, flooding or other causes. The ENGINEER shall be given a minimum of 24 hours for inspection before backfilling. The backfill shall be crushed rock, sand, or finely divided

earth free from debris, organic material and stones, places simultaneously on both sides of pipe to the same level by hand.

In backfilling of the lower part of the trench beginning at the top of the bedding, the backfill material shall be carefully and solidly tamped by hand or approved mechanical methods in 6" layers around the pipe and up to a point 8 inches higher than the top of the pipe. For PVC only the backfill shall be select material and may be walked-in. Walking or working on the completed pipe line, except as necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a point one diameter higher than the top of the pipe. The filling of the trench and the tamping of the backfill shall be carried on simultaneously on both sides of the pipe in such a manner that the completed pipe line will not be disturbed and injurious side pressures do not occur.

After the above specified backfill is hand placed, rock may be used in the backfill in pieces no larger than 18 inches in any dimension and to an extent not greater than one-half (1/2) the 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 between rocks may be filled with earth. Above the hand placed backfill, machine backfilling may be employed without tamping, (if not contrary to specified conditions for the location) provided caution is used in quantity per dump and uniformity of level of backfilling. Backfill material must be uniformly ridged over trench and excess hauled away, with no excavated rock over 1-1/2 inch in diameter or pockets of crushed rock or gravel in top 6 inches of backfill. Ridged backfill shall be confined to the width of the trench and not allowed to overlap onto firm original earth and its height shall not be in excess of needs for replacement of settlement of backfill. All rock, including crushed rock or gravel from construction, must be removed from yards and fields. Streets, roadways and walks shall be swept to remove all earth and loose rock immediately following backfilling.

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 machine tamped in not over 4-inch layers, measured loose in accordance with the standard details. Where backfill is under paved driveways, streets, highways, railroads, sidewalks, paved parking areas and other areas where settlement is not allowed, crushed stone or coarse sand backfill only shall be used up to the paving surface. Crushed stone shall be Kentucky Department of Highways Standard Specification No. 78 or finer. Coarse sand backfill shall be spread in layers not over 4 inches thick and thoroughly compacted. Sand may be moistened to aide compaction. Tunnels shall be backfilled in not over 3-inch layers, measured loose, with selected material suitable for mechanically tamping. If material suitable for tamping cannot be obtained, sand, gravel or crushed rock (No. 78) shall be blown, packed or sluiced to complete fill all void spaces.

Where local conditions permit, pavement shall not be placed until 30 days have passed since placing backfill. Crushed stone is specified for roads and parking areas and sidewalks or their bases, shall be placed and compacted to the top of

trench. Backfills shall be maintained easily passable to traffic at original ground level, until acceptance of project or replacement of paving or sidewalks.

Where the final surfacing is to be crushed stone, compacted earth backfill may be used in the trench to within 6 inches of the top as shown in the Standard Details.
Railroad Company and Highway Department requirements in regard to backfilling will take precedence over the above general specification where they are involved.

Excavated materials from trenches and tunnels in excess of quantity required for trench backfill shall be disposed as shown on the plans or as directed by the ENGINEER.

The CONTRACTOR shall protect all sewer, gas, electric, telephone, water and drain pipes or conduits, power and telephone poles and guy wires from danger of damage while pipelines are being constructed and backfilled, or from danger due to settlement of his backfill.

In case of damage to any such 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 uncovering and such restoration and repair shall be done without extra charge.

No extra charge shall be made for backfilling of any kind, except as provided in the Bid. Backfilling shall be included as a part of the unit price bid for which it is subsidiary. No extra charge shall be made for supplying outside materials for backfill.

Before completion of contract, all backfills shall be reshaped, holes filled and surplus material hauled away, and all permanent walks, street, driveway and highway paving, and sod, replaced (if such surface replacement items are included in the contract) and reseeding performed.

The line CONTRACTOR shall be responsible for clean-up, grading, seeding, sodding or otherwise restoring all areas that he disturbs within the work limits of other CONTRACTORS on this project.

Any deficiency in the quantity of material for backfilling the trenches or for filling depressions caused by settlement, shall be supplied by the CONTRACTOR.

9.0 TIE-INS TO EXISTING PIPELINES

This work shall consist of connecting new water pipes to the existing system where shown on the plans and shall include the necessary fittings, tapping sleeves, valves and necessary equipment and material required to complete the connection.

Knowledge of pipe sizes in the existing system may not be accurate, therefore, it is recommended that the CONTRACTOR check outside diameters of existing pipe and types of pipe prior to ordering the required accessories. No additional payment will be allowed for matching pipe and/or accessories when the proper size is not ordered.

Neither the OWNER nor the ENGINEER can guarantee the location of the existing lines. The CONTRACTOR shall verify the location of all existing water mains and valves pertaining to the proposed improvements before excavation is started.

The necessary regulation or operation of the valves on existing mains, to allow for the connections being made, shall be supervised by the ENGINEER. Before shutting down an existing water main or branch main for a proposed connection, prior approval for a specific time and time interval shall be obtained from a representative of the OWNER. At no time shall an existing main be shut down without the OWNER'S knowledge and permission.

Excavation to existing water mains shall be carefully made, care being exercised not to damage the pipe. The excavation shall not be of excessive size or depth beneath the pipe. The sides of the excavation shall be as nearly vertical as possible.

The CONTRACTOR shall be responsible for any damage to the existing system and any such damage shall be repaired to the satisfaction of the ENGINEER at the CONTRACTOR'S expense.

The CONTRACTOR shall verify, by field inspection, the necessary sizes, lengths and the types of fittings needed for each inter-connection. Typical connections are shown on the plans and any modifications or changes shall be subject to the approval of the ENGINEER. The exact length of the proposed water main needed for this work shall also be determined by field measurement as required.

The probing required to locate existing mains is not a separate pay item.

10.0 PIPE ENTERING STRUCTURES

Ductile iron, steel or PVC pressure pipe, 4-inch diameter or larger, entering structure below original earth level, unsupported by original earth for a distance of more than six (6') feet, shall be supported by Class B concrete, where depth of such support does not exceed three (3') feet, and by Class B Concrete piers where depth exceeds three (3') feet in accordance with the Standard Details. All other pressure pipe entering buildings or basins below original earth level, which have more than 3 feet span between wall and original earth and having a cover of more than 24 inches of earth, or under roadway, shall be supported as shown on Standard Detail drawings, in order to prevent breakage from settlement of backfill about the structure. Concrete and reinforcing steel for such supports are

to be included in the unit price of work to which it is subsidiary, and not as extra concrete, in order to discourage excessive excavation outside the limits of structures. Pipe entering structures shall have flexible joint within 16 inches of exterior of structure.

11.0 OWNERSHIP OF OLD MATERIALS

Pipe - Unless otherwise indicated, all existing pipe that is to be abandoned that interferes with construction or is easily removed shall become the property of the CONTRACTOR. All pipe that is not easily removed or not required to be removed as a result of the new construction, shall be abandoned in place by this CONTRACTOR.

Pipe Line Fittings and Appurtenances - All pipe line fittings, valves, hydrants and other like appurtenances that are removed as a result of new construction shall be removed by this CONTRACTOR but shall become the property of the OWNER. All such fittings and appurtenances shall be delivered to a point by the CONTRACTOR. Said point shall be on the OWNER'S property and shall be designated by the ENGINEER.

Other Materials - All other materials or items that are to be removed, demolished, or abandoned as a part of this contract shall become the property of the CONTRACTOR and shall be disposed of by him.

12.0 THRUST BLOCKS AND ANCHORAGE

Thrust blocks shall be installed whenever the pipe line changes direction, as at tees, bends, crosses, stops, as at a dead end; or at valves. The locations of thrust blocks depend on the direction of thrust and type of fitting. Their size and type depends on pressure, pipe size, kind of soil, and the type of fitting. Where thrusts act upward (as at vertical curves) the weight of the pipe, the water in the pipe and the weight of the soil over the pipe should be determined to make certain that the total weight is sufficient to resist upward movement. If there is not enough soil or if it will not compact over the pipe or it is too soft and mushy to resist movement, then ballast or concrete may be placed around the pipe in sufficient weight and volume to counteract the thrust. Where a fitting is used to make a vertical bend, the fitting may be anchored to a concrete thrust block designed to key in to undisturbed soil and to have enough weight to resist upward and outward thrust, since the new placed backfill may not have sufficient holding power.

Thrust blocks shall be constructed of not less than Class B concrete conforming to KTC Specification 601 and placed between the fitting and the trench wall. It is important to place the concrete so it extends to undisturbed (freshly cut) trench wall.

13.0 MAINTENANCE OF FLOW OF DRAINS AND SEWERS

Adequate provision shall be made for the flow of sewers, drains and water courses encountered during construction. Any structures which are disturbed shall be satisfactorily restored by the CONTRACTOR.

14.0 INTERRUPTION OF UTILITY SERVICES

No valve, switch or other control on any existing utility system shall be operated for any purpose by the CONTRACTOR without approval of the ENGINEER and the Utility. All consumers affected by such operations shall be notified by the CONTRACTOR as directed by the ENGINEER and utility before the operation and advised of the probable time when service will be restored.

15.0 FENCING

Where water supply line is being constructed in fields where stock is being grazed, CONTRACTOR shall provide temporary fence as approved by the ENGINEER around open trenches to prevent stock from falling in trenches. Where trenching operations should isolate grazing stock from their source of water, CONTRACTOR will either provide temporary bridging over trench or else provide water for such stock.

Where trench crosses near sound existing corner posts and existing fence is in good condition, fence may be taken loose, rolled back and stored until pipe line is completed at this point, then replaced by stretching tightly and thoroughly stapling. Additional posts will be provided and additional new fence shall be provided when it is necessary to place the fence crossed by the water line in a condition equal to existing fence before water line was constructed.

Where it is necessary to cut existing fence, new end posts shall be installed on each side of the water line and the old fence thoroughly stapled to these new posts before cutting. After pipe line is completed at this point, a new fence of galvanized wire (No. 9 gauge with No. 11 filler wires) shall be stretched between these new end posts and thoroughly stapled to existing posts and any new intermediate posts necessary to provide a good fence. Replacement of fences shall be on a replacement in-kind basis, and shall be considered incidental to laying of the lines and any additional cost shall be included in the unit price bid per lineal foot of pipe. Contractor shall notify property owner prior to cutting fence.

16.0 PROTECTION OF ADJACENT LANDSCAPE

Reasonable care shall be taken during construction of the water lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the

appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

In the course of construction, the CONTRACTOR may deflect horizontal alignment of the water line to avoid trees and to keep from damaging their roots. The CONTRACTOR shall be fully responsible for settling all claims by private property owners concerning damage to trees and shrubs.

17.0 COORDINATION WITH UTILITIES

The Plans show the general location of existing utilities, such information having been determined from the utilities. However, such information shall be considered general and is not guaranteed by OWNER, ENGINEER or the UTILITY.

Prior to construction, the CONTRACTOR shall arrange to meet with representatives of all utilities, and provide them with his anticipated work schedule. The CONTRACTOR shall have the utilities make their best determination of utility locations in the areas in which he is working. Throughout the progress of the work, such field markings of utilities shall be kept current.

Repairs to any utilities damaged by the CONTRACTOR shall normally be performed by the utility at the CONTRACTOR'S expense, unless the CONTRACTOR and the utility negotiate other understandings and/or procedures.

18.0 BLASTING AND ROCK EXCAVATION

The CONTRACTOR shall make his own investigation as he deems necessary to ascertain the sub-surface conditions to be encountered in the work.

All blasting operations shall be conducted in accordance with municipal ordinances, state and federal laws and Section 9, Explosives, of the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc. Soil particle velocity shall not exceed limit set by Kentucky law. All explosives shall be stored in conformity with said ordinances, laws and safety regulations. No blasting shall be done within five feet of any water mains, sewer lines, natural or manufactured gas lines, liquid petroleum product lines or other utilities. Any damage done by blasting is the responsibility of the CONTRACTOR and shall be promptly and satisfactorily repaired by him.

The CONTRACTOR shall use delay caps or other approved methods to reduce earth vibrations and noise. Mud capping, as defined in the above manual, will not be permitted as a method of breaking boulders. No blasting shall be permitted on Sundays or after dark.

Prior to commencing with the work, the CONTRACTOR shall, during a preconstruction conference with the OWNER and ENGINEER, state clearly his

approach to performing the excavations on the project. He shall be familiar with the laws and ordinances covering blasting and shall also give consideration to the use of hydraulically operated rock breaking devices in lieu of blasting where considered necessary. If blasting is not handled in an expert manner at all times, the ENGINEER reserves the right to suspend blasting and require the work to proceed without it.

Prior to blasting, the CONTRACTOR shall make his own detailed pre-blast survey of adjacent walks, curbs, retaining walls, house foundations, etc. to determine conditions prior to the work. Such a file of information, including photographs, may be certified in such a manner as the CONTRACTOR believes necessary since this information that may stand in his defense.

19.0 MEASUREMENT AND PAYMENT

Payment for supplying, transporting and storing pipe, trenching, standard bedding, pipe installation, fittings, thrust- blocking, pipe locating wire or tape, testing, backfilling, disinfection, seeding, crop damage, regular stream crossings, clean-up, tie-ins to other structures and other incidental items in this section shall be made on the basis of the unit price per lineal foot for the type and size of pipe installed. Payment will include all those items not specifically covered by another proposal. Pipe will be measured along the centerline of the pipe as installed with no deduction for valves and fittings. Clean-up is not a separate pay item.

SECTION 15101

WATER LINE ACCESSORIES

1.0 GENERAL

The CONTRACTOR is to supply and install all valves, hydrants, blow-off assemblies and other equipment at the locations shown on the plans in complete accordance with these specifications.

2.0 GATE VALVES

All gate valves shall be the resilient seat-type, iron body, non-rising steam, fully bronze mounted, and suitable for working water pressures of not less than 200 psi for installations on PVC pipe and not less than 250 psi for installations on DI pipe. Valves shall be of standard manufacture and of the highest quality both of materials and workmanship and shall conform to the latest revision of AWWA C-509 Standard. Valves shall be furnished with flanged connections for exposed piping and push-on or mechanical joint connections for buried service. Gate valves shall have a clear water way equal to the nominal diameter, and shall be opened by turning counter-clockwise. The operating nut or wheel shall have an arrow cast in the middle, indicating the direction of opening. Each valve shall have the maker's initials, pressure rating and the year in which manufactured, cast on the body. Prior to shipment from the factory each valve shall be tested by hydraulic pressure of at least 300 pounds per square inch.

Underground valves shall be nut operated, unless otherwise shown on the plans. Valve supplier shall furnish two standard stem iron wrenches for turning nut operated valves. All underground valves which have nuts deeper than thirty inches (30") below the top of valve box shall have extended stems with nuts located within two feet (2') of valve box cap. Buried service valves shall have either epoxy-coated or tar-coated exteriors.

The valve maker is to supply the ENGINEER, through the bidder, within one week after award is made, complete catalogs or other material giving complete details and dimensions of valves and accessories.

Gate valves installed in underground piping systems may be installed in the vertical position for sizes to 12-inch. Gate valves 14-inch and larger shall be installed in the horizontal position with bevel gear operators unless otherwise noted on the drawings. Gear operators shall be the totally enclosed type, oil filled and designed for buried and submerged service. Gear housing shall be ductile iron. Gears shall be steel. Pinion shafts shall be stainless steel. Shaft bearings shall be Teflon with "O"-Ring bearings.

3.0 FIRE HYDRANTS

3.1 WORK INCLUDED

Under this Item, the CONTRACTOR shall provide all labor, tools, equipment and materials to furnish and install hydrants with gate valves as shown on the plans and as directed by the ENGINEER.

3.2 MATERIALS

All fire hydrants shall have a six inch bell connection, shall have two hose outlets and one pumper connection, shall be designed for 250 pounds working pressure or 300 pounds hydrostatic pressure and shall conform to the latest specifications of the AWWA C502. All working parts shall be bronze. Both hose outlets shall be 2 1/2 inch with NST threads and the pumper outlet shall be 4 1/2 inch with NST thread. Hydrants shall be designed so that no water will be lost when they are broken off and so they can be repaired with a repair kit. 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 a 3 1/2 foot bury depth. Working drawings and full description of hydrants shall be submitted to the ENGINEER before ordering. All hydrants shall have a 5 1/4 inch valve opening against pressure. The hydrants shall be Mueller or Kennedy brand or approved equal. All hydrant extensions will be the responsibility of the CONTRACTOR.

3.3 PAINT

Hydrants shall be painted one coat of red paint and two finish coats of approved paint of color directed by the ENGINEER. All hydrants are to receive the final coat of paint after field installation.

3.4 INSTALLATION

Hydrants shall be set at such elevations that the connecting pipe will have the same depth of cover as the distribution main. The back of the hydrant opposite the pipe connection shall be firmly wedged against one and one-half square feet or enough of the vertical face of the trench with concrete to prevent the hydrants from blowing off the line. In addition, all fittings, valves and hydrants shall be joined by the use of all-thread rods, nuts and "DUC-LUG" offsets as shown on the attached drawing to prevent movement of the hydrant. If the character of the soil is such, in the opinion of the ENGINEER, that the hydrant cannot be securely wedged, bridle rod collars shall be used which shall be not less than three-fourths inch stock and shall be protected by a coat of acid resistant paint.

Not less than seven cubic feet of No. 9 stone shall be placed around the base of the hydrant to insure drainage. Before the No. 9 stone is placed and before it is

backfilled the drain hole shall be inspected and thoroughly cleaned if necessary. The backfill around the hydrant shall be thoroughly compacted to the grade line in a manner satisfactory to the ENGINEER. Hydrants shall have the interior cleaned of all foreign matter before installation.

All hydrants will be installed with the pumper connection facing the main access road or as directed by the ENGINEER.

Stuffing boxes shall be tightened and the hydrants shall be inspected in open and closed position to see that all parts are in working condition.

4.0 AIR VALVES

4.1 AIR RELEASE VALVES

A valve designed to allow exhaust of small pockets of air from the water main while in use shall be installed where shown on the plans or where directed by the ENGINEER. The air release valve shall have a 3/4" iron pipe thread inlet, cast iron body construction, bronze trim, with all internal parts of stainless steel. The valve shall have a minimum orifice size of 3/32". Valves shall be suitable for a working water pressure of 150 PSIG. The air release valve shall be mounted on 3/4" bronze riser pipe. The riser pipe shall be connected to the water main by use of a service clamp and a corporation stop. The riser shall also have a 3/4" bronze ball valve with stainless steel handle and be suitable for a 150 PSIG working water pressure. Air release valves shall be as manufactured by APCO Models 65 or 50, or approved equal.

Air release valves will be installed in the same type of box used for meter installation. The box must allow for adequate cover over the pipe at the installation.

In locations where the air release valve cannot be placed directly above the water main, such as roadway drainage ditches, then a section of service tubing shall be used to locate the valve as directed by the ENGINEER. The service tubing shall be installed with a continuous upward slope to eliminate air pockets. Additional payment for the tubing shall be made based on the linear foot bid for service tubing. Tubing shall also be rodded through the box to support the valve. No additional payment will be made for the tubing supports.

5.0 VALVE BOXES

All valves (gate, air release, check, etc.) installed underground shall be installed in an approved valve box. Each gate valve shall be installed in a vertical position with a valve box. Valve boxes shall be of a cast iron, two or three-piece, slip-type consisting of a base, a center section and a top section with a cover marked "water". Where valve box is constructed in a paved area the box

shall be a screw type box. The entire assembly shall be adjustable for elevation and shall be set vertically and be properly adjusted so that the cover will be in the same plane as the finished street surface (no more than 1/2" above ground in yards or pastures or 2" in unsodded areas). The assembly must provide for the required cover over the pipe at the installation site and shall rest on concrete pads as shown in the Standard Details.

6.0 BLOW-OFF ASSEMBLIES

Blow-off assemblies shall be installed in accordance with the details and the specifications at locations shown on the plans and in other locations as directed by the ENGINEER. The CONTRACTOR should refer to the Standard Details for blow-off installation.

The blowoff pipe from the main to the flush valve shall be connected to the main by means of a tee. Do not use a corporation stop for this assembly. The blow-off assembly shall include a resilient seal gate valve in conformance with AWWA C509.

7.0 TAPPING SLEEVE AND VALVE

Tapping sleeves shall be as manufactured by Ford Meter Box Company, Inc., Model FTSC, or approved equal, and shall be rated for a minimum working water pressure of 150 psi. CONTRACTOR shall ascertain the type and size of pipe to which the connection is to be made prior to selection. The valve shall be as specified under section 2.0 of this specification.

8.0 TIE IN CONNECTIONS

All tie in connections shall include any fittings suitable to make the required connection. The fittings shall be mechanical joint, ductile iron type as specified in other sections.

9.0 MEASUREMENT AND PAYMENT

Payment for gate valves, check valves and other special valves installed underground shall include all work necessary for a complete installation and shall include all valve stem boxes or other valve boxes and box covers. Payment will be made at the unit price bid for the type and size of valve installation.

Blow-off assemblies and air release valves will be paid for under their respective bid price and is to include box and six feet (6') of pipe for blow-offs only. Excess pipe will be paid under bid price for pipe installed.

SECTION 15102

SPECIAL ITEMS OF CONSTRUCTION IN WATERLINE INSTALLATION

1.0 GENERAL

These specifications govern special crossings, installations and construction procedures required to deal with unusual construction items or special requirements of governing agencies. This project takes place within subdivision(s) inside the city limits, thus may be subject to work stoppages due to homeowners', traffic issues, weather conditions or sequencing of tie-ins and project alternates as controlled by the Owner and/or Engineer. The Contractor shall be given additional time if a work stoppage is requested and approved by the Owner and Engineer.

2.0 STATE HIGHWAY CROSSINGS

In all cases, these crossings will be made in compliance with the requirements of the State Highway Department. Such requirements will normally be described by the appropriate District Highway Office. In general, unless otherwise shown on the plans or directed otherwise by the ENGINEER, the crossing of all State Highways shall be accomplished by boring under the roadway. In addition, the crossing of service lines 1-1/2 inches and greater under rigid and flexible surfaced paved roads shall be accomplished by boring and jacking a casing pipe under said roadway. In certain cases, as shown on the plans, service lines of all sizes will require casing pipe installed with the crossing.

2.1 OPEN TRENCH CROSSINGS

The trench shall be excavated to a minimum width that will allow the pipe installation. The trench walls shall be kept as nearly vertical as possible. The minimum specified cover above the pipe shall be maintained. The Standard Details section shows the requirements for open trench crossings.

The backfill in the trench under any roads, driveways, or parking areas where the open trench method is used shall be of the type shown in the Standard Details and shall be deposited and compacted in uniform layers not to exceed the depth shown in the Standard Details.

The surface of the road, driveway, or parking area shall be replaced with the same type of material as specified under pavement replacement.

2.2 BORING AND JACKING

The work is herein defined as the operations in which both the boring by auger and the jacking of the casing pipe are done mechanically and in which the diameter of the casing pipe is too small to permit hand working at the heading of the casing pipe. Two basic methods are; (1) pushing the casing pipe into the fill or earth simultaneously as the boring auger drills out the ground; and (2) drilling the hole through the fill or earth and pushing the casing or carrying pipe into the hole after the drill auger has completed the bore.

A suitable approach trench shall be opened adjacent to the slope of the embankment, or adjacent to point of bored and jacked section as shown on the plans. The approach trench shall be long enough to accommodate the selected working room. Guide timbers or rails for keeping the casing pipe on line and grade shall be accurately set and maintained in the bottom of the approach trench and with heavy timber back-stop supports installed at the rear of the approach trench to adequately take thrust of the jacks without any movement or distortion. It is paramount to the securing of acceptable tolerance limits of workmanship in the boring and jacking operation that extreme care be taken in the setting of all guides, rails and jacks to the end that the casing pipe in final position be within the limits of acceptability for the placing and laying of the carrier pipe. The minimum cover of 36 inches under the roadway must be maintained. Additional depth may be required as shown on the plans.
In general, the diameter, thickness, style, joints and materials selected for casing pipe shall be as shown on the plans and shall be considered as "minimum" requirements, all subject to prior approval of the ENGINEER. In all cases, the approval for construction by agreement with the private company and/or construction permit issued by the State, County, or Municipal agency will be required before construction starts.

Steel casing pipe for road and railroad crossings using the boring and jacking method shall be steel, plain end, uncoated and unwrapped, and shall be furnished in at least 18-foot lengths. Steel pipe shall meet the requirements of ASTM Specification A-120 and AWWA C200. Pipes up to and including 4 inches in diameter shall be Schedule 40. Pipe larger than 4 inches shall have a wall thickness equal to or greater than 0.312 inches under railroads and 0.250 for all other uses. The inside diameter of all casing pipes shall be a minimum of four (4") inches greater than the largest outside diameter of the carrier pipe, joint or coupling.

The steel casing pipe shall be bored and/or jacked in place at the locations as shown on the plans or as directed by the ENGINEER. All joints between lengths shall be solidly welded with a smooth non-obstructing joint inside. Any field welding shall be performed by a certified welder and shall be in accordance with AWWA C206. The casing pipe may be extended beyond the boring limits by open trenching as shown in the Standard Details. This would apply when the

casing is required from right-of-way to right-of-way or ditch line to ditch line. Open trenching at jacked or bored locations will be allowed no closer than 3 feet from edge of pavement.

Positioning guides (insulators) shall be utilized on all carrier pipe which is within the casing pipe. Positioning shall be accomplished by the use of prebuilt spacers such as those manufactured by CALPICO or an approved equal. The CONTRACTOR shall submit the type of position guide proposed for use for the approval of the ENGINEER. Spacing of the positioning guides shall be in accordance with the Standard Drawings.

The ends of the casing pipe shall be plugged and made watertight in a manner acceptable to the ENGINEER prior to backfilling. Casing seals as manufactured by Pipeline Seal & Insulator, Inc. (PSI), Advance Products & Systems, Inc. (APS) or equal shall be used.

Where road crossings are made using plastic pipe or copper, the location of joints under the roadway should be avoided by using lengths of adequate dimension for the crossing. This principle also applies to other types of pipe where sufficiently long lengths are available.

3.0 RAILROAD CROSSINGS

At all railroad crossings, cover pipe (casing) for water lines (carrier pipe) shall be jacked or pushed beneath tracks and the carrier pipe jointed and pushed through the cover pipe. Detailed drawings of railroad crossings including the length of casing and depth below track are shown in the plans. CONTRACTOR shall obtain and pay for services of a representative of the railroad to direct the CONTRACTOR's operations while on the railroad property when required by the railroad.

4.0 STREAM CROSSINGS

4.1 NO-FLOW CONDITION

Where required on the plans or instructed by the ENGINEER, the CONTRACTOR shall construct a special creek crossing as shown in the Miscellaneous Drawings. Crossings shall be scheduled for construction in times of no flow or very low flow, if practicable, otherwise the stream shall be directional bored. Concrete shall not be placed under water and CONTRACTOR shall provide suitable pumps to keep water out of trench excavation during stream crossing construction. Special creek crossings shall be designated as Type A or Type B as contained in the Standard Drawings.

4.2 NORMAL EARTHEN STREAM CROSSING

Where the stream crossing is made in earth or other beds which are stable (no casing or anchorage required), then the pipe will be laid in a narrow trench at the depth specified in the Standard Details to maintain the required cover between pipe and stream bed. Initial backfill will be mechanically compacted. Trench backfill in any stream crossing area from one (1) foot above the top of the pipe shall consist of trench excavated rock, if available. No extra payment will be made above normal construction for this type of creek crossing.

4.3 BLUE LINE STREAM CROSSINGS

All crossing of streams that appear as a blue line on a USGS 7.5 minute topographical map shall be accomplished in accordance with:

GENERAL CERTIFICATION
NATIONWIDE PERMIT #12
UTILITY LINE BACKFILL AND BEDDING

This document is bound in front of the specifications. The Contractor shall read, understand and comply with the requirements and procedures.

Stream size, for purposes of this specification, is differentiated as large or small. A stream is classified as small when the distance across the stream channel at top of banks is 15 L.F. or less. A stream is classified as large when this measurement is greater than 15 L.F.

It is the intent of the plans to identify a stream crossing at each blue line stream. Small stream crossings may frequently be accomplished by trenching when the stream is in a no-flow condition. If the stream is in a flow condition, irregardless of the size classification, the crossing shall be accomplished by directional boring or other method that complies with the General Certification and is approved by the Engineer. Specific details for stream crossings are contained in the Miscellaneous Drawings.

See Section 14 for Basis of Payment.

5.0 RIVER OR LAKE CROSSINGS

Crossings in rivers or lakes where the pipe cannot be laid in a trench shall normally be made with ductile iron pipe having ball and socket joints or polyethylene pipe or directional bored as indicated on the DRAWINGS. Details for any required installations of this type including pipe required; number, size and location of anchors; and, installation technique are shown in the plans and Miscellaneous Drawings. See Section 15100 for installation requirements.

6.0 BRIDGE CROSSINGS

Wherever possible bridges will not be utilized for stream crossings. However, where it is necessary for the water line to be attached to bridges, the pipe shall be securely fastened to bridge stringers or beams using supports as dimensioned and located in the plans. The carrier pipe shall be insulated with Vermiculite or other approved material to prevent freezing. Expansion joints to allow for movement of the bridge will be required as shown on the plans.

7.0 WATER LINE AND SEWER LINE SEPARATION

7.1 GENERAL

Wherever sewer lines cross, or are adjacent to, each other, special precautions shall be taken.

7.2 PARALLEL WATER AND SEWER LINES

Water lines must, if possible, be located a minimum lateral distance of 10 feet from any existing or future sewer lines measured from outside diameters. Where water lines and sewer lines must be placed in the same trench, the water line must be located on a shelf, 2 feet above and 2 feet to the side of the sewer line. Whenever this condition cannot be met, and upon direction from the ENGINEER, the water line shall be uncovered and encased with concrete per the standard encasement detail.

7.3 CROSSING WATER AND SEWER LINES

Wherever sewer lines and water lines cross, it is desirable, if practical, that the sewer line be at least 24 inches below the water line.

Where it is not practical to provide such a separation, care shall be taken to ascertain that the existing water line or existing sewer line is in good sound condition and that no evidence of joint leakage is known in that vicinity. If any such evidence does exist, the existing line shall be exposed by the CONTRACTOR at least 10 feet each side of the new pipe crossing, carefully examined and any defects positively corrected. The OWNER will arrange for examining and correcting any defects in the existing lines, but the CONTRACTOR shall cooperate in every way possible.

When the water line must be below or less than 2 feet above the sewer line, the CONTRACTOR shall encase the water line 5 feet in each direction from the crossing as directed by the ENGINEER. This encasement should only be accomplished when directed by the ENGINEER and shall be accomplished in accordance with the details shown on the drawings. The encasement is a separate pay item.

8.0 CLEANUP, SEEDING AND SODDING

8.1 GENERAL

Upon completion of the installation of the work, the CONTRACTOR shall remove all debris and surplus construction materials resulting from the work. The CONTRACTOR shall fine grade all the disturbed surfaces around the area of the work in a uniform and neat manner leaving the construction area in a condition as near as possible to the original ground line or to the lines as directed by the ENGINEER. The Contractor shall provide effective cleanup of the work as it progresses. Procrastination of cleanup will not be to berated.

8.2 ROUGH GRADE WORK AND CLEANUP

Rough Grade Work and Cleanup (Rough Cleanup) shall be defined to include the final backfill and windrowing of the ditch line, disposal of excess excavated material, level grading of the disturbed areas adjacent to the ditch line, filling and leveling street and driveway cuts, cleaning up and removal of rubbish, repair of fences and structures, and any other such work that may be required to result in a neat, orderly project area. **Rough Cleanup shall be performed as construction progresses and must be completed each day throughout the entirety of the project.**

Rough Cleanup is not a separate pay item. The cost for this work shall be included in the unit bid price for water lines. If Rough Cleanup is not performed as specified, the OWNER, after notification to the CONTRACTOR, will refuse payment for additional pipeline installation until the Rough Cleanup is accomplished.

8.3 FINAL CLEANUP

Final cleanup, grade work and seeding shall be performed on each line when backfilled trenches have had adequate time to settle, but at least within **30 days** from the date each line is constructed. Final grade work and seeding on Kentucky Transportation Cabinet rights-of-way shall be done in accordance with said Cabinet's specifications and the permit granted to the OWNER specifically for this project.

Where work was performed on private property in lawns, earth of good quality, free from rock shall be spread over the disturbed area and graded and compacted to match adjacent ground contours. The graded and seed bed area shall be prepared with a power landscape rake and further hand raked if necessary, until smooth and free from rock, potholes, and bumps. **The disturbed area shall then be seeded with the seed variety used on the original lawn (e.g., a bluegrass lawn shall be reseeded with bluegrass seed).** In the case of no preference by the OWNER, the mixture of grasses shall

consist of one-third (1/3) Rye grass, one-third (1/3) Kentucky Fescue and one-third (1/3) Kentucky Bluegrass by weight and shall be applied in accordance with the supplier's recommendations. The area shall be fertilized with 12-12-12 fertilizer applied at a rate of 6 pounds per 1,000 square feet of area. After the seed and fertilizer have been applied, the CONTRACTOR shall then lightly cover the seed by use of a drag or other approved device. The seeded area shall then be covered with clean straw to a depth of approximately one (1) inch.

Where work was performed on private property and not in lawns the trench line shall be graded and filled if necessary to match adjacent contours. All rock larger than 1-1/2" in diameter shall be removed from the disturbed area. In general, pasture and fallow land shall be fertilized and seeded with Kentucky 31 Fescue and plowed fields shall be left unseeded, however, the desire of each property owner shall govern regarding seeding. The entire pipeline length that is seeded shall be strawed.

In all cases on private property the rate of seed and fertilizer application shall be that recommended by the material supplier or the University of Kentucky Cooperative Extension Service for new plantings of the variety of grass seed used.

If the trench line settles following final grade work or if grass seed fails to germinate within a reasonable time, the CONTRACTOR shall regrade or reseed the area in question as specified above and as directed by the ENGINEER.

Final cleanup is a separate pay item and an allowance has been established in the Bid Form.

9.0 PAVEMENT AND OTHER STRUCTURE REPLACEMENT

The CONTRACTOR shall replace all pavement cut or disturbed, with pavement similar in all respects to existing pavement in accordance with the Standard Details and at those locations approved by the ENGINEER. Every effort shall be made to avoid cutting the pavement. In restoring pavement, new pavement is required, except that granite paving blocks, sound brick or sound asphalt paving blocks may be reused. No permanent paving shall be placed within thirty (30) days after the backfilling has been completed. All concrete and asphalt paving materials shall be in conformance with the Standard Details shown in the plans. The pipeline trench through all paved areas (parking lots, driveways, roads, etc.) shall be fully backfilled with crushed stone.

9.1 CLASSIFICATIONS OF PAYMENTS

A. Concrete Pavement Replacement - This pavement replacement shall be Portland cement concrete construction in accordance with the requirements shown in the Standard Details. It shall include all

pavement replacement on concrete surfaced roads, concrete driveways, concrete sidewalks and concrete parking areas, both public and private.

B. Heavy-Duty Bituminous Pavement Replacement - This type of asphalt pavement replacement shall be bituminous concrete surface over concrete base in accordance with the details. This type of pavement replacement shall be used on all heavily trafficked roads having an existing pavement greater than 2", whether public or private, or in other locations as directed by the ENGINEER.

C. Light-Duty Bituminous Pavement Replacement - This type of pavement replacement shall be bituminous concrete constructed in accordance with the details. This item shall include all light-duty bituminous concrete roadways, bituminous driveways and bituminous parking lots, both public and private.

D. Crushed Stone Surface Replacement - This type of surface replacement shall include all graveled roadways, driveways, parking areas, or other gravel surfaced areas, both private and public. This type of surfacing may also be required as a base course for other pavement replacement.

9.2 MATERIALS

The crushed stone backfill as noted on the drawings shall be dense graded aggregate per Kentucky Department of Highways Specifications or as noted on the Drawings. The CONTRACTOR shall continuously be responsible for the maintenance of the aggregate and the surface of the trenches until the pavement replacement is completed.

Portland cement concrete for pavement replacement shall contain a minimum of 6 sacks of cement per cubic yard, the maximum free water content shall be 6 gallons per sack of cement, the slump shall be between 2 and 4 inches, and the concrete shall have minimum 28-day compression strength of at least 3,500 PSI. Cement, aggregate and water shall be described in these specifications for Class "A" concrete. A set of cylinders shall be made and tested for each 25 cubic yards of concrete placed, or fraction thereof, to supply representative sampling and testing of the concrete, upon the direction of the ENGINEER. The CONTRACTOR shall produce a broomed, or burlaped uniformly smooth and nonskid surface, consistent with the existing pavement.

Bituminous materials and mixes shall be consistent with the recommended practice of the asphalt institute and it shall conform to the requirements of the Kentucky Department of Highways for prime coat and Class 1 bituminous

concrete. The bituminous concrete shall consist of a binder or base course and a surface course.

9.3 INSTALLATION OF PAVEMENT REPLACEMENT

The CONTRACTOR shall cut back the surfacing adjacent to the trench for 12 inches on both sides of the trench and shall cut down the dense graded aggregate he has placed to a depth required for either type of pavement replacement. The resulting surface shall be rolled to yield a smooth, dense surface and a uniform depth.

The concrete shall be placed in accordance with standard practice, with the welded wire mesh if required in proper position and thoroughly vibrated into place. The CONTRACTOR shall produce a surface consistent with the existing pavement. The CONTRACTOR shall apply a liquid curing component, sprayed on the surface of the concrete, and shall provide adequate protection to the pavement until it has set.

For bituminous concrete, the CONTRACTOR shall clean and broom the prepared surface, then apply the prime coat at the rate of 0.20 to 0.25 gallons per square yard, with a pressure distributor or approved pressure spray method. When the prime coat has become tacky but not dry and hard, the bituminous binder course, or base course, whichever applies, shall be placed and compacted. The CONTRACTOR shall then apply the surface course. It is recommended, but not required, that the base course remain in place for approximately one week before placing the surface course. The finished course shall be compacted and the completed surface shall match the grades and slopes of the adjacent existing surfacing and be free of offsets, depressions, raised places and all other irregular surfaces.

9.4 SEASONAL AND WEATHER LIMITATIONS FOR PAVEMENT REPLACEMENT

In the event the progress and scheduling of the work is such that the bituminous pavement replacement would occur in the winter months, during adverse cold weather and/or during such times the asphalt plants are not in operation, then the final pavement replacement shall be postponed until favorable weather occurs in the spring and the asphalt plants resume normal operations. No bituminous concrete shall be laid when the temperature is below 40° F except by written permission of the ENGINEER.

Concrete pavement shall not be placed when the temperature is such that the pavement placed will freeze before it has had adequate time to set and shall be placed in conformance with the temperature conditions specified in Section 3 of these specifications.

The CONTRACTOR shall be responsible for replacement of pavement which he has placed which has been damaged by cold weather or freezing without additional compensation.

In the meantime, the CONTRACTOR will be required to maintain the temporary surfacing until the permanent pavement is placed. Such labor, materials and equipment as is required for temporary maintenance of the streets, roadways and driveways shall be provided at the CONTRACTOR'S expense and is not a pay item. The CONTRACTOR will be required to use a cold mix asphaltic concrete as a temporary surface for trenches under heavy traffic use.

9.5 GUARANTEE

The one year guarantee as specified in the contract documents is also applicable to trench settlement and pavement replacement.

10.0 SIDEWALK AND DRIVEWAY REPLACEMENT

Sidewalks and driveways will be replaced if damaged by the CONTRACTOR in any way. Payment will be made for those pavements necessarily damaged by the line installation in accordance with the Standard Details. No pavements are to be replaced over a backfilled trench for at least 30 days after filling. Pavements damaged otherwise are to be replaced immediately at the CONTRACTOR'S expense.

Materials and dimensions are to be at least equal to existing pavement and are to conform to the Standard Details.

11.0 PAYMENT FOR WATER

All water used from the UTILITY shall be metered with meters supplied by the CONTRACTOR. The CONTRACTOR shall pay for such water monthly at the rates published by the water utility. Unmetered water lost through water line breakage shall also be paid at the rates published by the water utility. The quantity lost shall be computed on the basis of a discharge velocity of 7 feet/second, the diameter of the line, and the estimate duration of free uncontrolled discharge.

12.0 FINAL CLEAN-UP

The CONTRACTOR shall provide effective cleanup of the work as it progresses. Procrastination of cleanup will not be tolerated. At the time of final inspection, no trenches shall show any undue evidence of the previous construction. All areas shall be left free of ruts due to construction equipment and shall have a clean and neat appearance without rubble or debris. The areas shall not be mounded up and shall be completely restored, and all yards and fields shall be reseeded

so land may be cultivated, mowed, etc. Straw and fertilizing shall accompany the seeding in accordance with Item 8 - Cleanup, Seeding and Sodding of this section. If necessary to hasten proper restoration of terraces, principally along ditch lines, the CONTRACTOR shall sod such areas at the ENGINEER'S direction. For all line segments, final cleanup shall be performed within 30 days from day of installation.

13.0 PROTECTION OF ADJACENT LANDSCAPE

Reasonable care shall be taken during construction of the water lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

In the course of construction, the CONTRACTOR may deflect horizontal alignment of the water line to avoid trees and to keep from damaging their roots. The CONTRACTOR shall be fully responsible for settling all claims by private property owners concerning damage to trees and shrubs.

14.0 MEASUREMENT AND PAYMENT

14.1 Payment for crushed stone, black top and concrete pavement replacement will not be based on the quantities purchased by the CONTRACTOR. Payment for surfacing will be paid on the basis of linear feet installed in accordance with the STANDARD DRAWINGS with a maximum width of pipe diameter plus 24 inches. Crushed stone or concrete sub-grade under paving and crushed stone trench backfill shall be included in paving price and not paid for separately. Any additional cost estimated by the CONTRACTOR must be included in the cost of pipe in place.

14.2 STREAM CROSSINGS

14.2.1 No-Flow Crossings. Payment for no-flow stream crossings delineated on the plans (excluding directional bores) will be at the unit price bid per lineal foot for that item and shall include encasement pipe, crushed stone, concrete, solid rock excavation and all other work necessary for a satisfactory installation. The carrier pipe installed in the casing shall be paid separately under the unit price bid for pipe installed.

14.2.2 Directional Bores. Payment shall be "Lump Sum" for specific individual Bid Items for Directional Bores of large stream crossings and/or some streams classified as small where the physical crossing characteristics differ significantly from the other small streams in the project. Determination of the required length to accomplish the bore is the responsibility of the Contractor.

Payment shall be "Each" for directional bores of small stream crossings with the exception of individual small streams covered in a specific bid item. All small stream crossings in the project shall be considered the same for payment regardless of width (up to 15 L.F.) or depth. It is the responsibility of the Contractor to determine an average unit price that will be used for payment in each instance a blue line stream is crossed. Small stream crossings may be added, for extended lines beyond those shown on the plans, at the same unit price providing the crossings are reasonably similar to those in the initial project. Stream crossings may be deleted, without affecting the unit price, if a line is deleted or shortened.
Payment shall include the directional bore, encasement pipe if specified on the plans, the carrier pipe as specified on the plans and the transition fittings. Payment limits are shown on the Miscellaneous Drawing for Directional Bore for Stream Crossings.

14.3 Additional costs for normal earth creek crossings shall be included in the unit price bid for pipe installation and no special payment will be made for these crossings.

14.4 Casing pipe unit price bids shall include the cost of boring or jacking under railroads and highways and shall include the cost of steel casing pipe. Carrier pipe will be paid for under the unit price bid for installing lines as described in Article 2.2 of this section.

14.5 Sidewalk /driveway crossings when included as a bid item shall include the extra cost of free-boring or the removal and disposal of existing pavement and replacement with new construction. Payment for pavement replacement will be on the basis of linear feet installed. Width for payment for a standard trench crossing is shown in the Standard Details. When sidewalk/driveway crossings or replacement are not included as a bid item, their costs shall be considered subsidiary to the bid for pipe installation.

14.6 Where required by the Special Provisions or the Bid Proposal, the cost of pavement replacement, boring, crossings of all types and other incidental construction shall be included in the unit price bid for pipe line installation and shall comprise total compensation for all such work.

SECTION 15103

SWABBING, PRESSURE TESTING AND STERILIZATION OF POTABLE WATER PIPELINES

1.0 SWABBING

1.1 GENERAL

Swabbing of the pipeline shall be done when directed in the General Notes on the Drawings.

1.2 EXECUTION

The CONTRACTOR shall insert a flexible polyurethane foam "swab" (2 lb. per cubic foot density) complete with rear polyurethane drive seal into the first section of pipe. The "swab" shall remain in its initial position until construction of the specific pipeline segment is completed. Cleaning and flushing shall be accomplished by propelling the "swab" down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear.

The maximum operational distance for each individual "swab" shall not exceed 1.0-1.5 miles.

Pressure testing and sterilization, as stipulated in this section of the specifications, shall follow cleaning and flushing.

1.3 MATERIALS

The "swab" shall be Aqua-Swab as manufactured by GIRARD Industries or approved equal.

2.0 TESTING

2.1 After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure test of at least 1.5 times the working pressure at the point of testing, but in no case less than that required by other sections herein. In addition, a leakage test shall be conducted concurrently with the pressure test.

2.2 PRESSURE TEST

2.2.1 Test pressure shall:

2.2.1.1 Not be less than 1.25 times the working pressure at the highest point along the test section.

2.2.1.2 Not exceed pipe or thrust restraint design pressures at the lowest point along the test section.

2.2.1.3 Be of at least six (6) hour duration unless otherwise stipulated by owner.

2.2.1.4 Not vary by more than plus or minus 5 psi.

2.2.1.5 Not exceed twice the rated pressure of the valves or hydrants when the pressure of the test section includes closed gate valves or hydrants.

2.2.1.6 Not exceed the rated pressure of resilient seat butterfly valves when used.

2.2.2 Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the ENGINEER.

2.2.3 Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged, or left in place at the discretion of the ENGINEER.

2.2.4. All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the ENGINEER.

2.3 LEAKAGE TESTING

2.3.1 Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

2.3.2 No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = ND(P \text{ exp } 1/2)/7400$$

in which L is the allowable leakage, in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

2.3.2.1 Allowable leakage at various pressures is shown in TABLE K-1.

2.3.2.2 When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in of nominal valve size shall be allowed.

2.3.2.3 When hydrants are in the test section, the test shall be made against the closed hydrant.

2.3.3 Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified in Section 2.3.2 the contractor shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance.

2.3.3.1 All visible leaks are to be repaired regardless of the amount of leakage.

TABLE K-1
ALLOWABLE LEAKAGE PER 1,000 FT. OF PIPELINE (gph)

Avg. Test Pressure	Nominal Pipe Diameter (Inches)								
psi	2	3	4	6	8	10	12	14	16
450	0.32	0.48	0.64	0.95	1.27	1.59	1.91	2.23	2.55
400	0.30	0.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40
350	0.28	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25
300	0.26	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08
275	0.25	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99
250	0.24	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90
225	0.23	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80
200	0.21	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70
175	0.20	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59
150	0.19	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47
125	0.17	0.25	0.34	0.50	0.67	0.84	0.01	1.18	1.34
100	0.15	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20

Avg. Test Pressure psi	Nominal Pipe Diameter (Inches) 18	20	24	30	36	42	48	54
450	2.87	3.18	3.82	4.78	5.73	6.69	7.64	8.60
400	2.70	3.00	3.60	4.50	5.41	6.31	7.21	8.11
350	2.53	2.81	3.37	4.21	5.06	5.90	6.74	7.58
300	2.34	2.60	3.12	3.90	4.68	5.46	6.24	7.02
275	2.24	2.49	2.99	3.73	4.48	5.23	5.98	6.72
250	2.14	2.37	2.85	3.56	4.27	4.99	5.70	6.41
225	2.03	2.35	2.70	3.38	4.05	4.73	5.41	6.03
200	1.91	2.12	2.55	3.19	3.82	4.46	5.09	5.73
175	1.79	1.98	2.38	2.98	3.58	4.17	4.77	5.36
150	1.66	1.84	2.21	2.76	3.31	3.86	4.41	4.97
125	1.51	1.68	2.01	2.52	3.02	3.53	4.03	4.53
100	1.35	1.50	1.80	2.25	2.70	3.15	3.60	4.05

3.0 STERILIZATION

3.1 GENERAL

It is the intent of this section to present essential procedures for disinfecting new and repaired water mains. The section is patterned after AWWA C651. The basic procedure comprises:

3.1.1 Preventing contaminating materials from entering the water mains during construction or repair and removing by flushing materials that may have entered the water main.

3.1.2 Disinfecting any residual contamination that may remain.

3.1.3 Determining the bacteriologic quality by laboratory test after disinfection.

3.2 PREVENTIVE MEASURES DURING CONSTRUCTION

3.2.1 Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. When pipe laying is not in progress, as, for example, at the close of the day's work, all openings in the pipe line shall be closed by water tight plugs. Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

If dirt, that, in the opinion of the ENGINEER, will not be removed by the flushing operation (ARTICLE 3.3) enters the pipe, the interior of the pipe shall be cleaned

and swabbed as necessary, with a five (5%) percent hypochlorite disinfecting solution.

3.2.2 Gaskets and Joints - No contaminated material or any material capable of supporting prolific growth of micro-organisms shall be used for sealing joints. Gaskets shall be handled in such a manner as to avoid contamination. Gasket packing materials must conform to AWWA standards. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in enclosed containers and shall be kept clean.

3.3 PRELIMINARY FLUSHING

The main shall be swabbed and flushed prior to disinfection. It is recommended that the flushing velocity be not less than 2.5 ft/sec. The rate of flow required to produce this velocity in various diameters is shown in Table K-2. No site for flushing should be chosen unless it has been determined that drainage is adequate at the site.

TABLE K-2
REQUIRED OPENINGS TO FLUSH PIPELINES
(40-psi Residual Pressure)

Pipe Size (in)	Flow Required to Produce 2.5 fps Velocity (gpm)	Hydrant Outlet Nozzles Orifice Size (in)	Size Number	(in)
4	100	15/16	1	2 1/2
6	220	1 3/8	1	2 1/2
8	390	1 7/8	1	2 1/2
10	610	2 5/16	1	2 1/2
12	880	2 13/16	1	2 1/2
14	1,200	3 1/4	2	2 1/2
16	1,565	3 5/8	2	2 1/2
18	1,980	4 3/16	2	2 1/2

3.4 FORM OF CHLORINE FOR DISINFECTION

The most common forms of chlorine used in the disinfecting solutions are liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules, sodium hypochlorite solutions.

3.4.1 Liquid Chlorine

3.4.1.1 Use: Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is

properly trained and equipped to handle any emergency that may arise. Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.

NOTE: The preferred equipment consists of a solution fed chlorinator in combination with a booster pump for injecting the chlorine-gas water mixture into the main to be disinfected. Direct feed chlorinators are not recommended because their use is limited to situations where the water pressure is lower than the chlorine cylinder pressure.

3.4.2 Hypochlorites

3.4.2.1 Calcium Hypochlorite: Calcium hypochlorite contains seventy (70%) percent available chlorine by weight. It is either granular or tabular in form. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water. Calcium hypochlorite is packaged in containers of various types and sizes ranging from small plastic bottles to one hundred (100) pound drums.

A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

3.4.2.2 Sodium Hypochlorite: Sodium hypochlorite is supplied in strengths from five and one-quarter (5.25%) to sixteen (16%) percent available chlorine. It is packaged in liquid form in glass, rubber, or plastic containers ranging in size from one (1) quart bottles to five (5) gallon carboys. It may also be purchased in bulk for delivery by tank truck.

The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

3.4.2.3 Application: The hypochlorite solutions shall be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. For small applications, the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

3.5 METHODS OF CHLORINE APPLICATION

3.5.1 Continuous Feed Method: This method is suitable for general application.

3.5.1.1 Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipe line. The water shall receive a dose of chlorine, also fed at a constant,

measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/l available chlorine. To assure that this concentration is maintained, the chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of Standard Methods and AWWA M12--Simplified Procedures for Water Examination.

NOTE: In the absence of a meter, the rate may be determined either by placing a pitot gauge at the discharge or by measuring the time to fill a container of known volume.

TABLE K-3 gives the amount of chlorine residual required for each one hundred (100) feet of pipe of various diameters. Solutions of one (1%) percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately one (1) pound of calcium hypochlorite in eight and five tenths (8.5) gallons of water.

TABLE K-3
CHLORINE REQUIRED TO PRODUCE 50 Mg/l CONCENTRATION
IN 100 FT. OF PIPE (BY DIAMETER)

Pipe Size (in)	100 Percent Chlorine (lb)	1 Percent Chlorine Solutions (gal)
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

3.5.1.2 During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least twenty-four (24) hours during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this twenty-four (24) hour period, the treated water shall contain no less than 25 mg/l chlorine throughout the length of the main.

3.5.2 Slug Method: This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.

3.5.2.1 Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate (see ARTICLE

3.5.1.1) into the newly laid pipe line. The water shall receive a dose of chlorine also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipe line is maintained at no less than 300 mg/l. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least three (3) hours. The application shall be checked at a tap near the upstream end of the line by chlorine residual measurements.

3.5.2.2 As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated as to disinfect appurtenances.

3.6 FINAL FLUSHING

3.6.1 Clearing the Main of Heavily Chlorinated Water. After the applicable retention period, the heavily chlorinated water shall not remain in prolonged contact with the pipe. This water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/l. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipe line.

3.6.2 Disposing of Heavily Chlorinated Water. The environment into which the chlorinated water is to be discharged shall be inspected. If there is any possibility that the chlorinated discharge will cause damage to the environment, then a neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See Appendix B of ANSI/AWWA C651-92 for neutralizing chemicals.) Federal, state, provincial, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

3.7 BACTERIOLOGIC TESTS

3.7.1 After final flushing, and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriologic quality and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least one sample shall be collected from chlorinated supplies where a chlorine residual is maintained throughout the new main. From unchlorinated supplies at least two samples shall be collected at least twenty-four (24) hours apart. **The Contractor is responsible for all bacteriologic testing expenses.**

3.7.2 Samples for bacteriologic analysis shall be collected in sterile bottles treated with sodium thiosulphate. No hose or fire hydrant shall be used in collection of samples. A suggested sampling tap consists of a standard

corporation cock installed in the main with a copper tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed, and retained for future use.

3.8 REPETITION OF PROCEDURE

If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. The tablet method cannot be used in these subsequent disinfections. When the sample tests indicate that disinfection has been effective, the main may be placed in service.

3.9 PROCEDURE AFTER CUTTING INTO OR REPAIRING EXISTING MAINS

The procedures outlined in this Article apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

3.9.1 Trench "Treatment": When an old line is opened, either by accident or by design, the excavation will likely be wet and may be badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

3.9.2 Main Disinfection: The following procedure is considered as a minimum that may be used.

3.9.2.1 Swabbing With Hypochlorite Solution: The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a five (5%) percent hypochlorite solution before they are installed.

3.9.2.2 Flushing: Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.

3.9.2.3 Slug Method: Where practicable, in addition to the procedures of ARTICLE 3.9.2.1, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in ARTICLE 3.5.2, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as one-half (1/2) hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.

3.9.3 Sampling: Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.

4.0 PAYMENT

Payment for swabbing, pressure testing and sterilization of pipelines shall be included in the unit price for pipeline installation unless otherwise itemized on the Bid Schedule. Pipeline swabbing may be included in the Bid Schedule as a separate Bid Item.

N O T I C E

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
(NATIONWIDE PERMIT & GENERAL WQC AUTHORIZATION)

PROJECT: Rockcastle County, Item No. 8-6.10
I-75 Widening

The Section 404 & 401 activities for this project have been previously permitted under the authority of the Department of the Army Nationwide Permit No. 14 “Linear Transportation Projects” & Division of Water General Water Quality Certification. If there is need to cross the stream channel with heavy equipment or conduct work from within the stream channel a working platform or temporary crossing is authorized. This should be constructed with clean rock and sufficient pipe to allow stream flow to continue unimpeded (see attached typical drawing). In order for these authorizations to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Permit & General WQC in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

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 Corps of Engineers. A copy of any request to the Corps of Engineers 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.

MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

R. BRUCE SCOTT
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

General Certification--Nationwide Permit # 14
Linear Transportation Projects

This General Certification is issued March 19, 2017, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33 U.S.C. §1341), as well as Kentucky Statute KRS 224.16-050.

For this and all nationwide permits, the definition of surface water is as per 401 KAR 10:001 Chapter 10, Section 1(80): Surface Waters means those waters having well-defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Lagoons used for waste treatment and effluent ditches that are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the commonwealth.

Agricultural operations, as defined by KRS 224.71-100(1) conducting activities pursuant to KRS 224.71-100 (3), (4), (5), (6), or 10 are deemed to have certification if they are implementing an Agriculture Water Quality Plan pursuant to KRS 224.71-145.

For all other operations, the Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 304, 306 and 307 of the CWA, will not be violated for the activity covered under NATIONWIDE PERMIT 14, namely Linear Transportation Projects, provided that the following conditions are met:

1. The activity will not 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 Waters.

2. The activity will not occur within surface waters of the Commonwealth identified as perpetually-protected (e.g. deed restriction, conservation easement) mitigation sites.

3. The activity will impact less than 1/2 acre of wetland/marsh.

4. The activity will impact less than 300 linear feet of surface waters of the Commonwealth. Stream realignment greater than 100 feet and in-stream stormwater detention/retention basins are not covered under this general water quality certification.

5. For complete linear transportation projects, all impacts shall not exceed a cumulative length of 500 linear feet within each Hydrologic Unit Code (HUC) 14.

6. Any crossings must be constructed in a manner that does not impede natural water flow.

7. Stream impacts covered under this General Water Quality Certification and undertaken by those persons defined as an agricultural operation under the Agricultural Water Quality Act must be completed in compliance with the Kentucky Agricultural Water Quality Plan (KWQP).

8. The Kentucky Division of Water may require submission of a formal application for an individual certification for any project if the project has been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.

9. Activities that do not meet the conditions of this General Water Quality Certification require an Individual Section 401 Water Quality Certification.

10. Activities qualifying for coverage under this General Water Quality Certification are subject to the following conditions:

    - Projects requiring in-stream stormwater detention/retention basins shall require individual water quality certifications.
    - 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 violations of state water quality standards do not occur (401 KAR 10:031 Section 2 and KRS 224.70-100).
    - 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 prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to,

upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the activities.

- 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 utility line right-of-way shall be limited to that necessary for equipment access.
- 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 shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation.
- Any fill shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement.
- 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 such work will be done.
- 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 KDOW shall be notified immediately by calling (800) 928-2380.

Non-compliance with the conditions of this general certification or violation of Kentucky state water quality standards may result in civil penalties.

2017 Nationwide Permits Regional and Permit-Specific Conditions
COMMONWEALTH OF KENTUCKY

These regional conditions are in addition to, but do not supersede, the requirements in the Federal Register (Volume 82, No. 4 of January 6, 2017, pp 1860).

Notifications for all Nationwide Permits (NWPs) shall be in accordance with General Condition No. 32.

1. For activities that would impact Outstanding State or National Resource Waters (OSNRWs), Exceptional Waters (EWs), Coldwater Aquatic Habitat Waters (CAHs) under the Endangered Species Act for the NWPs listed below, a Pre-Construction Notification (PCN) will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs (Section 404 activities), for impacts to these waters.

   NWP 3 (Maintenance)
   NWP 4 (Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities)
   NWP 5 (Scientific Measurement Devices)
   NWP 6 (Survey Activities)
   NWP 7 (Outfall Structures and Associated Intake Structures)
   NWP 12 (Utility Line Activities)
   NWP 13 (Bank Stabilization)
   NWP 14 (Linear Transportation Projects)
   NWP 15 (U.S. Coast Guard Approved Bridges)
   NWP 16 (Return Water from Upland Contained Disposal Areas)
   NWP 17 (Hydropower Projects)
   NWP 18 (Minor Discharges)
   NWP 19 (Minor Dredging)
   NWP 20 (Response Operations for Oil or Hazardous Substances)
   NWP 21 (Surface Coal Mining Activities)
   NWP 22 (Removal of Vessels)
   NWP 23 (Approved Categorical Exclusions)
   NWP 25 (Structural Discharges)
   NWP 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities)
   NWP 29 (Residential Developments)
   NWP 30 (Moist Soil Management for Wildlife)
   NWP 31 (Maintenance of Existing Flood Control Facilities)
   NWP 32 (Completed Enforcement Actions)
   NWP 33 (Temporary Construction, Access, and Dewatering)
   NWP 34 (Cranberry Production Activities)
   NWP 36 (Boat Ramps)
   NWP 37 (Emergency Watershed Protection and Rehabilitation)
   NWP 38 (Cleanup of Hazardous and Toxic Waste)
   NWP 39 (Commercial and Institutional Developments)
   NWP 40 (Agricultural Activities)

NWP 41 (Reshaping Existing Drainage Ditches)
NWP 42 (Recreational Facilities)
NWP 43 (Stormwater Management Facilities)
NWP 44 (Mining Activities)
NWP 45 (Repair of Uplands Damaged by Discrete Events)
NWP 46 (Discharges in Ditches)
NWP 48 (Commercial Shellfish Aquaculture Activities)
NWP 49 (Coal Remining Activities)
NWP 50 (Underground Coal Mining Activities)
NWP 51 (Land-Based Renewable Energy Generation Facilities)
NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)
NWP 53 (Removal of Low-Head Dams)
NWP 54 (Living Shorelines)

2. In addition to the notification and agency coordination requirements in the NWPs, for impacts greater than 0.25 acres in all "waters of the U.S." for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

NWP 3 (Maintenance)
NWP 7 (Outfall Structures and Associated Intake Structures)
NWP 12 (Utility Line Activities)
NWP 14 (Linear Transportation Projects)
NWP 29 (Residential Developments)
NWP 39 (Commercial and Institutional Developments)
NWP 40 (Agricultural Activities)
NWP 41 (Reshaping Existing Drainage Ditches)
NWP 42 (Recreational Facilities)
NWP 43 (Stormwater Management Facilities)
NWP 44 (Mining Activities)
NWP 51 (Land-Based Renewable Energy Generation Facilities)
NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)
NWP 53 (Removal of Low-Head Dams)

3. For activities in all "waters of the U.S." for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

NWP 21 (Surface Coal Mining Activities)
NWP 27 (Aquatic Habitat Restoration, Establishment & Enhancement Activities)
NWP 49 (Coal Remining Activities)
NWP 50 (Underground Coal Mining Activities)

4. Nationwide Permit No. 14 – Linear Transportation Projects.

   (a) New road alignments or realignments are limited to a permanent loss of 500 linear feet of intermittent or perennial stream length at each crossing. Road crossings with permanent losses greater than 500 linear feet of intermittent or perennial stream associated with new

alignments or realignments will be evaluated as an individual permit (i.e., a Letter of Permission or as a Standard Individual Permit).

(b) In addition to the notification requirements contained in NWP 14, the permittee must submit a PCN to the district engineer prior to commencing the activity for the permanent loss of greater than 300 feet of ephemeral, intermittent and perennial stream of all “waters of the U.S.” (See General Condition 32 and the definition of "loss of waters of the United States" in the Nationwide Permits for further information.)

5. Notification in accordance with General Condition 32 is required to the Corps for all activities which are subject to jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

6. All applications are required as both a paper copy and in an electronic media format, including electronic mail or compact disc.

7. For all activities, the applicant shall review the U.S. Fish and Wildlife Service’s IPaC website: http://ecos.fws.gov/ipac to determine if the activity might affect threatened and/or endangered species or designated critical habitat. If federally-listed species or designated critical habitat are identified, a PCN in accordance with General Condition 18 and 32 would be triggered and the official species list generated from the IPaC website must be submitted with the PCN.

Further information:

Outstanding State or National Resource Water (OSNRWs), Exceptional Waters (EWs), and Coldwater Aquatic Habitat Waters (CAHs) are waters designated by the Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet. The list can be found at the following link: http://eppcapp.ky.gov/spwaters/

Information on Pre-Construction Notification (PCN) can be found at NWP General Condition No. 32 in the Federal Register (Volume 81, No. 105 of June 1, 2017, pp 35211).

COORDINATING RESOURCE AGENCIES

Chief, Wetlands Regulatory Section
U.S. Environmental Protection Agency
Region IV
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

Supervisor
U.S. Fish & Wildlife Service
JC Watts Federal Building, Room 265
330 West Broadway
Frankfort, Kentucky 40601

Supervisor
401 Water Quality Certification
Kentucky Division of Water
300 Sower Boulevard, 3rd Floor
Frankfort, KY 40601

Commissioner
Department of Fish and Wildlife Resources
#1 Game Farm Road
Frankfort, Kentucky 40601

Executive Director and State Historic Preservation Officer
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

ADDITIONAL COORDINATING RESOURCE AGENCY FOR NWPS 21, 49, AND 50

Kentucky Department for Natural Resources
Division of Mine Permits
300 Sower Boulevard
Frankfort, KY 40601

Terms for Nationwide Permit No. 14
Linear Transportation Projects

Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

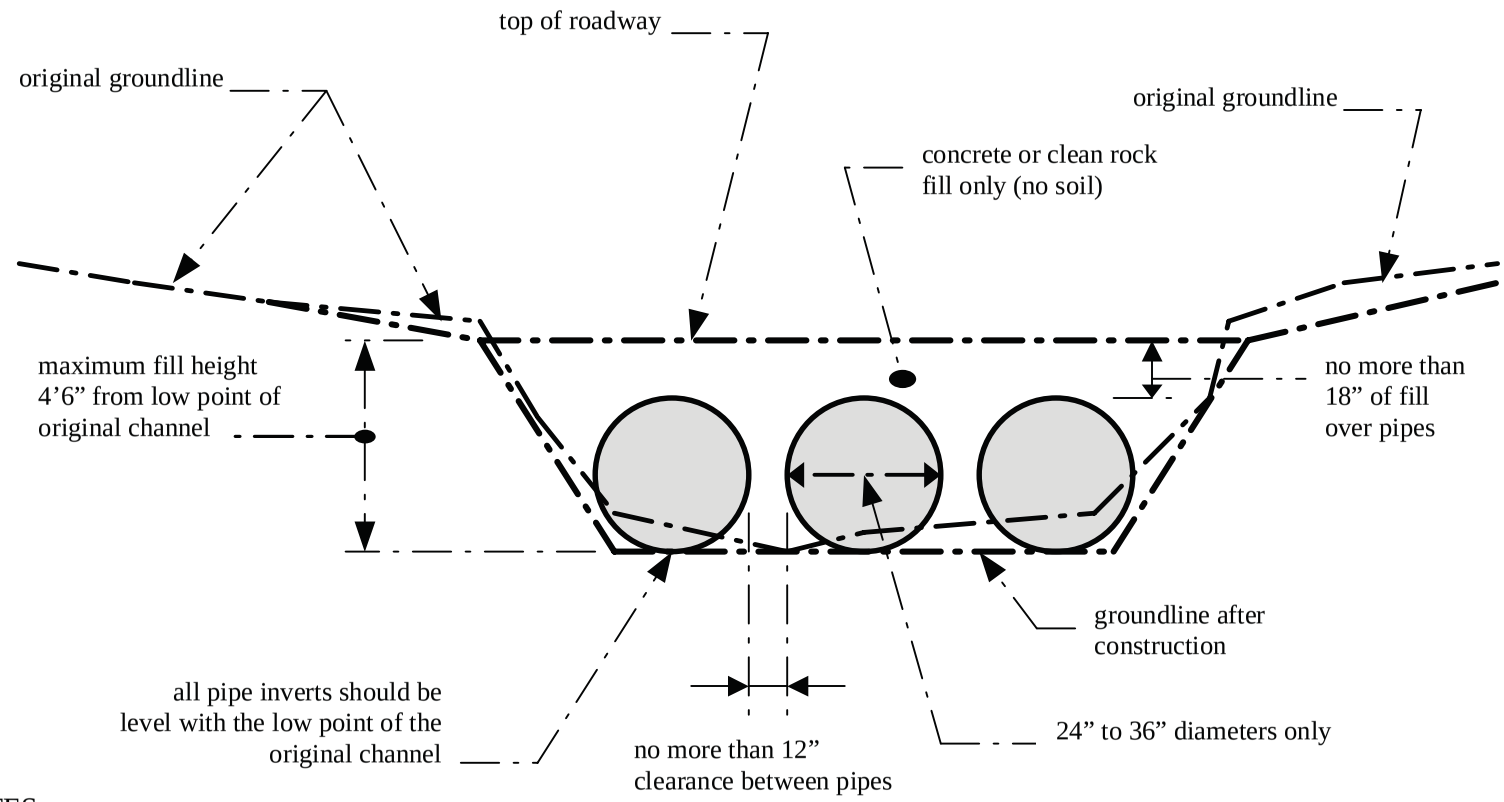
Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: For linear transportation projects crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, “District Engineer’s Decision.” The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

ATTACHMENT 1



NOTES:

1. This is a conceptual drawing. The number and size of pipes and other details will vary depending on specific site conditions.
2. The pipes and backfill must be contained within the stream channel as shown above. During the construction of the approaches and access roadway across the floodplain, unstable and unconsolidated materials unsuitable for roadways may be excavated and replaced with riprap, crushed stone, or other stable road construction materials. This may only be done, however, with the following provisions: (1) the disposal of excess, unconsolidated materials thus excavated must be outside of the floodplain and (2) the finished surface of the completed road may be no more than three inches (3") above the pre-construction surface of the floodplain at any point beyond the top of banks.

LOW-WATER CROSSING

STANDARD DRAWING
Not to Scale

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

December 11, 2017

Mr. David Waldner
Division of Environmental Analysis
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40601

Re: FWS 2017-B-0577; KYTC Item No. 8-6.1, I-75 Widening in Rockcastle County, Kentucky

Dear Mr. Waldner:

Thank you for your letter and Biological Assessment (BA) received November 16, 2017 evaluating the potential effects of the subject project proposal on the federally-listed gray bat, Virginia big-eared bat, Indiana bat, and northern long-eared bat (NLEB). The U.S. Fish and Wildlife Service (Service) has reviewed the document and offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

According to the information provided, the Kentucky Transportation Cabinet (KYTC) proposes to widen 4.4 miles of I-75 from four to six lanes, from 1.0 miles north of the Sand Hill Road overpass in Rockcastle County, Kentucky (mile point 60.1) to the previously widened roadway. The proposed widening would be constructed toward the center of the roadway. Impacts to the landscape include typical road construction activities, tree removal for construction access, and grading to allow for proper drainage.

Gray Bat *(Myotis grisescens)*
Virginia Big-eared Bat *(Corynorhinus townsendii virginianus)*
According to the BA, Redwing Ecological Services qualified biologists conducted mist net surveys of the proposed project area from June 15, 2017 through June 28, 2017. In total, eight netting sites (32 net nights) were selected based on the species habitat suitability within and near the project corridor. The survey was conducted in accordance to the Service's "2017 Range-Wide Indiana Bat Summer Survey Guidelines" which may also be used for other, similar bat species. Five species of bats were captured totaling 84 bats; however, no federally listed species were captured. Therefore, we believe that the gray bat and Virginia long-eared bat are not likely to be using habitat in the proposed project area during the summer. In addition, the BA stated that there are no suitable hibernacula or year-round roosting habitats for these species within the proposed project vicinity. Based on the information available to us, the Service concurs that the proposed project is not likely to adversely affect the gray bat or Virginia big-eared bat.

Indiana bat *(Myotis sodalis)*
Northern Long-eared Bat *(Myotis septentrionalis)*
Based on the aforementioned mist-netting survey results, the Indiana bat and NLEB are presumed absent from the project corridor during the summer maternity/roosting period. Further, no suitable hibernacula for these species were identified within the proposed project vicinity; therefore, it is not anticipated that the proposed action would impact wintering Indiana bats, NLEBs, and/or their winter habitat. However, the proposed action would result in indirect adverse effects to both species from the removal of Indiana bat "Known Swarming 1" habitat, and NLEB "Known Swarming 2" habitat. KYTC has committed to avoid tree clearing activities between the dates of August 16 – November 15, which is the occupied timeframes within known swarming habitat. This conservation measure would minimize potential direct effects on swarming Indiana bats and NLEBs.

As previously discussed, the proposed action requires the removal of approximately 38.16 acres of "Known Swarming 1" forested habitat for the Indiana bat, and "Known Swarming 2" forested habitat for the NLEB. KYTC has determined that the action "may affect, is likely to adversely affect" the Indiana bat and NLEB, and proposes to account for potential adverse effects to these species and their habitat through the processes identified in the 2015 Interim Programmatic Agreement for Forest Dwelling bats between the Federal Highway Administration (FHWA), KYTC, and the Service's Kentucky Field Office. The Service concurs with KYTC's effects determination for the Indiana bat and NLEB, and agrees with the proposed ESA compliance process

In view of these findings we believe that the requirements of section 7 of the Endangered Species Act have been fulfilled for this project. Your obligations under section 7 must be reconsidered, however, if: (1) new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Phil DeGarmo at (502) 695-0468 extension 110 or Phil_DeGarmo@fws.gov.

Sincerely,

Jennifer Garland

for Virgil Lee Andrews, Jr.
Field Supervisor

KYTC Item No: 8-6.10 County: Rockcastle

Route: I-75

Are there Historical Resources (50 years old or older) identified within the project APE based on field investigations?

☐ Yes

☑ No

Date of Field Investigation: N/A

Investigator Name(s):

Discuss Basis for finding
(Historic Mapping, PVA, Building Permit, Date of Construction, Deed/Title, etc.):

NRHP listed or potentially eligible sites/districts (> 50 years old) are:

☑ Not Present within the APE

No Historic Properties Affected

As Determined By:

_____ 11/28/17
KYTC Representative **Date**

_____ 12-4-17
SHPO Representative **Date**

(Concurrence is assumed if no response is received within 30 days)

Attachments:

☑ Map showing topography, APE and identified Historic Resources

☑ Relevant Photos (Overview and individual resources)

☑ Project Plans

☐ Other (Describe): _____

☑ Copy EPM

☑ Copy DEC

☑ Copy DEA Architectural Historian

☑ Copy SHPO

KYTC Item No: 8-6.1 County: Rockcastle

Route: I-75

No Historic Properties Affected

As Determined By:

10/11/17

KYTC Representative **Date**

10.12.17

SHPO Representative **Date**

(Concurrence is assumed if no response is received within 30 days)

Attachments

- ☑ Project Plans (show date on plans)
- ☑ Photos
- ☑ Mapping
- ☐ Other: _____
- ☑ Copy EPM
- ☑ Copy DEC
- ☑ Copy DEA Archaeologist
- ☑ Copy SHPO

If the project plans change then additional archaeological survey may be required. If human remains are discovered or a previously unidentified archaeological site is encountered, work must cease and the KYTC Division of Environmental Analysis be notified immediately.

KYTC Item No: 8-6.1 County: Rockcastle

Route: I-75

KYTC Archaeological Investigation Form

Project Description: Widen I-75 to 6 lanes. All work will be within the existing right-of-way.

USGS Quad Name: Mount Vernon

USGS Date: 1993

Coordinates (Project center point) -84.307912 37.341964 Decimal Degrees

Project Type listed in Attachment 1 (in Section 106 Programmatic Agreement)?

☐ Yes (list project activity types) _____

☑ No (Continue)

Project Type listed in Attachment 2 (in Section 106 Handbook)?

☑ Yes (list project activity types) 9 - Modernization of highway (lanes)

Are all new or existing ROW areas previously disturbed?

☑ Yes (Describe disturbance or basis for conclusion. Attach photos or maps):

All areas within the existing ROW have been previously disturbed by the construction of the interstate (blasting, earth moving, drainage reconstruction, clearing and grubbing, utilities, etc.). Archived plans, historic aerials, and inspection of the project were used to confirm this.

KYTC Item No: 8-6.1 County: Rockcastle

Route: I-75

No Historic Properties Affected

As Determined By:

10/11/17

KYTC Representative **Date**

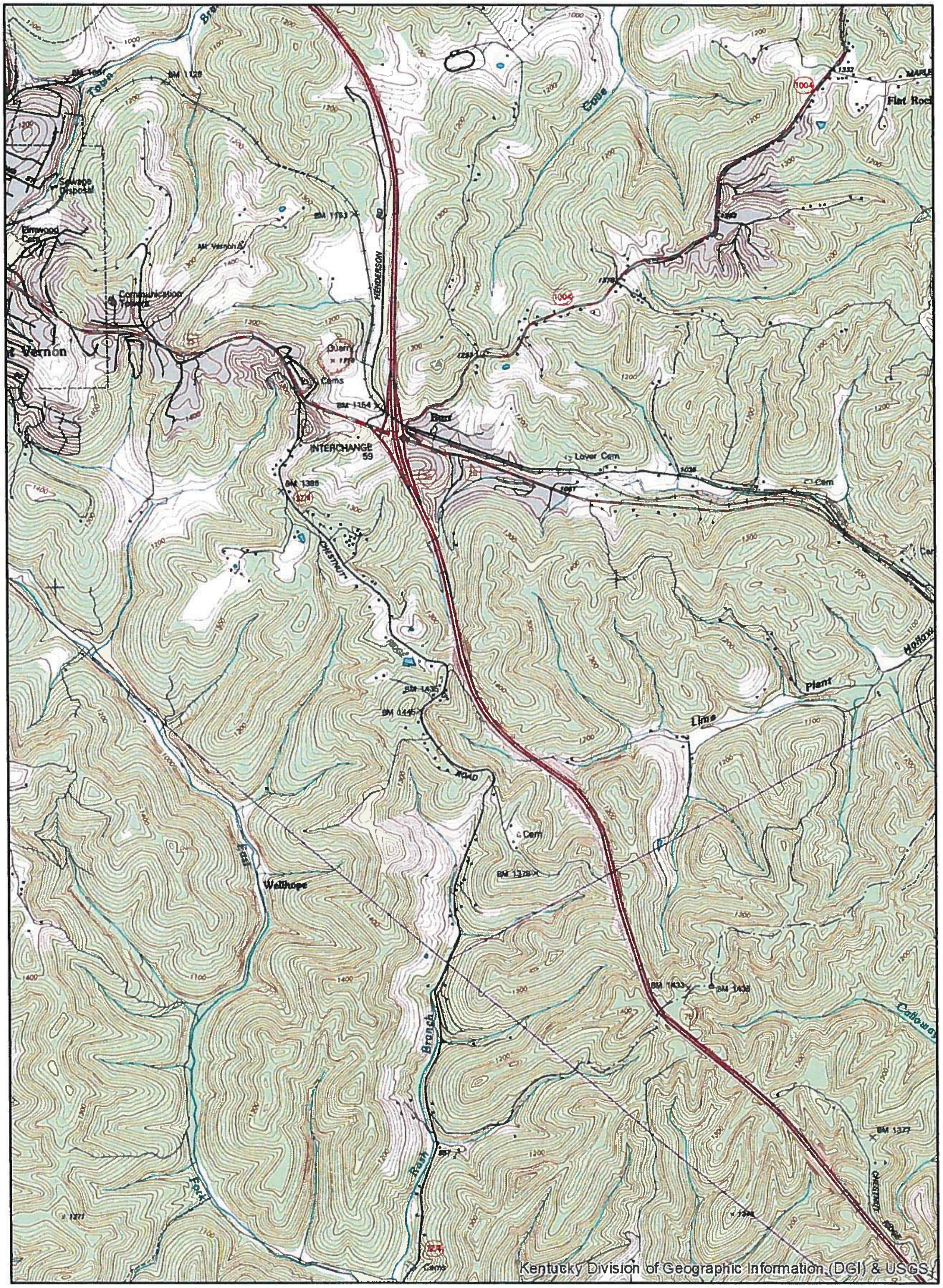
SHPO Representative **Date**

(Concurrence is assumed if no response is received within 30 days)

Attachments

- ☑ Project Plans (show date on plans)
- ☑ Photos
- ☑ Mapping
- ☐ Other: _____
- ☑ Copy EPM
- ☑ Copy DEC
- ☑ Copy DEA Archaeologist
- ☑ Copy SHPO

If the project plans change then additional archaeological survey may be required. If human remains are discovered or a previously unidentified archaeological site is encountered, work must cease and the KYTC Division of Environmental Analysis be notified immediately.


Flat Rock
Sewage Disposal
Elmwood Cem
Communication Towers
Quarry
Cems
INTERCHANGE 59
HENDERSON RD
Lower Cem
Cem
Lime
Plant
Wellhope
Branch
Fork
Kentucky Division of Geographic Information (DGI) & USGS

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R1

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

PLANS OF
PROPOSED PROJECT
I-75 ROCKCASTLE COUNTY
GRADE, DRAIN, & SURFACING PLAN

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
R1	LAYOUT SHEET
R2-R2N	TYPICAL SECTIONS-SUMMARY OF QUANTITIES
R3-R3I	PLAN AND PROFILE SHEETS
R32-R49	DETAIL SHEETS
R50-R84	TRAFFIC CONTROL SHEETS
R85-R97	EROSION CONTROL SHEETS
R98-R103	COORDINATE CONTROL SHEETS
R104-R142	PIPE DRAINAGE SHEETS
R143-	GEOTECHNICAL SHEETS
SI-	STRUCTURE PLANS
TI-24	SIGNING PLANS
T25-T33	LIGHTING PLANS
T34-	CAMERA PLANS
XI-X460	CROSS SECTION SHEETS

SHEETS NOT INCLUDED IN TOTAL SHEETS

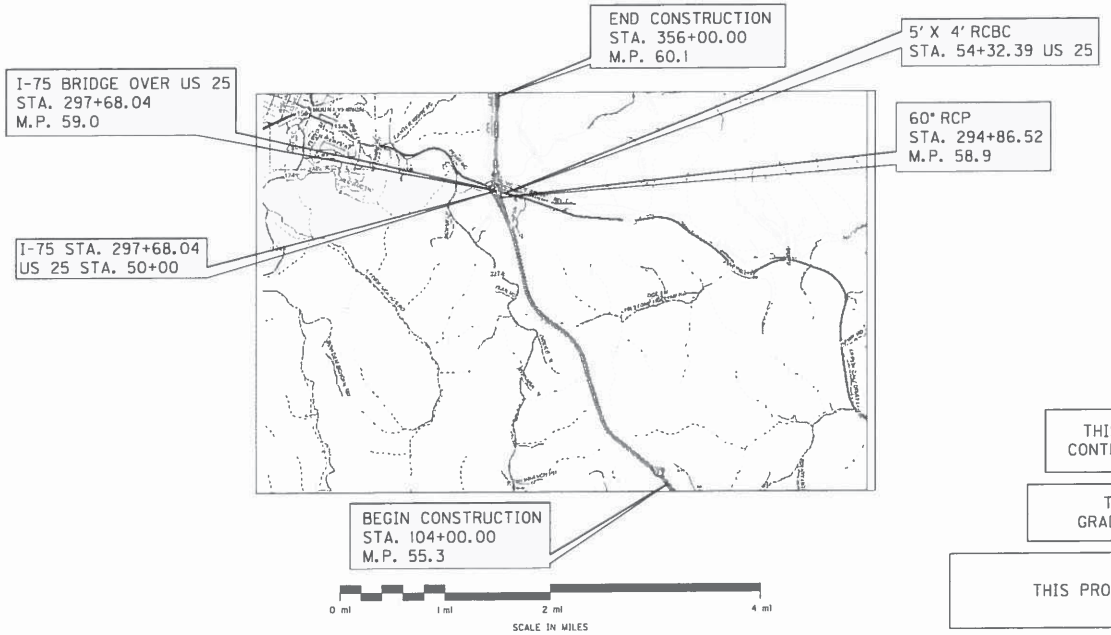
R2A-R2N
R16A

STANDARD DRAWINGS

NUMBER

RBB-001	RDI-001	TPM-100
RBC-002	RDI-002	TPM-115
RBC-003	RDI-003	TPM-125
RBC-005	RDI-004	TPM-135
RBC-006	RDI-020	TPM-165
RBE-060	RDI-021	TPM-170
RBE-100	RDI-025	TPM-171
RBI-001	RDI-026	TTC-100
RBI-002	RDI-040	TTC-115
RBI-003	RDI-041	TTC-120
RBI-004	RDM-001	TTC-135
RBI-005	RDM-010	TTC-155
RBM-001	RDM-011	TTC-160
RBM-015	RDM-012	TTD-120
RBM-020	RDM-013	TTD-125
RBM-050	RDM-055	TTS-120
RBM-115	RDM-100	TTS-125
RBM-120	RDP-001	TTS-130
RBR-001	RDP-005	TTS-135
RBR-005	RDP-006	
RBR-010	RDP-007	
RBR-015	RDP-010	
RBR-020	RDX-001	
RBR-025	RDX-002	
RBR-030	RDX-160	
RBR-055	RDX-210	
RDB-001	RDX-220	
RDB-002	RDX-225	
RDB-003	RDX-230	
RDB-100	RFW-005	
RDB-101	RGS-001	
RDB-231	RGS-002	
RDB-241	RGX-001	
RDD-001	RGX-002	
RDD-021	RGX-005	
RDD-040	RGX-010	
RDH-020	RGX-060	
RDH-110	RGX-061	
RDH-210	RGX-065	
RDH-310	RGX-100	
	RGX-105	
	RGX-200	

TOTAL STANDARD DRAWINGS: 99



LAYOUT MAP

THIS PROJECT IS A FULLY CONTROLLED ACCESS HIGHWAY

THESE PLANS ARE FOR GRADE, DRAIN, & SURFACING

THIS PROJECT IS ON THE NH SYSTEM

DESIGN CRITERIA

CLASS OF HIGHWAY	INTERSTATE
TYPE OF TERRAIN	ROLLING
DESIGN SPEED	70 MPH
REQUIRED NPSD	730 FT
REQUIRED PSD	N/A
LEVEL OF SERVICE	D
ADT PRESENT (2015)	45,210
ADT FUTURE (2022)	59,200
DHV	
D %	
T %	28.2%

GEOGRAPHIC COORDINATES

LATITUDE 37 DEGREES 20 MINUTES 31 SECONDS NORTH
LONGITUDE 84 DEGREES 18 MINUTES 28 SECONDS WEST

DESIGNED

% RESTRICTED SD	
LEVEL OF SERVICE	D
MAX. DISTANCE W/O PASSING	

LENGTH 25,200 LIN. FT. 4.773 MILES	LENGTH ____ LIN. FT. ____ MILES	LENGTH ____ LIN. FT. ____ MILES	LENGTH ____ LIN. FT. ____ MILES
ADDED / DEDUCTED FOR EQUALITIES ____ LIN. FT.	ADDED / DEDUCTED FOR EQUALITIES ____ LIN. FT.	ADDED / DEDUCTED FOR EQUALITIES ____ LIN. FT.	ADDED / DEDUCTED FOR EQUALITIES ____ LIN. FT.
NOT INCLUDED	NOT INCLUDED	NOT INCLUDED	NOT INCLUDED
RAILROAD CROSSINGS NO. ____ LIN. FT.	RAILROAD CROSSINGS NO. ____ LIN. FT.	RAILROAD CROSSINGS NO. ____ LIN. FT.	RAILROAD CROSSINGS NO. ____ LIN. FT.
BRIDGES 244.5 LIN. FT.	BRIDGES ____ LIN. FT.	BRIDGES ____ LIN. FT.	BRIDGES ____ LIN. FT.

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS
COUNTY OF
ROCKCASTLE

ITEM NO. 8-6.10
PROJECT NUMBER: NH 0752 (066)
FD52 102 0075 055-061
LETTING DATE:

RECOMMENDED BY: _____ PROJECT MANAGER DATE:

PLAN APPROVED BY: _____ STATE HIGHWAY ENGINEER DATE:

Stantec
3052 Beaumont Centre Circle
Lexington, Ky. 40513
Phone (859) 233-2100

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R4

LT. STA. 104+00 TO STA. 120+00
CONST. 1550' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 1 - END TREATMENT TY. 1 AND TIE TO EXISTING GUARDRAIL

LT. STA.104+00.00 TO LT. STA.130+00 REMOVE AND REPLACE 2812' OF TY.1 WOVEN WIRE FENCE

STA. 104+00.00 TO STA. 130+00
CONST. 2475' CONC. MEDIAN BARRIER WALL TYPE 12C-50

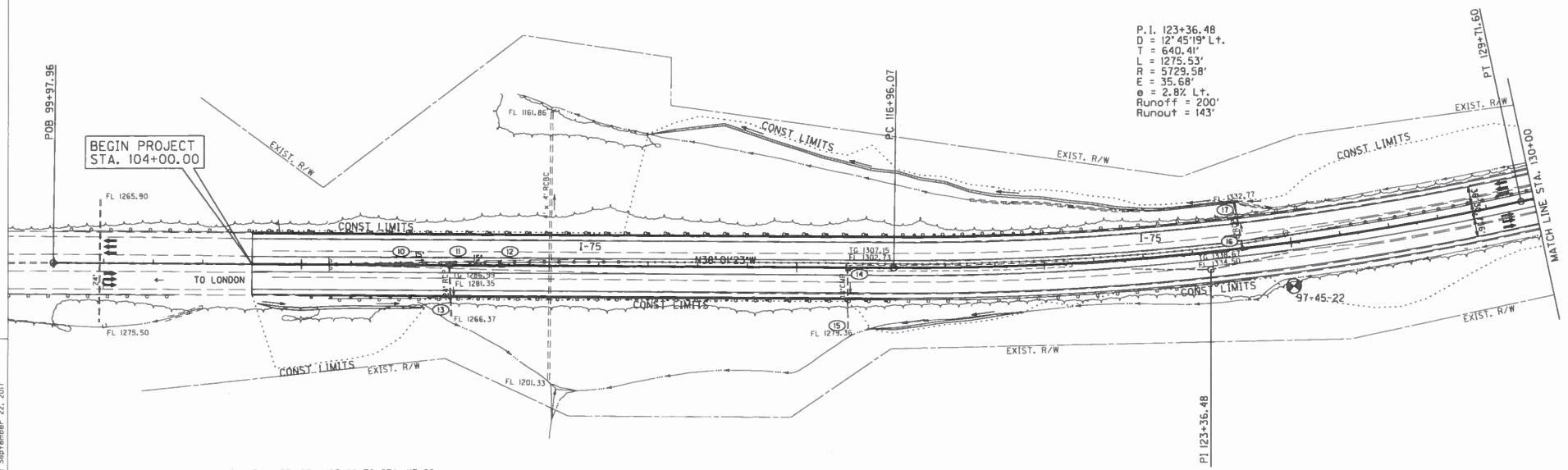
STA. 104+00.00 TO STA. 104+14.00
REMOVE 14' CONC. MEDIAN BARRIER WALL (REMOVE BARRIER WALL INCIDENTAL TO BID ITEM "CONC. MEDIAN BARRIER WALL TYPE 12C-50")

STA. 104+14 REMOVE EXISTING CRASH CUSHION

STA. 104+00.00 TO STA. 104+36.00
TRANSITION EXISTING 32" MEDIAN BARRIER WALL TO MEDIAN BARRIER WALL TYPE 12C-50

TOTAL GUARDRAIL REMOVAL THIS SHEET - 3990'

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	112+50	-	123+95	4' FB SPCL	CL III	1.0'	1130 TON
LT	123+95	-	125+00	V' SPCL	N/A		
LT	125+00	-	130+00	NORM	N/A		



RT. STA.104+00.00 TO RT. STA.130+00 REMOVE AND REPLACE 2713' OF TY.1 WOVEN WIRE FENCE

RT. STA. 105+00 TO STA. 117+00
CONST. 1150' STEEL "W" BEAM GUARDRAIL, SINGLE FACE,
1 - END TREATMENT TY. 1 AND
1 - END TREATMENT TY. 2A

STA. 105+55 TO 130+00
REMOVE 2445 LF CABLE GUARDRAIL BARRIER SYSTEM AND 1 - END ANCHOR

I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. / T.G.	I.E.	F.L.	O.E.
10	107+00.00		1288.79	1284.98	
11	107+98.32		1288.61	1281.37	
12	109+00.00		1289.05	1285.06	
13	108+03.53				EX. 1266.37
14	116+02.63		1308.86	1302.80	
15	116+04.72				EX. 1279.36
16	124+01.89		1339.98	1334.40	
17	123+95.30				1332.63

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	104+50	-	107+00	5' FB SPCL	N/A		
RT	117+00	-	119+00	4' FB SURF	CL II	1.0'	94 TON
RT	125+00	-	130+00	NORM	N/A		

SCALE: 1"=100'

0' 100' 200' 400'

I-75
PLAN SHEET
STA. 104+00 TO STA. 130+00

FILE NAME: V:\1785\ACTIVE\178568D01\TRANSPORTATION\DESIGN\DRAWING\PLAN_SHEETS\PL_10000.DGN
USER: hlowier
DATE PLOTTED: September 22, 2017
E-SHEET NAME:
MicroStation v8.11.9.832

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R6

130+00 135+00 140+00 145+00 150+00 155+00 160+00

TOTAL GUARDRAIL REMOVAL
THIS SHEET - 1075'

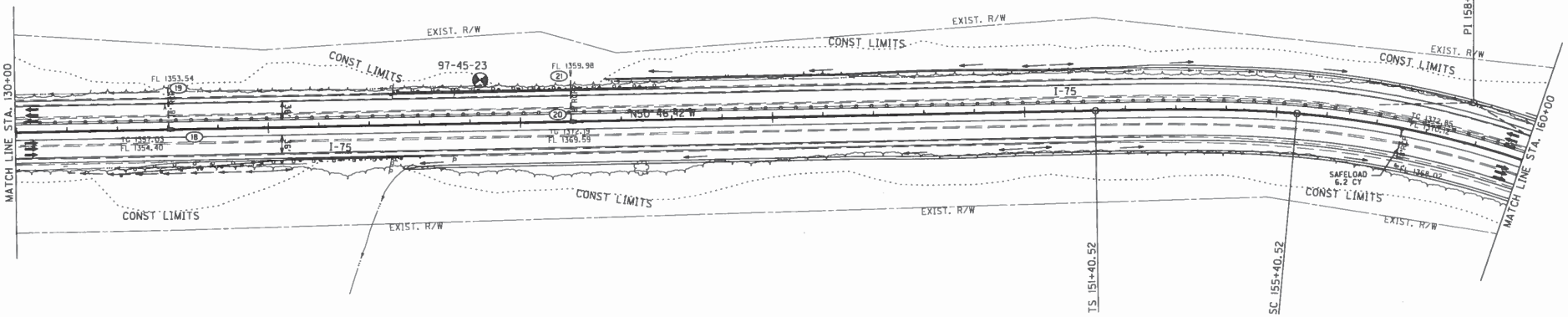
STA. 130+00 TO STA. 160+00
CONST. 2925' CONC. MEDIAN
BARRIER WALL TYPE 12C-50

LT. STA. 137+50 TO STA. 142+50
CONST. 450' STEEL "W" BEAM
GUARDRAIL, SINGLE FACE,
1 - END TREATMENT TY. 1 AND
1 - END TREATMENT TY. 2A

LT. STA.130+00 TO LT. STA.160+00 REMOVE
AND REPLACE 3072' OF TY.1 WOVEN WIRE FENCE

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	130+00	-	136+50	NORM	N/A		
LT	136+50	-	139+50	NORM	ECB		400 SQYD
LT	142+00	-	142+50	2.5' FB SPCL	CL II	1.0'	62 TON
LT	142+50	-	152+50	2.5' FB SPCL	N/A		
LT	152+50	-	160+00	5' FB SPCL	N/A		

P.I. 158+90.92
D = 32°15'30" Rt.
Ts = 750.40'
Ls = 400.00'
Lc = 669.74'
fs = 6°01'52"
LT = 266.82'
ST = 133.47'
R = 1900.00'
E = 81.50'
e = 8.3% Rt.
Runoff = 400'
Runout = 100'



RT. STA. 132+00 TO STA. 138+00
CONST. 600' STEEL "W" BEAM
GUARDRAIL, SINGLE FACE,
2 - END TREATMENT TY. 2A

RT. STA.130+00 TO RT. STA.160+00 REMOVE
AND REPLACE 2943' OF TY.1 WOVEN WIRE FENCE

I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R / T.G.	I.E.	F.L.	O.E.
18	133+02.17		1360.23	1354.38	
19	133+01.66				EX. 1353.54
20	141+00.35		RT. 1375.66 LT. 1375.66	1369.52	
21	141+00.63				EX. 1359.98
22-26	NOT USED				

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	130+00	-	131+50	NORM	N/A		
RT	131+50	-	135+50	V' SPCL	N/A		
RT	138+00	-	150+00	5' FB SPCL	N/A		
RT	150+00	-	160+00	5' FB SPCL	CL II	1.0'	694 TON

STA. 130+00 TO 160+00
REMOVE 3000 LF CABLE
GUARDRAIL BARRIER SYSTEM

0' 100' 200' 400'

SCALE: 1"=100'

I-75
PLAN SHEET
STA. 130+00 TO STA. 160+00

MicroStation V8.11.9.832 | E-SHEET NAME: | USER: dmcculough | DATE PLOTTED: September 22, 2017 | FILE NAME: V:\185\ACTIVE\185660\S\TRANSPORTATION\DESIGN\DRAWING\PLAN_SHEETS\PL_13000.DGN

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R8

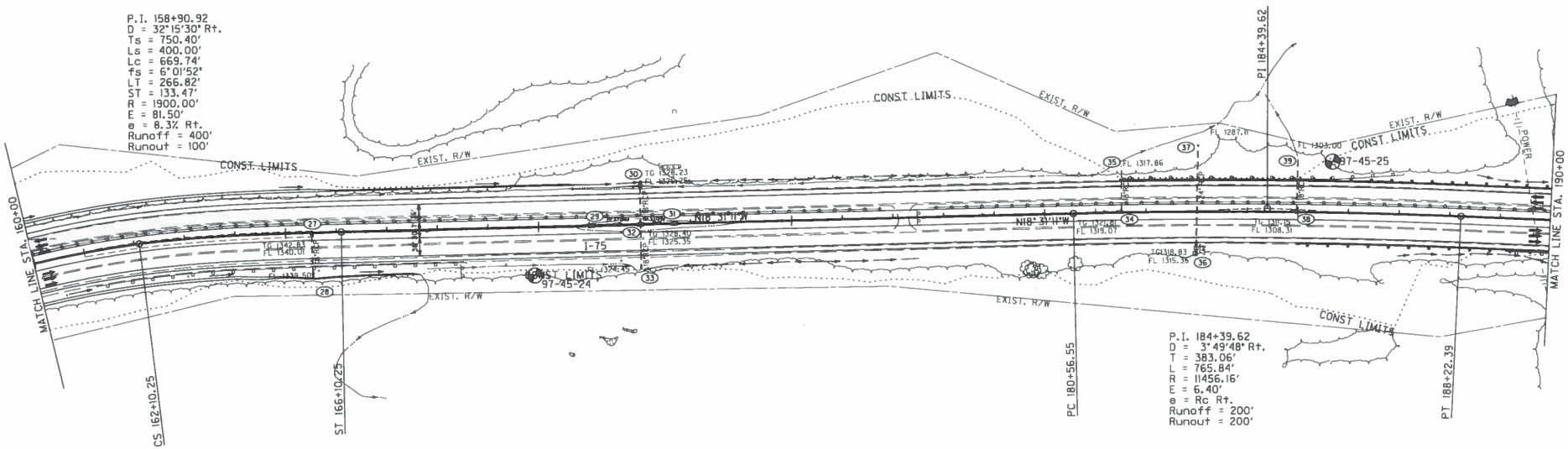
TOTAL GUARDRAIL REMOVAL
THIS SHEET - 1375'

STA. 160+00 TO STA. 190+00
CONST. 2850' CONC. MEDIAN
BARRIER WALL TYPE 12C-50

LT. STA. 181+50 TO STA. 190+00
CONST. 850' STEEL 'W' BEAM
GUARDRAIL, SINGLE FACE AND
1 - END TREATMENT TY. 2A

LT. STA.160+00 TO LT. STA.190+00 REMOVE
AND REPLACE 3147' OF TY.1 WOVEN WIRE FENCE

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	160+00	-	165+50	5' FB SPCL	N/A		
LT	165+50	-	171+00	2' FB SPCL	CL II	1.0'	247 TON
LT	171+50	-	174+50	V' SPCL	N/A		
LT	175+50	-	178+00	V' SPCL	N/A		
LT	178+50	-	181+00	NORM	N/A		
LT	185+50	-	190+00	NORM	N/A		



RT. STA.160+00 TO RT. STA.190+00 REMOVE
AND REPLACE 2968' OF TY.1 WOVEN WIRE FENCE

I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R / T.G.	I.E.	F.L.	O.E.
27	165+51.52		1345.83	1340.03	
28	165+53.09				1339.49
29	171+11.11		LT. 1332.08 RT. 1332.08	1328.25	
30	172+01.82	1329.19		1326.35	
31	172+64.11		LT. 1332.10 RT. 1332.10	1328.27	
32	172+01.69		LT. 1331.89 RT. 1331.89	(15") 1325.42 (18") 1325.45 (OUT) 1325.40	
33	172+01.56				EX. 1324.45
34	181+51.37		1325.20	1319.08	
35	181+52.50				EX. 1317.86
36	182+96.88	1318.54		1315.34	
JUNCT. BOX	182+99.17		1314.87	1314.79	
37	183+02.52				EX. 1287.11
38	184+97.39		1314.81	1308.32	
39	184+98.00				EX. 1303.00

LT. STA. 185+00 TO STA. 190+00
CONST. 450' STEEL 'W' BEAM
GUARDRAIL, SINGLE FACE AND
1 - END TREATMENT TY. 1

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	160+00	-	165+00	5' FB SPCL	CL II	1.0'	347 TON
RT	165+00	-	167+50	2' FB SPCL	CL II	1.0'	170 TON
RT	168+50	-	172+00	NORM	CL II	1.0'	237 TON
RT	172+50	-	174+50	V' SPCL	ECB		333 SQYD
RT	175+50	-	177+00	V' SPCL	N/A		
RT	177+50	-	190+00	NORM	N/A		

STA. 160+00 TO 176+77
REMOVE 1677 LF CABLE
GUARDRAIL BARRIER SYSTEM
AND 1 - END ANCHOR

STA. 177+70 TO 190+00
REMOVE 1230 LF CABLE
GUARDRAIL BARRIER SYSTEM
AND 1 - END ANCHOR

0' 100' 200' 400'

SCALE: 1"=100'

I-75
PLAN SHEET
STA. 160+00 TO STA. 190+00

FILE NAME: V:\1785\ACTIVE\178566D1\TRANSPORTATION\DESIGN\DRAWING\PLAN_SHEETS\PL_I6000.DGN
USER: hiowar
DATE PLOTTED: September 22, 2017
E-SHEET NAME:
MicroStation v8.11.9.832

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R10

TOTAL GUARDRAIL REMOVAL
THIS SHEET - 5076'

190+00 195+00 200+00 205+00 210+00 215+00 220+00

LT. STA. 190+00 TO STA. 192+50
CONST. 200' STEEL "W" BEAM
GUARDRAIL, SINGLE FACE AND
1 - END TREATMENT TY. 1

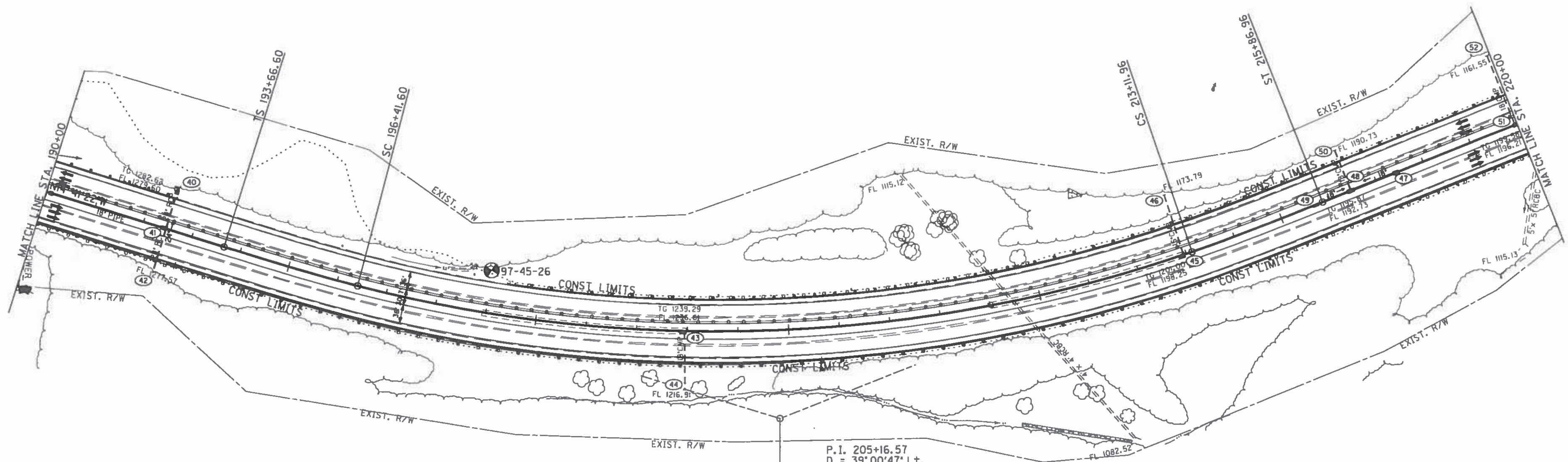
STA. 190+00 TO STA. 220+00
CONST. 2825' CONC. MEDIAN
BARRIER WALL TYPE 12C-50

LT. STA. 190+00 TO LT. STA. 220+00 REMOVE
AND REPLACE 2923' OF TY. 1 WOVEN WIRE FENCE

LT. STA. 199+50 TO STA. 220+00
CONST. 2050' STEEL "W" BEAM
GUARDRAIL, SINGLE FACE AND
1 - END TREATMENT TY. 2A

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	190+00	-	198+00	NORM	N/A		

STA. 190+10 TO STA. 192+45
DO NOT DISTURB SPRING BOX INLET
AND CONNECTO CMMBI AT STA. 192+45



P.I. 205+16.57
D = 39°00'47" Lt.
Ts = 1149.97'
Ls = 275.00'
Lc = 1670.36'
fs = 2°45'27"
LT = 183.36
ST = 91.69
R = 2857.00'
E = 175.14'
e = 5.5% Lt.
Runoff = 275'
Runout = 100'

I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. / T.G.	I.E.	F.L.	O.E.
40	192+45.58	1282.41		1279.70	
41	192+46.26		LT. 1284.90 RT. 1284.90	(IN) 1278.66 (OUT) 1278.62	
42	192+46.94				EX. 1277.57
43	202+94.39		1242.02	1236.49	
44	202+98.55				EX. 1216.91
45	212+94.15		1203.45	1198.49	
46	212+95.31				EX. 1173.79
47	217+38.54		LT. 1199.65 RT. 1199.65	1195.82	
48	216+47.06		LT. 1199.60 RT. 1199.48	(IN) 1192.75 (OUT) 1192.71	
49	215+76.54		1199.74	1195.65	
50	216+47.06				EX. 1190.73
51	219+95.35		LT. 1203.18 RT. 1203.18	1196.02	
52	219+94.10				1161.55

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	190+00	-	192+00	NORM	N/A		

RT. STA. 190+00 TO STA. 220+00
CONST. 3000' STEEL "W" BEAM
GUARDRAIL, SINGLE FACE

RT. STA.190+00 TO RT. STA.220+00 REMOVE
AND REPLACE 3242' OF TY.1 WOVEN WIRE FENCE

STA. 190+00 TO 220+00
REMOVE 3000 LF CABLE
GUARDRAIL BARRIER SYSTEM

0' 100' 200' 400'

SCALE: 1"=100'

I-75
PLAN SHEET
STA. 190+00 TO STA. 220+00

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R12

LT. STA. 220+00 TO LT. STA. 245+40 REMOVE AND REPLACE 2779' OF TY.1 WOVEN WIRE FENCE

STA. 220+00 TO STA. 250+00
CONST. 2950' CONC. MEDIAN BARRIER WALL TYPE 12C-50

TOTAL GUARDRAIL REMOVAL THIS SHEET - 3115'

LT. STA. 247+40 TO LT. STA. 250+00 REMOVE AND REPLACE 264' OF TY.1 WOVEN WIRE FENCE

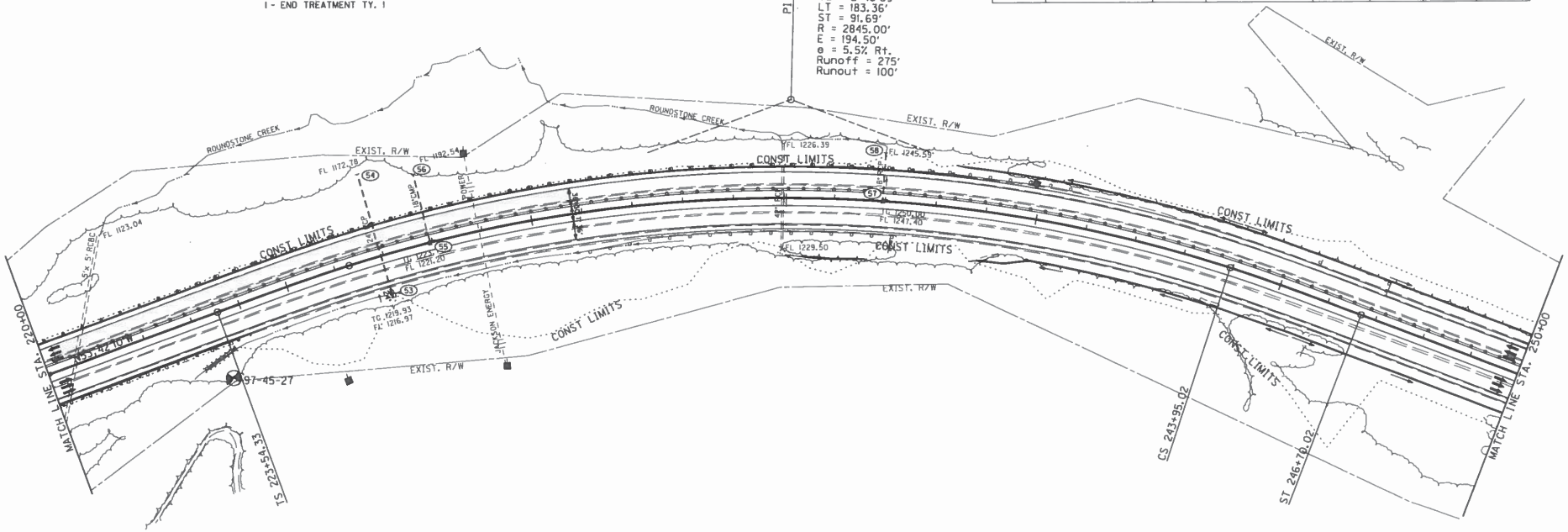
220+00 225+00 230+00 235+00 240+00 245+00 250+00

LT. STA. 220+00 TO STA. 238+50
CONST. 1800' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND
1 - END TREATMENT TY. 1

P.I. 235+58.70
D = 41°05'52" Rt.
Ts = 1204.37'
Ls = 275.00'
Lc = 1765.69'
fs = 2°46'09"
LT = 183.36'
ST = 91.69'
R = 2845.00'
E = 194.50'
e = 5.5% Rt.
Runoff = 275'
Runout = 100'

DITCHES I-75

SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	239+00	-	242+00	2' FB DT	CL II	1.0'	194 TON
LT	242+00	-	246+00	2' FB DT	ECB		533 SQYD
LT	246+00	-	250+00	2' FB DT	CL II	1.0'	229 TON



RT. STA. 222+93.82 TO STA. 223+63.63
REMOVE 42 SQ. YDS. EXISTING PAVED DITCH
REPLACE W/ 74' CLASS III CHANNEL LINING
(42 TONS, D-1.0', T=2.0', 42 SQ. YDS. OF
TYPE I GOETEXTILE FABRIC)

RT. STA. 220+00 TO STA. 224+00
CONST. 400' STEEL "W" BEAM
GUARDRAIL, SINGLE FACE AND
1 - END TREATMENT TY. 2A

RT. STA. 220+00 TO RT. STA. 250+00 REMOVE
AND REPLACE 2898' OF TY.1 WOVEN WIRE FENCE

I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS

STRUCTURE	STA.	T.R. / T.G.	I.E.	F.L.	O.E.
53	226+95.63	1220.00		1217.03	
JUNCT. BOX	226+95.57		1216.32	1216.24	
54	226+94.32				EX. 1172.78
55	227+95.40		1226.05	1220.85	
56	227+95.02				EX. 1192.54
57	236+94.79		1252.91	1247.39	
58	236+94.38				EX. 1245.59

DITCHES I-75

SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	224+00	-	234+00	NORM			
RT	235+00	-	236+50	2' FB SPCL	CL II	1.0'	58 TON
RT	239+50	-	245+50	2' FB SPCL	CL II	1.0'	309 TON
RT	245+50	-	250+00	2' FB SPCL	CL II	1.0'	258 TON

STA. 220+00 TO 250+00
REMOVE 3000 LF CABLE
GUARDRAIL BARRIER SYSTEM

0' 100' 200' 400'

SCALE: 1"=100'

I-75
PLAN SHEET
STA. 220+00 TO STA. 250+00

MicroStation v8.11.9.832 | E-SHEET NAME: | USER: hlowder | DATE PLOTTED: September 22, 2017 | FILE NAME: V:\1785\ACTIVE\178566DS\TRANSPORTATION\DESIGN\DRAWING\PLAN_SHEETS\PL_22000.DGN

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R14

LT. STA.250+00 TO LT. STA.280+00 REMOVE AND REPLACE 2975' OF TY.1 WOVEN WIRE FENCE

STA. 250+00 TO STA. 280+00
CONST. 2850' CONC. MEDIAN BARRIER WALL TYPE 12C-50

TOTAL GUARDRAIL REMOVAL THIS SHEET - 4687'

250+00 255+00 260+00 265+00 270+00 275+00 280+00

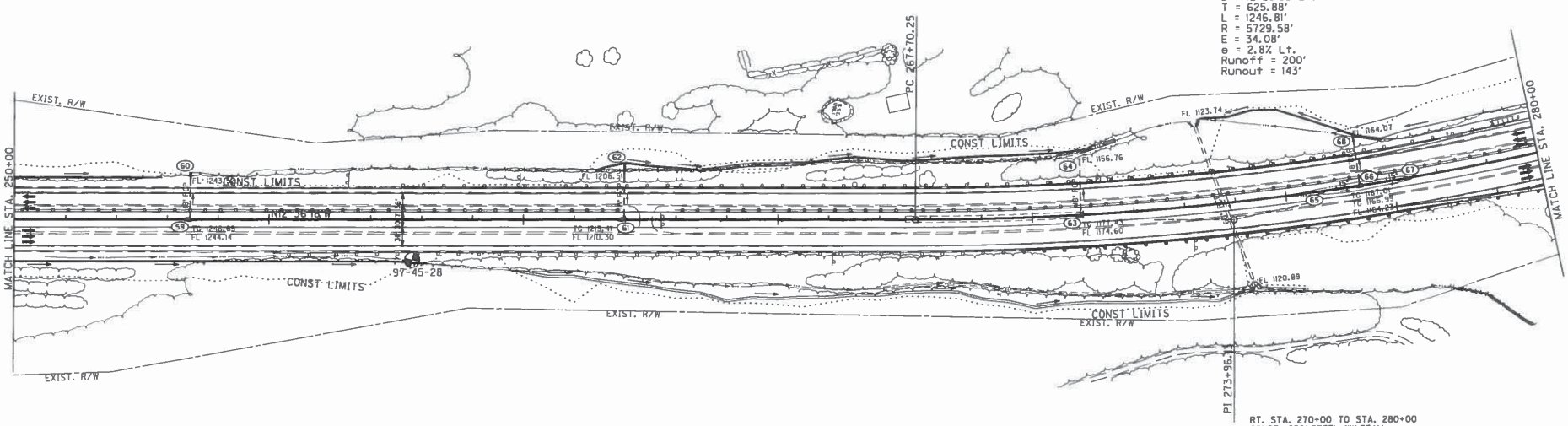
DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	250+00	-	252+50	2' FB SPCL	CL II	1.0'	143 TON
LT	261+50	-	263+00	2' FB SPCL	CL II	1.0'	90 TON
LT	266+00	-	270+50	2' FB SURF	CL II	1.0'	162 TON
LT	274+00	-	276+00	2' FB SURF	CL III	1.0'	229 TON
LT	276+00	-	277+50	2' FB SPCL	CL II	1.0'	81 TON
LT	277+50	-	280+00	15' FB SPCL	ROCK		

LT. STA. 263+49.61 TO STA. 265+85.87
REMOVE 143 SQ. YDS. EXISTING PAVED DITCH
REPLACE W/ 206' CLASS III CHANNEL LINING
(143 TONS, D-1.0', T=2.0', 143 SQ. YDS. OF TYPE I GOETEXTILE FABRIC)

LT. STA. 270+61.04 TO STA. 271+72.16
REMOVE 46 SQ. YDS. EXISTING PAVED DITCH
REPLACE W/ 71' CLASS III CHANNEL LINING
(46 TONS, D-1.0', T=2.0', 46 SQ. YDS. OF TYPE I GOETEXTILE FABRIC)

LT. STA. 270+00 TO STA. 276+25
CONST. 575' STEEL "W" BEAM GUARDRAIL, SINGLE FACE,
1 - END TREATMENT TY. 2A AND
1 - END TREATMENT TY. 1

P.I. 273+96.13
D = 12°28'05" Lt.
T = 625.88'
L = 1246.81'
R = 5729.58'
E = 34.08'
e = 2.8% Lt.
Runoff = 200'
Runout = 143'



RT. STA. 270+00 TO STA. 280+00
CONST. 950' STEEL "W" BEAM GUARDRAIL, SINGLE FACE,
1 - END TREATMENT TY. 1

RT. STA. 274+12.72 TO STA. 275+14.28
REMOVE 93 SQ. YDS. EXISTING PAVED DITCH
REPLACE W/ 102' CLASS III CHANNEL LINING
(93 TONS, D-1.0', T=2.0', 93 SQ. YDS. OF TYPE I GOETEXTILE FABRIC)

I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. / T.G.	I.E.	F.L.	O.E.
59	253+44.39		LT. 1249.92 RT. 1249.92	1244.13	
60	253+45.82				1243.50
61	261+97.68		LT. 1216.72 RT. 1216.72	1210.27	
62	261+98.33				1205.87
63	270+95.37		1180.69	1174.78	
64	270+98.32				EX. 1156.76
65	275+74.00		1170.87	1164.63	
66	276+46.61		1170.69	(IN) 1164.27 (OUT) 1164.23	
67	277+38.00		1170.96	1164.72	
68	276+46.73				EX. 1164.07

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	250+00	-	258+00	2' FB SPCL	CL II	1.0'	459 TON
RT	260+50	-	273+50	4' FB SURF	CL II	1.0'	612 TON

RT. STA.250+00 TO RT. STA.280+00 REMOVE AND REPLACE 3064' OF TY.1 WOVEN WIRE FENCE

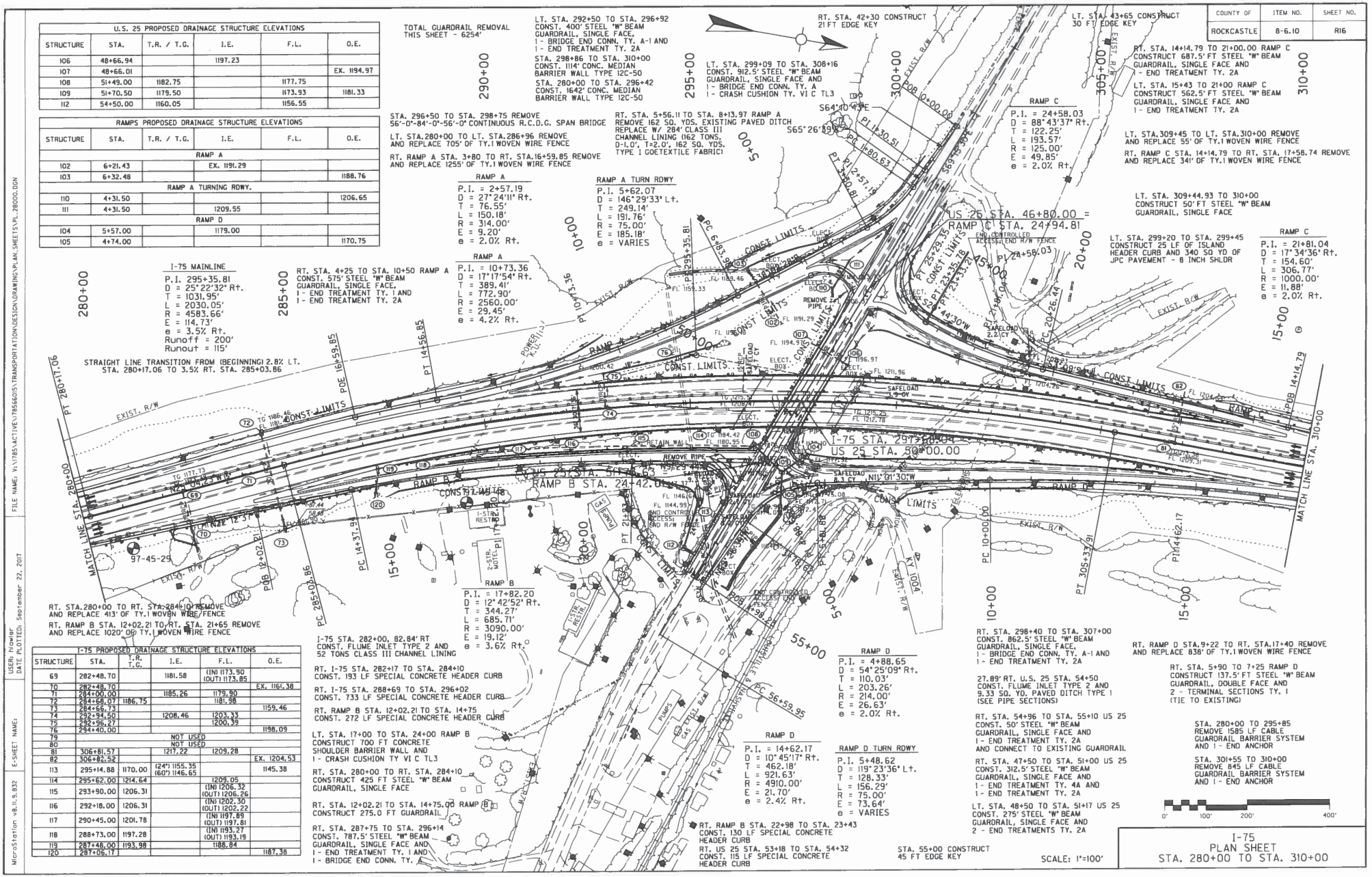
STA. 250+00 TO 280+00
REMOVE 3000 LF CABLE GUARDRAIL BARRIER SYSTEM

0' 100' 200' 400'

SCALE: 1"=100'

I-75
PLAN SHEET
STA. 250+00 TO STA. 280+00

USER: hlawler
DATE PLOTTED: September 25, 2017
FILE NAME: V:\1785\ACTIVE\178560105\TRANSPORTATION\DESIGN\DRAWING\PLAN SHEETS\PL_25000.DGN
E-SHEET NAME:
MicroStation v8.11.9.832



COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R16

U.S. 25 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. / T.G.	I.E.	F.L.	O.E.
106	48+66.94		1197.23		
107	48+66.01				EX. 1194.97
108	51+49.00	1182.75		1177.75	
109	51+70.50	1179.50		1173.93	1181.33
112	54+50.00	1160.05		1156.55	

RAMPS PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. / T.G.	I.E.	F.L.	O.E.
RAMP A					
102	6+21.43		EX. 1191.29		
103	6+32.48				1188.76
RAMP A TURNING RDWY.					
110	4+31.50				1206.65
111	4+31.50		1209.55		
RAMP D					
104	5+57.00		1179.00		
105	4+74.00				1170.75

I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. T.G.	I.E.	F.L.	O.E.
69	282+48.70		1181.58	(IN) 1173.90 (OUT) 1173.85	
70	282+48.70				EX. 1161.38
71	284+00.00		1185.26	1179.90	
72	284+68.07	1186.75		1181.98	
73	284+66.73				1159.46
74	292+94.50		1208.46	1203.33	
75	292+96.27			1200.39	
76	294+40.00				1198.09
79			NOT USED		
80			NOT USED		
81	306+81.57		1217.22	1209.28	
82	306+82.52				EX. 1204.53
113	295+14.88	1170.00	(24") 1155.35 (60") 1146.65		1145.38
114	295+62.00	1214.64		1208.05	
115	293+90.00	1206.31		(IN) 1206.32 (OUT) 1206.26	
116	292+18.00	1206.31		(IN) 1202.30 (OUT) 1202.22	
117	290+45.00	1201.78		(IN) 1197.89 (OUT) 1197.81	
118	288+73.00	1197.28		(IN) 1193.27 (OUT) 1193.19	
119	287+48.00	1193.98		1188.84	
120	287+06.17				1187.38

TOTAL GUARDRAIL REMOVAL THIS SHEET - 6254'

LT. STA. 292+50 TO STA. 296+92 CONST. 400' STEEL "W" BEAM GUARDRAIL, SINGLE FACE, 1 - BRIDGE END CONN. TY. A-1 AND 1 - END TREATMENT TY. 2A

STA. 298+86 TO STA. 310+00 CONST. 1114' CONC. MEDIAN BARRIER WALL TYPE 12C-50

STA. 280+00 TO STA. 296+42 CONST. 1642' CONC. MEDIAN BARRIER WALL TYPE 12C-50

LT. STA. 299+09 TO STA. 308+16 CONST. 912.5' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 1 - BRIDGE END CONN. TY. A 1 - CRASH CUSHION TY. VI C TL3

RT. STA. 42+30 CONSTRUCT 21 FT EDGE KEY

LT. STA. 43+65 CONSTRUCT 30 FT EDGE KEY

RT. STA. 14+14.79 TO 21+00.00 RAMP C CONSTRUCT 687.5' FT STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 1 - END TREATMENT TY. 2A

LT. STA. 15+43 TO 21+00 RAMP C CONSTRUCT 562.5' FT STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 1 - END TREATMENT TY. 2A

STA. 296+50 TO STA. 298+75 REMOVE 56'-0"-84'-0"-56'-0" CONTINUOUS R.C.D.G. SPAN BRIDGE

LT. STA. 280+00 TO LT. STA. 286+96 REMOVE AND REPLACE 705' OF TY. 1 WOVEN WIRE FENCE

RT. RAMP A STA. 3+80 TO RT. STA. 16+59.85 REMOVE AND REPLACE 1255' OF TY. 1 WOVEN WIRE FENCE

RT. STA. 5+56.11 TO STA. 8+13.97 RAMP A REMOVE 162 SQ. YDS. EXISTING PAVED DITCH REPLACE W/ 284' CLASS III CHANNEL LINING (162 TONS, D-L-O', T=2.0', 162 SQ. YDS. TYPE I GOETEXTILE FABRIC)

LT. STA. 309+45 TO LT. STA. 310+00 REMOVE AND REPLACE 55' OF TY. 1 WOVEN WIRE FENCE

RT. RAMP C STA. 14+14.79 TO RT. STA. 17+58.74 REMOVE AND REPLACE 341' OF TY. 1 WOVEN WIRE FENCE

LT. STA. 309+44.93 TO 310+00 CONSTRUCT 50' FT STEEL "W" BEAM GUARDRAIL, SINGLE FACE

LT. STA. 299+20 TO STA. 299+45 CONSTRUCT 25 LF OF ISLAND HEADER CURB AND 340 SQ YD OF JPC PAVEMENT - 8 INCH SHLDR

RAMP A
P.I. = 2+57.19
D = 27°24'11" Rt.
T = 76.55'
L = 150.18'
R = 314.00'
E = 9.20'
e = 2.0% Rt.

RAMP A TURN RDWY
P.I. 5+62.07
D = 146°29'33" Lt.
T = 249.14'
L = 191.76'
R = 75.00'
E = 185.18'
e = VARIES

RAMP A
P.I. = 10+73.36
D = 17°17'54" Rt.
T = 389.41'
L = 772.90'
R = 2560.00'
E = 29.45'
e = 4.2% Rt.

RAMP C
P.I. = 24+58.03
D = 88°43'37" Rt.
T = 122.25'
L = 193.57'
R = 125.00'
E = 49.85'
e = 2.0% Rt.

RAMP C
P.I. = 21+81.04
D = 17°34'36" Rt.
T = 154.60'
L = 306.77'
R = 1000.00'
E = 11.88'
e = 2.0% Rt.

I-75 MAINLINE
P.I. 295+35.81
D = 25°22'32" Rt.
T = 1031.95'
L = 2030.05'
R = 4583.66'
E = 114.73'
e = 3.5% Rt.
Runoff = 200'
Runout = 115'

RT. STA. 4+25 TO STA. 10+50 RAMP A CONST. 575' STEEL "W" BEAM GUARDRAIL, SINGLE FACE, 1 - END TREATMENT TY. 1 AND 1 - END TREATMENT TY. 2A

STRAIGHT LINE TRANSITION FROM (BEGINNING) 2.8% LT. STA. 280+17.06 TO 3.5% RT. STA. 285+03.86

RAMP B
P.I. = 17+82.20
D = 12°42'52" Rt.
T = 344.27'
L = 685.71'
R = 3090.00'
E = 19.12'
e = 3.6% Rt.

RAMP D
P.I. = 4+88.65
D = 54°25'09" Rt.
T = 110.03'
L = 203.26'
R = 214.00'
E = 26.63'
e = 2.0% Rt.

RAMP D
P.I. = 14+62.17
D = 10°45'17" Rt.
T = 462.18'
L = 921.63'
R = 4910.00'
E = 21.70'
e = 2.4% Rt.

RAMP D TURN RDWY
P.I. 5+48.62
D = 119°23'36" Lt.
T = 128.33'
L = 156.29'
R = 75.00'
E = 73.64'
e = VARIES

RT. STA. 280+00 TO RT. STA. 284+10 REMOVE AND REPLACE 413' OF TY. 1 WOVEN WIRE FENCE

RT. RAMP B STA. 12+02.21 TO RT. STA. 21+65 REMOVE AND REPLACE 1020' OF TY. 1 WOVEN WIRE FENCE

I-75 STA. 282+00, 82.84' RT CONST. FLUME INLET TYPE 2 AND 52 TONS CLASS III CHANNEL LINING

RT. I-75 STA. 282+17 TO STA. 284+10 CONST. 193 LF SPECIAL CONCRETE HEADER CURB

RT. I-75 STA. 288+69 TO STA. 296+02 CONST. 733 LF SPECIAL CONCRETE HEADER CURB

RT. RAMP B STA. 12+02.21 TO STA. 14+75 CONST. 272 LF SPECIAL CONCRETE HEADER CURB

LT. STA. 17+00 TO STA. 24+00 RAMP B CONSTRUCT 700 FT CONCRETE SHOULDER BARRIER WALL AND 1 - CRASH CUSHION TY VI C TL3

RT. STA. 280+00 TO RT. STA. 284+10 CONSTRUCT 425 FT STEEL "W" BEAM GUARDRAIL, SINGLE FACE

RT. STA. 12+02.21 TO STA. 14+75.00 RAMP B CONSTRUCT 275.0 FT GUARDRAIL

RT. STA. 287+75 TO STA. 296+14 CONST. 787.5' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 1 - END TREATMENT TY. 1 AND 1 - BRIDGE END CONN. TY. A

RT. RAMP B STA. 22+98 TO STA. 23+43 CONST. 130 LF SPECIAL CONCRETE HEADER CURB

RT. US 25 STA. 53+18 TO STA. 54+32 CONST. 115 LF SPECIAL CONCRETE HEADER CURB

RT. STA. 298+40 TO STA. 307+00 CONST. 862.5' STEEL "W" BEAM GUARDRAIL, SINGLE FACE, 1 - BRIDGE END CONN. TY. A-1 AND 1 - END TREATMENT TY. 2A

RT. RAMP D STA. 9+22 TO RT. STA. 17+40 REMOVE AND REPLACE 838' OF TY. 1 WOVEN WIRE FENCE

27.89' RT. U.S. 25 STA. 54+50 CONST. FLUME INLET TYPE 2 AND 9.33 SQ. YD. PAVED DITCH TYPE I (SEE PIPE SECTIONS)

RT. STA. 5+90 TO 7+25 RAMP D CONSTRUCT 137.5' FT STEEL "W" BEAM GUARDRAIL, DOUBLE FACE AND 2 - TERMINAL SECTIONS TY. 1 (TIE TO EXISTING)

RT. STA. 54+96 TO STA. 55+10 US 25 CONST. 50' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 1 - END TREATMENT TY. 2A AND CONNECT TO EXISTING GUARDRAIL

STA. 280+00 TO 295+85 REMOVE 1585 LF CABLE GUARDRAIL BARRIER SYSTEM AND 1 - END ANCHOR

RT. STA. 47+50 TO STA. 51+00 US 25 CONST. 312.5' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 1 - END TREATMENT TY. 4A AND 1 - END TREATMENT TY. 2A

STA. 301+55 TO 310+00 REMOVE 845 LF CABLE GUARDRAIL BARRIER SYSTEM AND 1 - END ANCHOR

LT. STA. 48+50 TO STA. 51+17 US 25 CONST. 275' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND 2 - END TREATMENTS TY. 2A

STA. 55+00 CONSTRUCT 45 FT EDGE KEY

SCALE: 1"=100'

0' 100' 200' 400'

I-75
PLAN SHEET
STA. 280+00 TO STA. 310+00

USER: hlowlar
DATE PLOTTED: September 22, 2017
FILE NAME: V:\1785\ACTIVE\7856001S\TRANSPORTATION\DESIGN\DRAWING\PLANS\SHEETS\PL_28000.DGN
E-SHEET NAME:
MicroStation v8.11.9.832

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R18

310+00 315+00 320+00 325+00 330+00 335+00 340+00

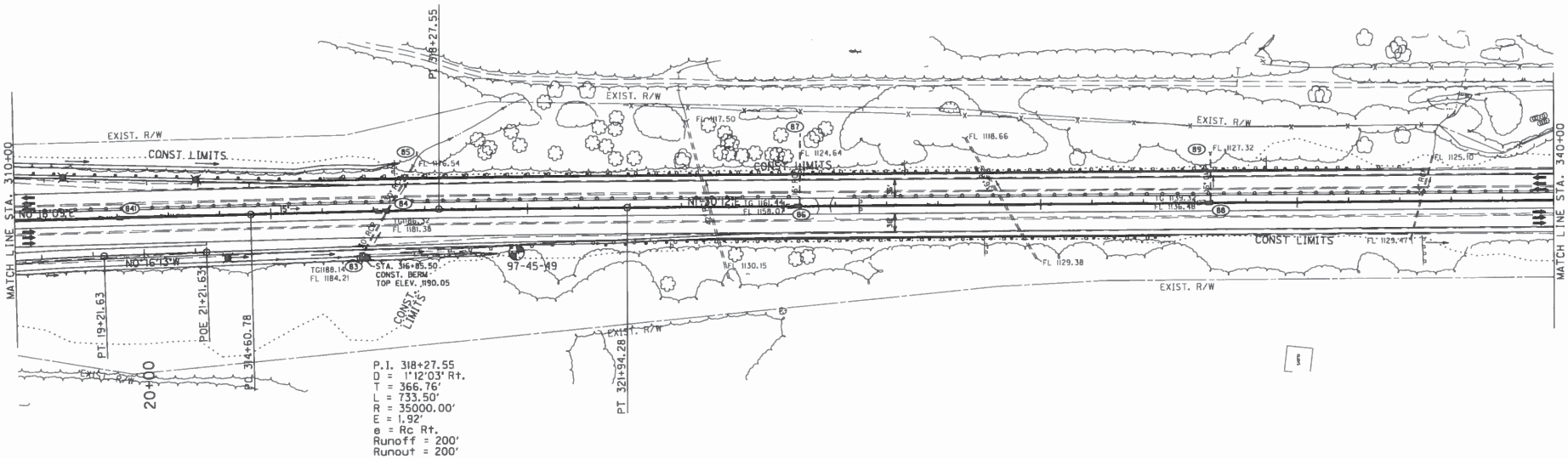
TOTAL GUARDRAIL REMOVAL
THIS SHEET - 352ft

STA. 310+00 TO STA. 340+00
CONST. 2900' CONC. MEDIAN
BARRIER WALL TYPE 12C-50

LT. STA. 310+00 TO STA. 336+00
CONST. 2550' STEEL 'W' BEAM
GUARDRAIL, SINGLE FACE,
1 - END TREATMENT TY. 1

LT. STA.310+00 TO LT. STA.340+00 REMOVE
AND REPLACE 3033' OF TY. 1 WOVEN WIRE FENCE

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	311+00	-	317+00	7.5' FB SPCL	N/A		
LT	339+00	-	340+00	NORM	ECB		89 SQYD



I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. / T.G.	I.E.	F.L.	O.E.
841	312+10.00		LT. 1204.61 RT. 1205.32	1200.36	
83	316+72.90	1188.46		1184.22	
84	317+26.76		1189.04	(30") 1181.43 (15") 1181.38 (OUT) 1181.35	
85	317+78.53				EX. 1176.54
86	325+30.47		1164.89	1158.00	
87	325+31.64				EX. 1124.64
88	333+31.34		LT. 1142.21 RT. 1142.21	1136.41	
89	333+30.87				EX. 1127.32

RT. STA.310+00 TO RT. STA.340+00 REMOVE
AND REPLACE 3005' OF TY.1 WOVEN WIRE FENCE

RT. STA. 321+35 TO STA. 332+50
CONST. 1062.5' STEEL 'W' BEAM
GUARDRAIL, SINGLE FACE,
1 - END TREATMENT TY. 1 AND
1 - END TREATMENT TY. 2A

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	314+00	-	318+00	7.5' FB SPCL	N/A		
RT	338+00	-	340+00	NORM	ECB		133 SQYD

DITCHES RAMP D							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	17+48.30	-	21+50	7.5' FB SPCL	N/A		

STA. 310+00 TO 325+30
REMOVE 1530 LF CABLE
GUARDRAIL BARRIER SYSTEM
AND 1 - END ANCHOR

STA. 326+22 TO 340+00
REMOVE 1378 LF CABLE
GUARDRAIL BARRIER SYSTEM
AND 1 - END ANCHOR

0' 100' 200' 400'

SCALE: 1"=100'

I-75
PLAN SHEET
STA. 310+00 TO STA. 340+00

USER: hlowlar
DATE PLOTTED: September 22, 2017
FILE NAME: V:\7185\ACTIVE\785660\ST\TRANSPORTATION\DESIGN\DRAWING\PLAN_SHEETS\PL_31000.DGN
E-SHEET NAME:
MicroStation v8.11.9.832

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R20

TOTAL GUARDRAIL REMOVAL THIS SHEET - 1755'

STA. 356+00 REMOVE CRASH CUSHION

340+00 345+00 350+00 355+00 360+00 365+00 370+00

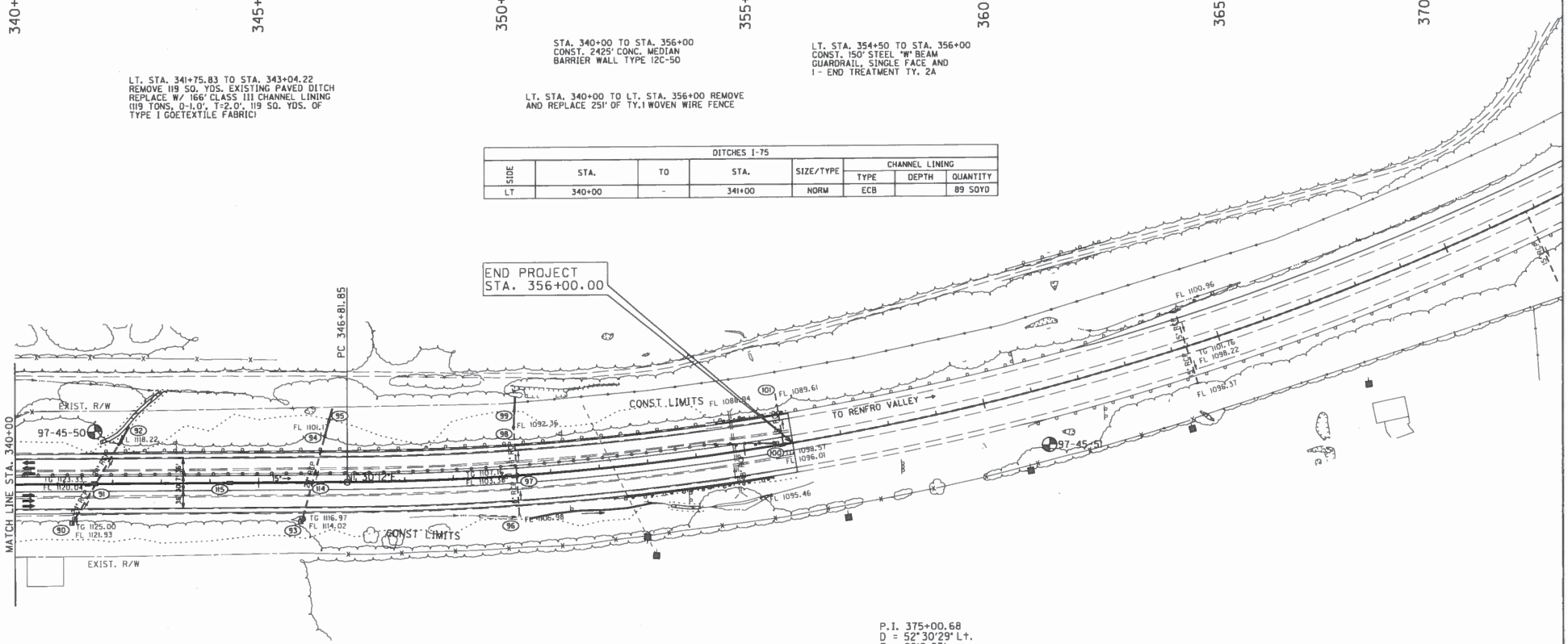
STA. 340+00 TO STA. 356+00
CONST. 2425' CONC. MEDIAN BARRIER WALL TYPE 12C-50

LT. STA. 354+50 TO STA. 356+00
CONST. 150' STEEL "W" BEAM GUARDRAIL, SINGLE FACE AND
1 - END TREATMENT TY. 2A

LT. STA. 341+75.83 TO STA. 343+04.22
REMOVE 119 SQ. YDS. EXISTING PAVED DITCH
REPLACE W/ 166' CLASS III CHANNEL LINING
(119 TONS, 0-1.0', T=2.0', 119 SQ. YDS. OF
TYPE I GOETEXTILE FABRIC)

LT. STA. 340+00 TO LT. STA. 356+00 REMOVE AND REPLACE 251' OF TY.1 WOVEN WIRE FENCE

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
LT	340+00	-	341+00	NORM	ECB		89 SQYD



I-75 PROPOSED DRAINAGE STRUCTURE ELEVATIONS					
STRUCTURE	STA.	T.R. / T.C.	I.E.	F.L.	O.E.
90	341+18.28	1125.27		1122.14	
91	341+65.25		LT. 1126.71 RT. 1126.74	(IN) 1120.10 (OUT) 1120.02	
92	342+17.33				1117.84
115	344+45.00		LT. 1122.28 RT. 1121.58	1116.55	
93	345+88.29	1117.03		1114.16	
94	346+35.78			1101.46	
95	346+43.63				1100.59
114	346+10.31		1118.60	(IN) 1108.65 (IN) 1108.52 (OUT) 1108.40	
96	350+30.21		EX. 1105.98		
97	350+29.99		1110.82	(IN) 1103.43 (OUT) 1103.35	
98	350+29.69			1092.47	
99	350+33.40				1091.47
100	355+80.47		1103.25	1096.09	
101	355+80.47				EX. 1089.61

RT. STA. 340+00 TO RT. STA. 356+00 REMOVE AND REPLACE 249' OF TY.1 WOVEN WIRE FENCE

RT. STA. 352+50 TO STA. 355+50
CONST. 250' STEEL "W" BEAM GUARDRAIL, SINGLE FACE,
1 - END TREATMENT TY. 1 AND
1 - END TREATMENT TY. 2A

RT. STA. 353+37.54 TO STA. 353+95.53
REMOVE 35 SQ. YDS. EXISTING PAVED DITCH
REPLACE W/ 60' CLASS III CHANNEL LINING
(35 TONS, 0-1.0', T=2.0', 35 SQ. YDS. OF
TYPE I GOETEXTILE FABRIC)

P.I. 375+00.68
D = 52°30'29" Lt.
T = 2818.83'
L = 5237.45'
R = 5715.00'
E = 657.36'
e = 2.8% Lt.
Runoff = 200'
Runout = 143'

DITCHES I-75							
SIDE	STA.	TO	STA.	SIZE/TYPE	CHANNEL LINING		
					TYPE	DEPTH	QUANTITY
RT	340+00	-	349+50	NORM	N/A		
RT	351+00	-	352+50	2' FB SPCL	CL II	1.0'	136 TON

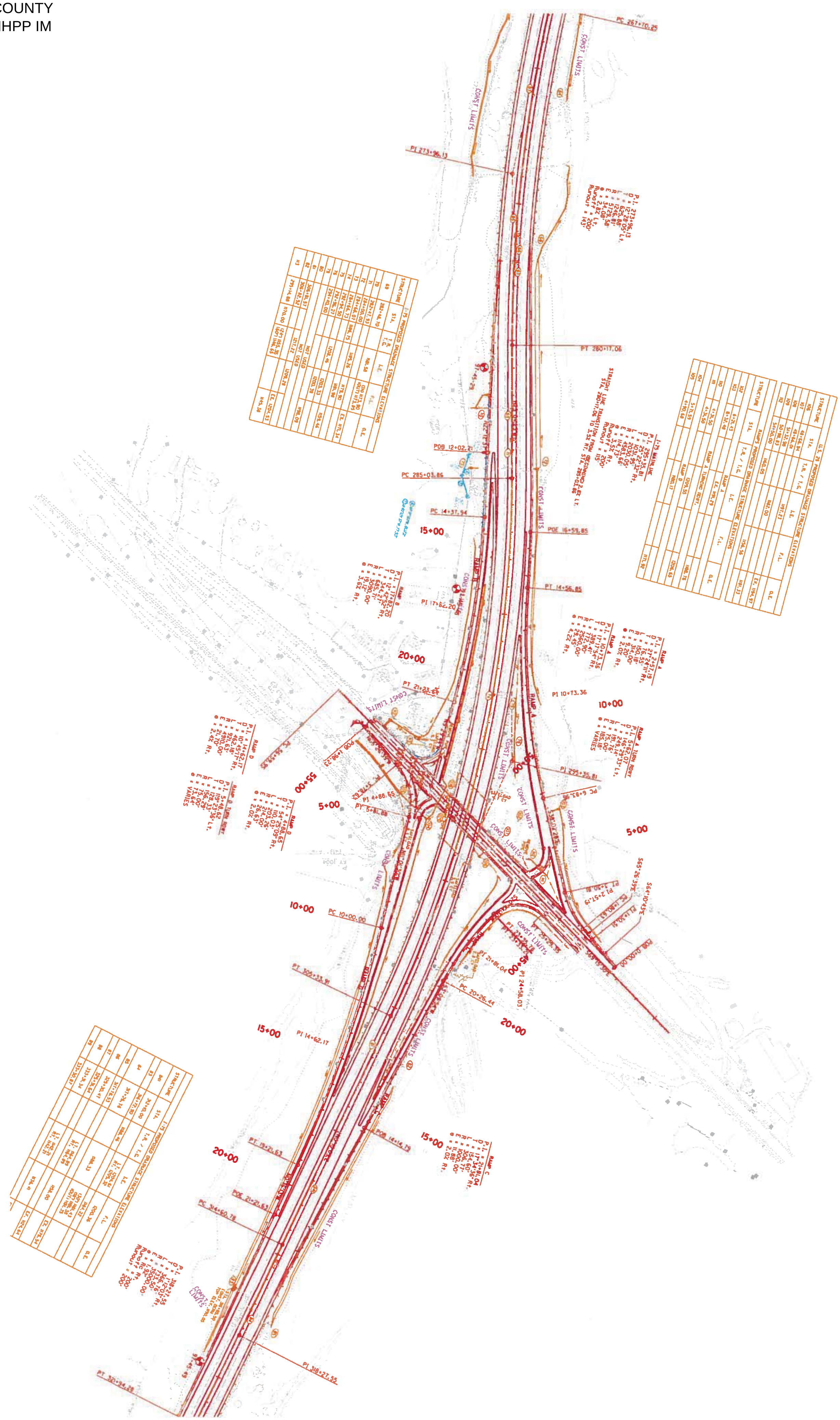
STA. 340+00 TO 356+00
REMOVE 1600 LF CABLE
GUARDRAIL BARRIER SYSTEM
AND 1 - END ANCHOR

0' 100' 200' 400'

SCALE: 1"=100'

I-75
PLAN SHEET
STA. 340+00 TO STA. 356+00

USER: hlawler
DATE PLOTTED: September 22, 2017
E-SHEET NAME:
MicroStation v8.11.9.832
FILE NAME: V:\1785\ACTIVE\178566D1\S\TRANSPORTATION\DESIGN\DRAINING\PLAN_SHEETS\PL_34000.DGN


PC 267+70.25
CONST LIMITS
PI 273+96.13
PT 280+17.06
PC 285+03.86
PDE 16+59.85
PT 14+56.85
15+00
20+00
10+00
5+00
55+00
PI 10+73.36
PI 295+35.81
10+00
PC 10+00.00
PT 305+33.91
15+00
PI 14+62.17
PC 20+26.44
20+00
15+00
20+00
PT 19+71.63
PC 314+60.78
PI 318+27.55

N O T I C E

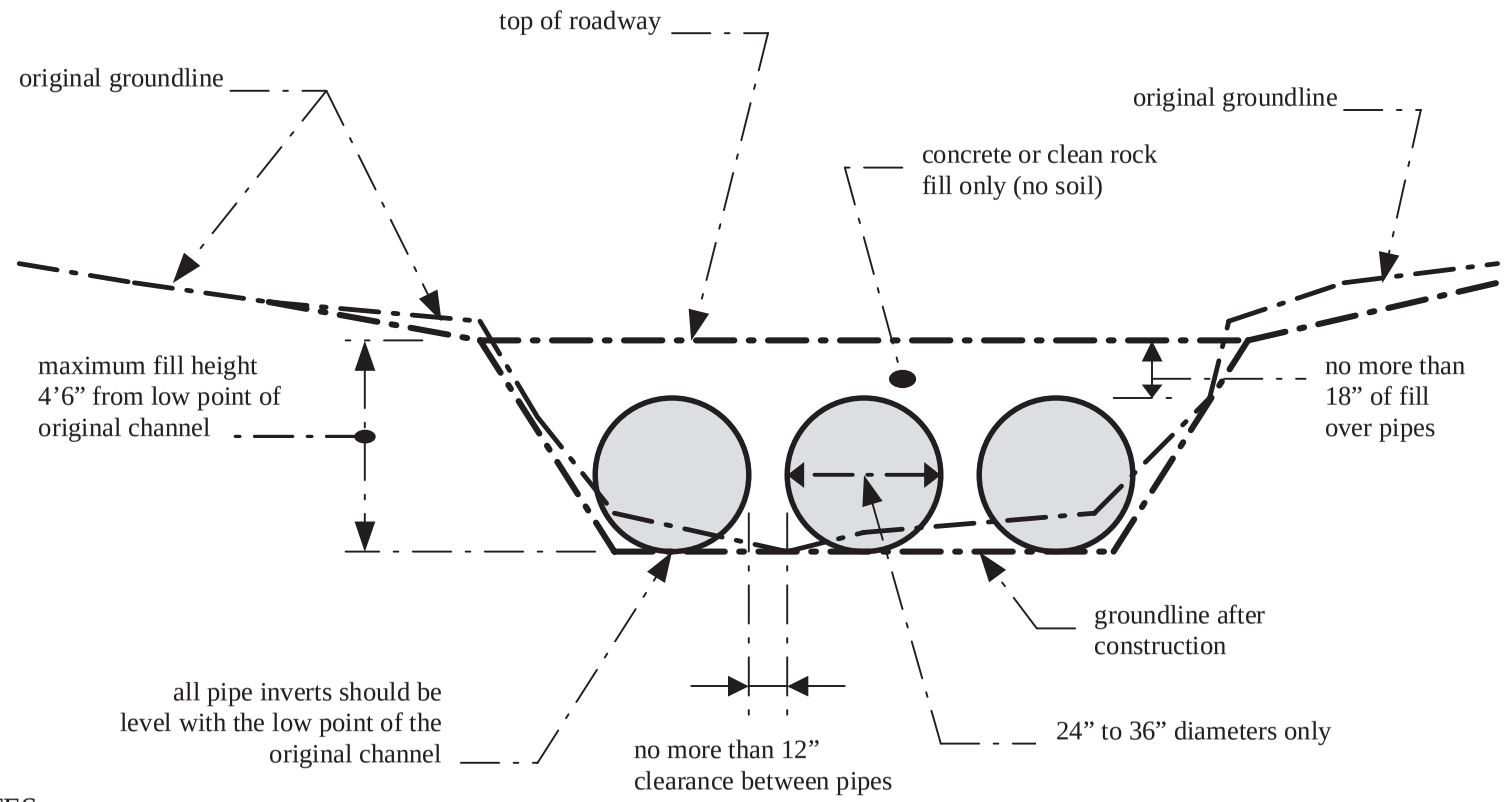
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
(NATIONWIDE PERMIT & GENERAL WQC AUTHORIZATION)

PROJECT: Rockcastle County, Item No. 8-6.20
I-75 Widening

The Section 404 & 401 activities for this project have been previously permitted under the authority of the Department of the Army Nationwide Permit No. 14 "Linear Transportation Projects" & Division of Water General Water Quality Certification. If there is need to cross the stream channel with heavy equipment or conduct work from within the stream channel a working platform or temporary crossing is authorized. This should be constructed with clean rock and sufficient pipe to allow stream flow to continue unimpeded (see attached typical drawing). In order for these authorizations to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Permit & General WQC in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

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 Corps of Engineers. A copy of any request to the Corps of Engineers 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.

ATTACHMENT 1



NOTES:

1. This is a conceptual drawing. The number and size of pipes and other details will vary depending on specific site conditions.
2. The pipes and backfill must be contained within the stream channel as shown above. During the construction of the approaches and access roadway across the floodplain, unstable and unconsolidated materials unsuitable for roadways may be excavated and replaced with riprap, crushed stone, or other stable road construction materials. This may only be done, however, with the following provisions: (1) the disposal of excess, unconsolidated materials thus excavated must be outside of the floodplain and (2) the finished surface of the completed road may be no more than three inches (3") above the pre-construction surface of the floodplain at any point beyond the top of banks.

LOW-WATER CROSSING

STANDARD DRAWING
Not to Scale

MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

R. BRUCE SCOTT
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

General Certification--Nationwide Permit # 14
Linear Transportation Projects

This General Certification is issued March 19, 2017, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33 U.S.C. §1341), as well as Kentucky Statute KRS 224.16-050.

For this and all nationwide permits, the definition of surface water is as per 401 KAR 10:001 Chapter 10, Section 1(80): Surface Waters means those waters having well-defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Lagoons used for waste treatment and effluent ditches that are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the commonwealth.

Agricultural operations, as defined by KRS 224.71-100(1) conducting activities pursuant to KRS 224.71-100 (3), (4), (5), (6), or 10 are deemed to have certification if they are implementing an Agriculture Water Quality Plan pursuant to KRS 224.71-145.

For all other operations, the Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 304, 306 and 307 of the CWA, will not be violated for the activity covered under NATIONWIDE PERMIT 14, namely Linear Transportation Projects, provided that the following conditions are met:

1. The activity will not 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 Waters.

2. The activity will not occur within surface waters of the Commonwealth identified as perpetually-protected (e.g. deed restriction, conservation easement) mitigation sites.

3. The activity will impact less than 1/2 acre of wetland/marsh.

4. The activity will impact less than 300 linear feet of surface waters of the Commonwealth. Stream realignment greater than 100 feet and in-stream stormwater detention/retention basins are not covered under this general water quality certification.

5. For complete linear transportation projects, all impacts shall not exceed a cumulative length of 500 linear feet within each Hydrologic Unit Code (HUC) 14.

6. Any crossings must be constructed in a manner that does not impede natural water flow.

7. Stream impacts covered under this General Water Quality Certification and undertaken by those persons defined as an agricultural operation under the Agricultural Water Quality Act must be completed in compliance with the Kentucky Agricultural Water Quality Plan (KWQP).

8. The Kentucky Division of Water may require submission of a formal application for an individual certification for any project if the project has been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.

9. Activities that do not meet the conditions of this General Water Quality Certification require an Individual Section 401 Water Quality Certification.

10. Activities qualifying for coverage under this General Water Quality Certification are subject to the following conditions:

    - Projects requiring in-stream stormwater detention/retention basins shall require individual water quality certifications.
    - 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 violations of state water quality standards do not occur (401 KAR 10:031 Section 2 and KRS 224.70-100).
    - 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 prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to,

upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the activities.

- 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 utility line right-of-way shall be limited to that necessary for equipment access.
- 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 shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation.
- Any fill shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement.
- 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 such work will be done.
- 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 KDOW shall be notified immediately by calling (800) 928-2380.

Non-compliance with the conditions of this general certification or violation of Kentucky state water quality standards may result in civil penalties.

2017 Nationwide Permits Regional and Permit-Specific Conditions
COMMONWEALTH OF KENTUCKY

These regional conditions are in addition to, but do not supersede, the requirements in the Federal Register (Volume 82, No. 4 of January 6, 2017, pp 1860).

Notifications for all Nationwide Permits (NWPs) shall be in accordance with General Condition No. 32.

1. For activities that would impact Outstanding State or National Resource Waters (OSNRWs), Exceptional Waters (EWs), Coldwater Aquatic Habitat Waters (CAHs) under the Endangered Species Act for the NWPs listed below, a Pre-Construction Notification (PCN) will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs (Section 404 activities), for impacts to these waters.

   NWP 3 (Maintenance)
   NWP 4 (Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities)
   NWP 5 (Scientific Measurement Devices)
   NWP 6 (Survey Activities)
   NWP 7 (Outfall Structures and Associated Intake Structures)
   NWP 12 (Utility Line Activities)
   NWP 13 (Bank Stabilization)
   NWP 14 (Linear Transportation Projects)
   NWP 15 (U.S. Coast Guard Approved Bridges)
   NWP 16 (Return Water from Upland Contained Disposal Areas)
   NWP 17 (Hydropower Projects)
   NWP 18 (Minor Discharges)
   NWP 19 (Minor Dredging)
   NWP 20 (Response Operations for Oil or Hazardous Substances)
   NWP 21 (Surface Coal Mining Activities)
   NWP 22 (Removal of Vessels)
   NWP 23 (Approved Categorical Exclusions)
   NWP 25 (Structural Discharges)
   NWP 27 (Aquatic Habitat Restoration, Establishment, and Enhancement Activities)
   NWP 29 (Residential Developments)
   NWP 30 (Moist Soil Management for Wildlife)
   NWP 31 (Maintenance of Existing Flood Control Facilities)
   NWP 32 (Completed Enforcement Actions)
   NWP 33 (Temporary Construction, Access, and Dewatering)
   NWP 34 (Cranberry Production Activities)
   NWP 36 (Boat Ramps)
   NWP 37 (Emergency Watershed Protection and Rehabilitation)
   NWP 38 (Cleanup of Hazardous and Toxic Waste)
   NWP 39 (Commercial and Institutional Developments)
   NWP 40 (Agricultural Activities)

NWP 41 (Reshaping Existing Drainage Ditches)
NWP 42 (Recreational Facilities)
NWP 43 (Stormwater Management Facilities)
NWP 44 (Mining Activities)
NWP 45 (Repair of Uplands Damaged by Discrete Events)
NWP 46 (Discharges in Ditches)
NWP 48 (Commercial Shellfish Aquaculture Activities)
NWP 49 (Coal Remining Activities)
NWP 50 (Underground Coal Mining Activities)
NWP 51 (Land-Based Renewable Energy Generation Facilities)
NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)
NWP 53 (Removal of Low-Head Dams)
NWP 54 (Living Shorelines)

2. In addition to the notification and agency coordination requirements in the NWPs, for impacts greater than 0.25 acres in all "waters of the U.S." for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

NWP 3 (Maintenance)
NWP 7 (Outfall Structures and Associated Intake Structures)
NWP 12 (Utility Line Activities)
NWP 14 (Linear Transportation Projects)
NWP 29 (Residential Developments)
NWP 39 (Commercial and Institutional Developments)
NWP 40 (Agricultural Activities)
NWP 41 (Reshaping Existing Drainage Ditches)
NWP 42 (Recreational Facilities)
NWP 43 (Stormwater Management Facilities)
NWP 44 (Mining Activities)
NWP 51 (Land-Based Renewable Energy Generation Facilities)
NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)
NWP 53 (Removal of Low-Head Dams)

3. For activities in all "waters of the U.S." for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

NWP 21 (Surface Coal Mining Activities)
NWP 27 (Aquatic Habitat Restoration, Establishment & Enhancement Activities)
NWP 49 (Coal Remining Activities)
NWP 50 (Underground Coal Mining Activities)

4. Nationwide Permit No. 14 – Linear Transportation Projects.

   (a) New road alignments or realignments are limited to a permanent loss of 500 linear feet of intermittent or perennial stream length at each crossing. Road crossings with permanent losses greater than 500 linear feet of intermittent or perennial stream associated with new

alignments or realignments will be evaluated as an individual permit (i.e., a Letter of Permission or as a Standard Individual Permit).

(b) In addition to the notification requirements contained in NWP 14, the permittee must submit a PCN to the district engineer prior to commencing the activity for the permanent loss of greater than 300 feet of ephemeral, intermittent and perennial stream of all “waters of the U.S.” (See General Condition 32 and the definition of "loss of waters of the United States" in the Nationwide Permits for further information.)

5. Notification in accordance with General Condition 32 is required to the Corps for all activities which are subject to jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

6. All applications are required as both a paper copy and in an electronic media format, including electronic mail or compact disc.

7. For all activities, the applicant shall review the U.S. Fish and Wildlife Service’s IPaC website: http://ecos.fws.gov/ipac to determine if the activity might affect threatened and/or endangered species or designated critical habitat. If federally-listed species or designated critical habitat are identified, a PCN in accordance with General Condition 18 and 32 would be triggered and the official species list generated from the IPaC website must be submitted with the PCN.

Further information:

Outstanding State or National Resource Water (OSNRWs), Exceptional Waters (EWs), and Coldwater Aquatic Habitat Waters (CAHs) are waters designated by the Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet. The list can be found at the following link: http://eppcapp.ky.gov/spwaters/

Information on Pre-Construction Notification (PCN) can be found at NWP General Condition No. 32 in the Federal Register (Volume 81, No. 105 of June 1, 2017, pp 35211).

COORDINATING RESOURCE AGENCIES

Chief, Wetlands Regulatory Section
U.S. Environmental Protection Agency
Region IV
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

Supervisor
U.S. Fish & Wildlife Service
JC Watts Federal Building, Room 265
330 West Broadway
Frankfort, Kentucky 40601

Supervisor
401 Water Quality Certification
Kentucky Division of Water
300 Sower Boulevard, 3rd Floor
Frankfort, KY 40601

Commissioner
Department of Fish and Wildlife Resources
#1 Game Farm Road
Frankfort, Kentucky 40601

Executive Director and State Historic Preservation Officer
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

ADDITIONAL COORDINATING RESOURCE AGENCY FOR NWPS 21, 49, AND 50

Kentucky Department for Natural Resources
Division of Mine Permits
300 Sower Boulevard
Frankfort, KY 40601

Terms for Nationwide Permit No. 14
Linear Transportation Projects

Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: For linear transportation projects crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, “District Engineer’s Decision.” The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

August 14, 2017

Mr. David Waldner
Division of Environmental Analysis
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40601

Re: FWS 2017-B-0577; KYTC Item No. 8-6.2, I-75 Widening in Rockcastle County, Kentucky

Dear Mr. Waldner:

Thank you for your letter and Biological Assessment (BA) dated August 11, 2017 evaluating the potential effects of the subject project proposal on the federally-listed gray bat, Virginia big-eared bat, Indiana bat, and northern long-eared bat (NLEB). The U.S. Fish and Wildlife Service (Service) has reviewed the document and offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

According to the information provided, the Kentucky Transportation Cabinet (KYTC) proposes to widen 4.4 miles of I-75 from four to six lanes, from 1.1 miles north of the US Highway 25 interchange at Mount Vernon (mile point 60.1) to 1.85 miles north of the Green Hill Road overpass (mile point 64.5). The proposed widening would be constructed toward the center of the roadway. Impacts to the landscape include typical road construction activities, tree removal for construction access, and grading to allow for proper drainage.

Gray Bat *(Myotis grisescens)*
Virginia Big-cared Bat *(Corynorhinus townsendii virginianus)*
According to the BA, Redwing Ecological Services qualified biologists conducted mist net surveys of the proposed project area from June 12, 2017 through June 22, 2017. In total, seven netting sites (28 net nights) were selected based on the species habitat suitability within and near the project corridor. The survey was conducted in accordance to the Service's "2017 Range-Wide Indiana Bat Summer Survey Guidelines" which may also be used for other, similar bat species. Three species of bats were captured totaling 17 bats; however, no federally listed species were captured. Therefore, we believe that the gray bat and Virginia long-eared bat are not likely to be using habitat in the proposed project area during the summer. In addition, the BA stated that there are no suitable hibernacula or year-round roosting habitats for these species within the proposed project vicinity. Based on the information available to us, the Service concurs that the proposed project is not likely to adversely affect the gray bat or Virginia big-eared bat.

Indiana bat *(Myotis sodalis)*
Northern Long-cared Bat *(Myotis septentrionalis)*
Based on the aforementioned mist-netting survey results, the Indiana bat and NLEB are presumed absent from the project corridor during the summer maternity/roosting period. Further, no suitable hibernacula for these species were identified within the proposed project vicinity; therefore, it is not anticipated that the proposed action would impact wintering Indiana bats, NLEBs, and/or their winter habitat. However, the proposed action would result in indirect adverse effects to both species from the removal of Indiana bat "Known Swarming 1 and 2" habitat, and NLEB "Known Swarming 2" habitat. KYTC has committed to avoid tree clearing activities between the dates of August 16 – October 14, which is the occupied timeframes within known swarming habitat. This conservation measure would minimize potential direct effects on swarming Indiana bats and NLEBs.

As previously discussed, the proposed action requires the removal of approximately 98.94 acres of "Known Swarming 1 and 2" forested habitat for the Indiana bat, and "Known Swarming 2" forested habitat for the NLEB. KYTC has determined that the action "may affect, is likely to adversely affect" the Indiana bat and NLEB, and proposes to account for potential adverse effects to these species and their habitat through the processes identified in the 2015 Interim Programmatic Agreement for Forest Dwelling bats between the Federal Highway Administration (FHWA), KYTC, and the Service's Kentucky Field Office. The Service concurs with KYTC's effects determination for the Indiana bat and NLEB, and agrees with the proposed ESA compliance process

In view of these findings we believe that the requirements of section 7 of the Endangered Species Act have been fulfilled for this project. Your obligations under section 7 must be reconsidered, however, if: (1) new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact Phil DeGarmo at (502) 695-0468 extension 110 or Phil_DeGarmo@fws.gov.

Sincerely,

Virgil Lee Andrews, Jr.
Field Supervisor

MATTHEW G. BEVIN
GOVERNOR

DON PARKINSON
SECRETARY

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE
THE BARSTOW HOUSE
410 HIGH STREET
FRANKFORT, KENTUCKY 40601
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REGINA STIVERS
DEPUTY SECRETARY

CRAIG A. POTTS
EXECUTIVE DIRECTOR
& STATE HISTORIC
PRESERVATION OFFICER

May 4, 2017

Mr. David Waldner, P. E., Director
Division of Environmental Analysis
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, KY 40622

Re: *An Archaeological Survey for the Proposed Widening of Interstate 75 in Rockcastle County, Kentucky* (KYTC Item # 8-6.2)

Dear Mr. Waldner:

Thank you for the letter regarding the above referenced report. This project entailed pedestrian survey and screened shovel test excavations within the project area. No new archaeological sites were documented during this investigation and no further work is recommend. KYTC concurs with these determinations and the no further work recommendation.

We concur with the author's recommendation of no further work. We accept this report without further revision.

Should the project plans change, or should additional information become available regarding cultural resources or citizens' concerns regarding impacts to cultural resources, please submit that information to our office as additional consultation may be warranted. Should you have any questions, feel free to contact Nicole Konkol of my staff at nicole.konkol@ky.gov.

Sincerely,

Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP:nk KHC # 49054/48823
Cc: George Crothers (OSA); Carl Shields (KYTC); Richard Herndon (CRAI)

17 NOV '16 P2:27

MATTHEW G. BEVIN
GOVERNOR

DON PARKINSON
SECRETARY

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REGINA STIVERS
DEPUTY SECRETARY

CRAIG A. POTTS
EXECUTIVE DIRECTOR
& STATE HISTORIC
PRESERVATION OFFICER

November 14, 2016

Mr. David M. Waldner, P.E.
Director, Division of Environmental Analysis
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, KY 40622

Re: **An Archaeological Survey of New Right-of-Way for the Proposed Widening of i-75 in Rockcastle County, Kentucky.**
Report submitted by Alexandra Bybee of Cultural Resource Analysts, Inc. Report dated October 4, 2016.
KYTC Item Number 8-6.3

Dear Mr. Waldner:

Thank you for the letter regarding the above referenced project report, received November 9, 2016. The letter describes the intensive pedestrian survey, supplemented by screened shovel testing, of five parcels to be acquired as new right-of-way along Interstate 75 in Rockcastle County, Kentucky. As a result of the survey, the investigators defined one new prehistoric archaeological site, 15Rk104. This site consists of a low density of lithic material, no temporally diagnostic material, and no evidence of intact cultural features below the plowzone. The investigators recommended that this site was not eligible for listing on the National Register of Historic Places, and recommended no additional work within the project area. After review of this report, staff with the KYTC concurred with the investigator's recommendations. The Kentucky Heritage Council also concurs with the investigator's and KYTC's recommendations concerning archaeological cultural resources within the proposed project area.

If the project design or boundaries change, this office should be consulted to determine the nature and extent of additional documentation that may be needed. In the event of the unanticipated discovery of an archaeological site or object of antiquity, the discovery should be reported to the Kentucky Heritage Council and to the Kentucky Office of State Archaeology in the Anthropology Department at the University of Kentucky in accordance with KRS 164.730. In the event that human remains are encountered during project activities, all work should be immediately stopped in the area and the area cordoned off, and in accordance with KRS 72.020 the county coroner and local law enforcement must be contacted immediately. Upon confirmation that the human remains are not of forensic interest, the unanticipated discovery must be reported to the Kentucky Heritage Council.

Should you have any questions, feel free to contact Chris Gunn of my staff at (502) 564-7005, extension 118.

Sincerely,

Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP: KHC # 47952
cc: George Crothers (OSA); Charles Niquette (CRAI)

KYTC Item No: 8-6.2 County: Rockcastle

Route: I-75

No Historic Properties Affected

As Determined By:

[signature] 7/14/17

KYTC Representative **Date**

[signature] 7/14/17

SHPO Representative **Date**

(Concurrence is assumed if no response is received within 30 days)

Attachments:

- ☑ Map showing topography, APE and identified Historic Resources
- ☐ Relevant Photos (Overview and individual resources)
- ☐ Project Plans
- ☐ Other (Describe): _____
- ☐ Copy EPM
- ☐ Copy DEC
- ☐ Copy DEA Architectural Historian
- ☐ Copy SHPO

KYTC Item No: 8.6.30 County: Rockcastle

Route: I-75

Are there Historical Resources (50 years old or older) identified within the project APE based on field investigations?

Yes

☑ No

Date of Field Investigation: June 28, 2016

Investigator Name(s): Amanda Abner

Discuss Basis for finding
(Historic Mapping, PVA, Building Permit, Date of Construction, Deed/Title, etc.):

RK 86 is located south of APE, no new sites identified within APE. Project requires very little new ROW.

NRHP listed or potentially eligible sites/districts (> 50 years old) are:

☑ Not Present within the APE

No Historic Properties Affected

As Determined By:

_____ 9/9/16
KYTC Representative **Date**

_____ 10/07/16
SHPO Representative **Date**

(Concurrence is assumed if no response is received within 30 days)

Attachments:

☐ Map showing topography, APE and identified Historic Resources
☐ Relevant Photos (Overview and individual resources)
☐ Project Plans
☐ Other (Describe): _____
☐ Copy EPM
☐ Copy DEC
☐ Copy DEA Architectural Historian
☐ Copy SHPO

KYTC BMP Plan for Contract ID ######

Kentucky Transportation Cabinet

Highway District 8

And

_____(2), Construction

Kentucky Pollutant Discharge Elimination System
Permit KYR10
Best Management Practices (BMP) Plan
Groundwater Protection Plan
For Highway Construction Activities

For

I-75 Widening in

Rockcastle County

Contract ID ###### (2)

Six Year Plan Item 8-6.1

KYTC BMP Plan for Contract ID ######

Project Information

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

1. Owner — Kentucky Transportation Cabinet, District 8
2. Resident Engineer: (2)
3. Contractor Name: (2)
   Address: (2)
   Phone number: (2)
   Contact: (2)
   Contractor's agent responsible for compliance with the KPDES permit requirements: (3)
4. Contract ID Number: (2)
5. Route (Address): I-75, Rockcastle County, KY
6. Latitude/Longitude (project mid-point)

   37° 20' 31" N - 84° 18' 28" W
7. County (project mid-point): Rockcastle County
8. Project start date (date work will begin): (2)
9. Projected completion date: (2)

1.0 SITE DESCRIPTION.

1) **Nature of construction activity (from letting project description).** Major widening of I-75 to 6 lanes from Mile point 55.7 – 60.1 in Rockcastle County.
2) **Order of major soil disturbing activities.** (2) and (3)
3) **Projected volume of material to be moved.** Approximately 573,510 C Y.
4) **Estimate of total project area (acres).** 252 acres.
5) **Estimate of area to be disturbed (acres).** 108 acres
6) **Post construction runoff coefficient will be included in the project drainage folder. Persons needing information pertaining to the runoff coefficient will contact the resident engineer to request this information.**
7) **Data describing existing soil condition.** According to the US Agriculture Soil Survey for this area, the soils include the Frederick Silt Loam, Caneyville-Hagerstown Silt Loam, the Brookside-Faywood outcrop complex and the Caneyville-Shelocta Silt Loam.
8) **Data describing existing discharge water quality (if any).** Existing discharge is in the form of point discharges with little to no BMPs associated with them.
9) **Receiving water name.** Renfro Creek and several unnamed tributaries to Roundstone Creek.
10) **TMDLs and Pollutants of Concern in Receiving Waters.** There are no TMDLs on Renfro Creek or Roundstone Creek. However, Roundstone Creek is an outstanding resource water.
11) **Site Map. Project layout sheet plus the erosion control sheets in the project plans that depict Disturbed Drainage Areas (DDAs) and related information. These sheets depict the existing project conditions with areas delineated by DDA (drainage area bounded by watershed breaks and right of way limits), the storm water discharge locations (either as a point discharge or as overland flow) and the areas that drain to each discharge point. These plans define the limits of areas to be disturbed and the location of control measures. Controls will be either site specific as designated by the designer or will be annotated by the contractor and resident engineer before disturbance commences. The project layout sheet shows the surface waters and wetlands.**
12) **Potential sources of pollutants. The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris.** (3)

2.0 SEDIMENT AND EROSION CONTROL MEASURES.

2.1 Erosion Control Sheets. 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.

The following non-structural BMPs will be implemented throughout the project duration:

- Sediment control BMPs will be maintained when the sediment reaches 1/3 the depth of the BMP.
- Appropriate stock of straw erosion control blanket (ECB) and straw bales shall be available onsite at all times.
- Straw ECB or seeding mulched with blown straw followed by crimping shall be applied within 7 days of the cessation of the land disturbing activity. If blown straw is used, the blower and crimping equipment shall be kept on-site during land disturbing activities.
- Disturbed areas shall be stabilized prior to a forecasted rain event.
- EPSC/SWPPP inspections shall be performed at least twice a week.

2.2 Annotations. 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 BMPs 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 BMPs in place before being disturbed.

2.3 Disturbed Drainage Areas. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:

A) Construction Access. This is the first land-disturbing activity. As soon as construction begins, bare areas will be stabilized with straw ECB or straw followed by crimping and designated construction entrances will be installed.

B) Sources. At the beginning of the project, all DDAs for the project will be inspected for areas that are a source of storm water pollutants. Areas that are a source of pollutants will receive appropriate cover or BMPs to arrest the introduction of pollutants into storm water. Areas that have not been opened by the contractor will be inspected periodically (once per month) to determine if there is a need to employ BMPs to keep pollutants from entering storm water.

C) Clearing and Grubbing. The following BMPs will be considered and used where appropriate.

1) Leaving areas undisturbed when possible.
2) Silt Basins to provide silt volume for large areas.
2) Silt Traps Type A for small areas.
3) Silt Traps Type C in front of existing and drop inlets which are to be saved.
4) Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.
5) Brush and/or other barriers to slow and/or divert runoff.
6) Silt fences to catch sheet runoff on short slopes. For longer slopes, multiple

rows of silt fence may be considered.
7) Temporary Mulch for areas which are not feasible for the fore mentioned types of protections.
8) Non-standard or innovative methods.
9) Spill Containment Areas to protect sinkholes and outfalls.

D) Cut and FM and Placement of Drainage Structures. The BMP Plan will be modified to show additional BMPs such as:

1) Silt Traps Type B in ditches and/or drainways as they are completed.
2) Silt Traps Type C in front of pipes after they are placed.
3) Channel Lining
4) Erosion Control Blanket
5) ECB and/or straw, seeding and crimping for areas where construction activities will be ceased for seven days or more.
6) Non-standard or innovative methods.

E) Profile and X-Section in Place. The BMP Plan will be modified to show elimination of BMPs which had to be removed and the addition of new BMPs as the roadway was shaped. Probably changes include:

1) 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.
2) Additional Silt Traps Type B and Type C to be placed as final drainage patterns are put in place.
3) Additional Channel Lining and/or Erosion Control Blanket and/or Turf Reinforcement Mats.
4) Temporary Mulch and/or seeding for areas where construction activities will be ceased for seven days or more.

F) Finish Work (Paving, Seeding, Protect, etc.). A final BMP Plan will result from modifications during this phase of construction. Probable changes include:

1) Removal of Silt Traps Type B from ditches and drainways if they are protected with other BMPs which are sufficient to control erosion, i.e. Erosion Control Blanket, Turf Reinforcement Mats or Permanent Seeding and Protection on moderate grades.
2) Permanent Seeding and Protection.
3) Placing Sod.

G) Post Construction. BMPs, including Karst policy BMPs, to be installed during construction to control the pollutants in stormwater discharges that will occur after construction has been completed are:

- Filter ditches: Filter ditches are grass swales placed at the outlets of some of the spill containment areas to promote infiltration and vegetative filtering.

- Spill containment areas: Detention/containment basins for capturing accidental spills on the newly constructed roadway will be provided in accordance with KYTC's Design Policy.

3.0 OTHER CONTROL MEASURES.

1) Solid Materials. 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 are any hazardous wastes being generated at the project site and how these wastes are being managed. Site personnel will be instructed with regard to proper storage and handling of hazardous wastes when required. The Transportation Cabinet will file for generator, registration when appropriate, with the Division of Waste Management and advise the contractor regarding waste management requirements.
4) Spill Prevention. The following material management practices will be used to reduce the risk of spills or other exposure of materials and substances to the weather and/or runoff. (3)

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

1) An effort will be made to store only enough product required to do the job.
2) 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.
3) Products will be kept in their original containers with the original manufacturer's label.
4) Substances will not be mixed with one another unless recommended by the manufacturer.
5) Whenever possible, all of the product will be used up before disposing of the container.
6) Manufacturers' recommendations for proper use and disposal will be followed
7) The site contractor will inspect daily to ensure proper use and disposal of materials onsite.

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

1) Products will be kept in original containers unless they are not re-sealable.
2) Original labels and material safety data sheets (MSDS) will be reviewed and retained.
3) Contractor will follow procedures recommended by the manufacturer when handling hazardous materials.
4) If surplus product must be disposed of, manufacturers' or state/local

recommended methods for proper disposal will be followed.

3.3 The following product-specific practices will be followed onsite:

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

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

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

B) 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.

C) 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.

D) 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.

E) 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:

1) 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.
2) Materials and equipment necessary for spill cleanup will be kept in the material storage area. Equipment and materials will include as appropriate, brooms, dust pans, mops, rags, gloves, oil absorbents, sand, sawdust, and plastic and metal trash containers.
3) All spills will be cleaned up immediately after discovery.
4) The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contract with a hazardous substance.
5) Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.

6) The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
7) Spills of products will be cleaned up promptly. Wastes from spill clean-up will be disposed in accordance with appropriate regulations. Spills will be addressed in the "dry", and will not be "washed away" to clean.

4.0 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. (1)

5.0 MAINTENANCE. The BMP plan shall include a clear description of the maintenance procedures necessary to keep the control measures in good and effective operating condition.

Maintenance of BMPs during construction shall be a result of twice a week and post rain event inspections with action being taken by the contractor to correct deficiencies within three working days.

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. Post-construction BMP maintenance will be covered in the cabinets MS4 permit under MCM 5 activities.

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

1) All erosion prevention and sediment control measures will be inspected by the Contractor at least twice each week.
2) Inspections will be conducted by individuals that have received Kentucky Erosion Prevention and Sediment Control – Roadway Inspector (KEPSC-RI) training or other qualification as prescribed by the Cabinet that includes instruction concerning erosion prevention and sediment control.
3) Inspection reports will be written, signed, dated, and kept on file.
4) Stabilization of disturbed areas shall be performed within 7 days of the cessation of the land disturbing activity.
5) Disturbed areas shall be stabilized prior to a forecasted rain event.
6) Sediment control BMPs will be maintained when the sediment reaches 1/3 the depth of the BMP.
7) All measures will be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours of being reported and completed within three working days.
8) Silt fences will be inspected for bypassing, overtopping, undercutting, depth of sediment, tears, and to ensure attachment to secure posts.
9) 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.

10) 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.

11) 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.

7.0 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:

1) Water from water line flushings.
2) Water form cleaning concrete trucks and equipment.
3) Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
4) 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.

8.0 GROUNDWATER PROTECTION PLAN.

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

Contractor's statement: (3)

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

____ (a) Land treatment or land disposal of a pollutant;

_ (b) Storing, treating, disposing, or related handling of hazardous waste, solid waste or
special waste, or special waste in landfills, incinerators, surface impoundments, 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);

(c) 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;

(d) Storing or related handling of road oils, dust suppressants, or deicing agents at a
central location;

_____ (e) 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);

(f) Installation, construction, operation, or abandonment of wells, bore holes, or core holes, (this does not include bore holes for the purpose of explosive demolition);

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

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

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 3. 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) Groundwater plan activities will be inspected during the EPSC inspections
(g) Certification (see signature page.)

KYTC BMP Plan for Contract ID ######

Contractor and Resident Engineer Plan Certification

The contractor that is responsible for implementing this BMP plan is identified in the Project Information section of this plan.

The following certification applies to all parties that are signatory to this BMP plan:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Further, this plan complies with the requirements of 401 KAR 5:037. By this certification, the undersigned state that the individuals signing the plan have reviewed the terms of the plan and will implement its provisions as they pertain to ground water protection.

Contractor and Resident Engineer Certification:

(3) Signed _____ title

typed or printed name' *signature*

(2) Signed _____ title

typed or printed name[2] *signature*

1. *Contractors Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5: 060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 200 Fair Oaks Lane, Fourth Floor, Frankfort, Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.*

2. *KYTC Note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the resident engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 300 Sower Blvd, Frankfort, Kentucky 40601 Reference the Contract ID number and KPDES number when one has been issued.*

Sub-Contractor Certification

The following sub-contractor shall be made aware of the BMP plan and responsible for implementation of BMPs identified in this plan as follows:

Subcontractor Name:

Address:

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 _____ _____ _____

typed *or*

printed name[1] *title* *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, 300 Sower Blvd., Frankfort, Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.*

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

December 2, 2017

Tamra Wilson
KYTC District 8
1660 S US 27
Somerset, KY 42502

Re: **KYR10 Coverage Acknowledgment**
KPDES No.: **KYR10M031**
Permit Type: Construction
AI ID: **6377**
I-75 Widening from MP 55.7 - 60.1
I-75
Mount Vernon (Rockcastle), Rockcastle County, Kentucky

Dear Tamra Wilson:

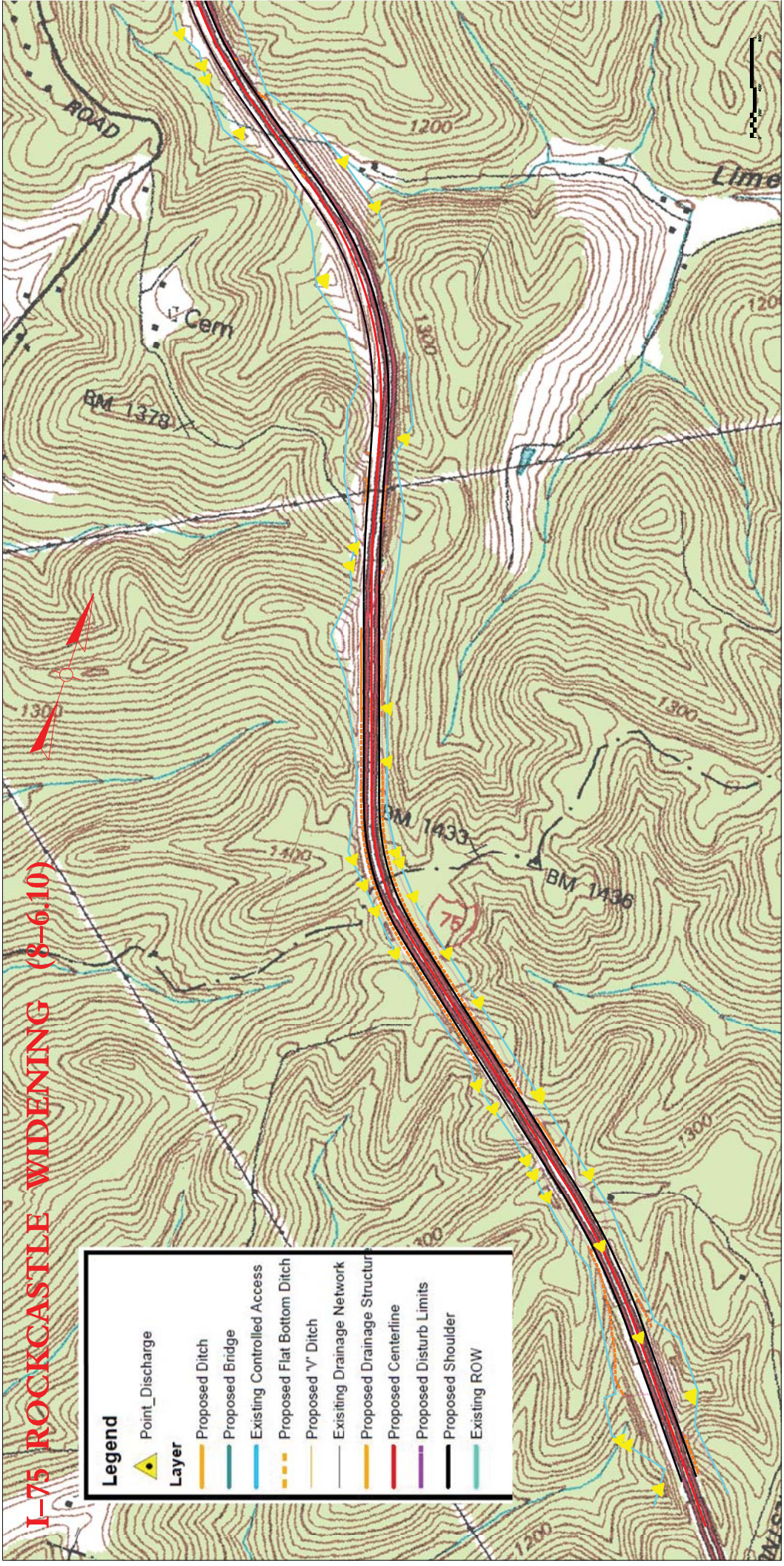
The discharges associated with the Notice of Intent you submitted have been approved for coverage under the "Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Storm Water Discharges Associated with Construction Activities (KYR100000)" master general permit. Your coverage becomes effective on the date of this letter, and will automatically terminate: two years from the effective date of coverage unless an extension is requested prior to the termination date, upon the November 30, 2019, expiration of the KYR100000 master general permit, or upon the revocation of coverage by the Division of Water, whichever comes first. During this period of coverage, all discharges shall comply with the conditions of the KYR100000 master general permit. This permit and links to the eNOI (and permit coverage extension) and eNOT forms can be found on our website: http://dep.ky.gov/formslibrary/Documents/KYR10PermitPage.pdf.

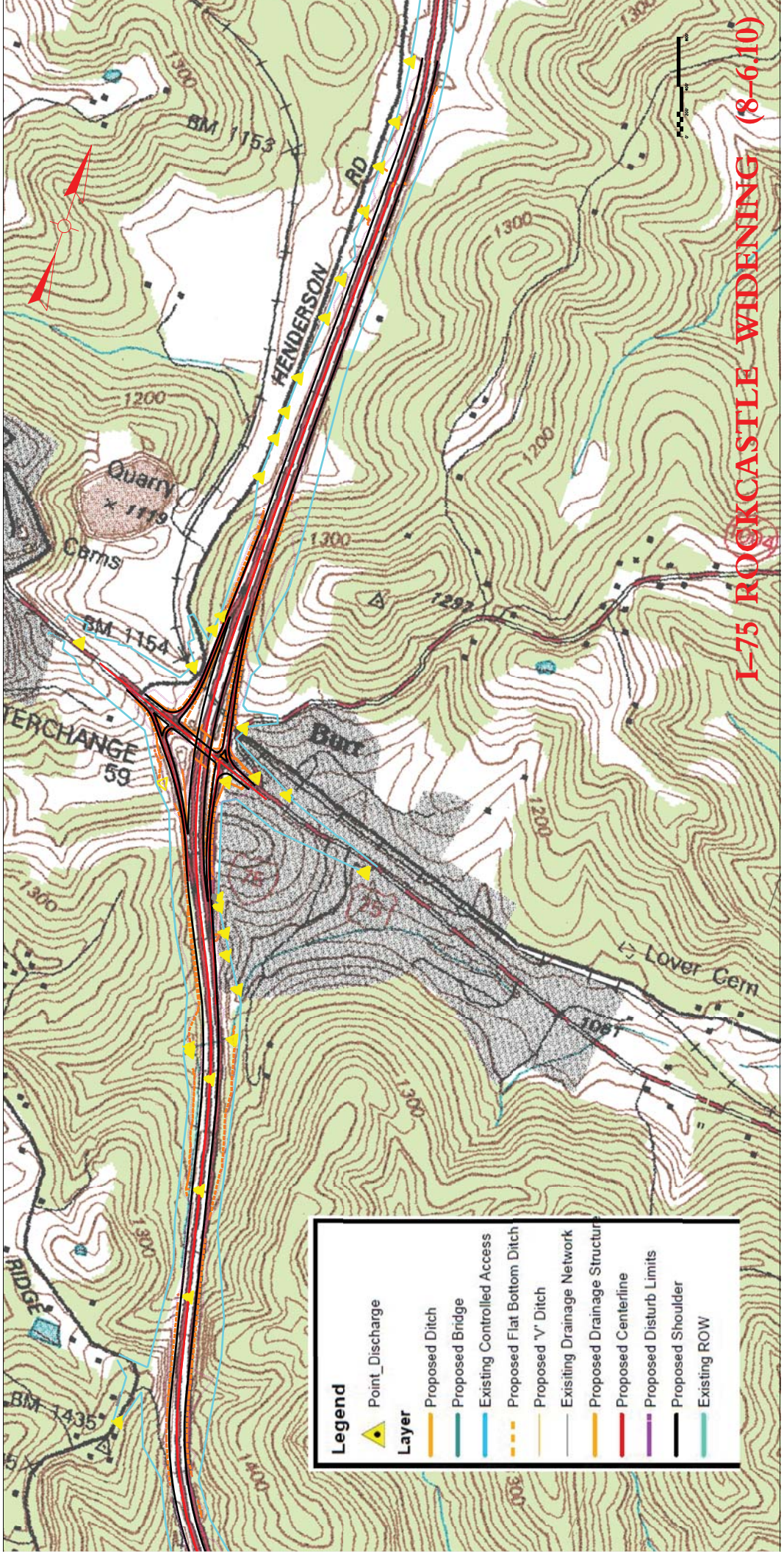
Any questions concerning the general permit and its requirements should be directed to the undersigned at 502-782-7048:

Construction Site GPS Coordinates: 37.326809, -84.302545
Receiving Water: Renfro Creek

Sincerely,

Justina Bascombe
Surface Water Permits Branch
Division of Water


I-75 ROCKCASTLE WIDENING (8-6.10)
Legend
Layer
Point_Discharge
Proposed Ditch
Proposed Bridge
Existing Controlled Access
Proposed Flat Bottom Ditch
Proposed 'V' Ditch
Exisiting Drainage Network
Proposed Drainage Structure
Proposed Centerline
Proposed Disturb Limits
Proposed Shoulder
Existing ROW
ROAD
Cem
BM 1378
BM 1433
BM 1436
1200
1300
1400
75


I-75 ROCKCASTLE WIDENING (8-6.10)
HENDERSON RD
BM 1153
BM 1154
BM 1435
Quarry
Cems
Burr
Lover Cem
RIDGE
1300
1200
1400
1292
1081
Legend
Point_Discharge
Layer
Proposed Ditch
Proposed Bridge
Existing Controlled Access
Proposed Flat Bottom Ditch
Proposed 'V' Ditch
Exisiting Drainage Network
Proposed Drainage Structure
Proposed Centerline
Proposed Disturb Limits
Proposed Shoulder
Existing ROW

COUNTY OF	ITEM NO.	SHEET NO.
ROCKCASTLE	8-6.10	R97

I-75 DISCHARGE POINTS

ROAD	DDA	STATION	OFFSET	NORTH	EAST	LATTITUDE	LONGITUDE
				PROJECT COORDINATES			
I-75	1	104+07.0039	-253.3730	1994758.0039	2069139.2835	37.29681280	84.27679541
I-75	2	108+23.1319	-371.0795	1995013.3094	2068790.2328	37.29752879	84.27798145
I-75	3	110+08.5961	242.2747	1995537.2242	2069159.1685	37.29895161	84.27668529
I-75	4	108+80.9725	-419.0226	1995029.3421	2068716.8364	37.29757595	84.27823286
I-75	5	116+04.5884	3.1278	1995859.4155	2068603.6589	37.29986009	84.27857743
I-75	6	110+33.0710	251.5793	1995562.2361	2069151.4222	37.29902062	84.27671057
I-75	8	131+72.0521	-180.4178	1996825.9733	2067384.8593	37.30256620	84.28271513
I-75	9	124+01.8215	0.4417	1996457.6868	2068077.3289	37.30152537	84.28035456
I-75	10	129+40.5110	201.4364	1996974.6309	2067806.4816	37.30295641	84.28125792
I-75	11	133+01.2098	-168.1616	1996917.1374	2067292.5499	37.30282047	84.28302757
I-75	12	136+68.8636	196.3878	1997432.0315	2067238.2388	37.30423663	84.28318677
I-75	13	137+91.7319	-168.6495	1997226.9272	2066912.2310	37.30368733	84.28431834
I-75	14	140+20.9112	-179.0665	1997363.7722	2066728.0976	37.30407093	84.28494399
I-75	15	137+03.5592	196.0559	1997453.7132	2067211.1500	37.30429732	84.28327873
I-75	16	145+74.7441	187.7219	1997998.1259	2066530.9682	37.30582119	84.28558780
I-75	17	152+63.7304	-169.4607	1998158.4692	2065770.3066	37.30629383	84.28819406
I-75	18	150+42.7081	183.2453	1998290.5616	2066165.6030	37.30663973	84.28682818
I-75	19	156+16.5595	-148.1076	1998429.0512	2065511.5745	37.30704781	84.28906907
I-75	20	155+96.6941	177.0643	1998635.3147	2065763.7209	37.30760348	84.28819133
I-75	21	158+25.9199	-161.7322	1998595.5744	2065357.7102	37.30751160	84.28958914
I-75	22	159+18.7291	165.0922	1998857.9565	2065573.3550	37.30822291	84.28883389
I-75	23	172+02.4110	130.2094	1999999.3327	2065089.6475	37.31137754	84.29043607
I-75	24	167+74.5982	126.0200	1999592.3439	2065221.5622	37.31025440	84.29000421
I-75	27	183+41.9078	-175.0239	2000988.1191	2064440.3261	37.31412017	84.29261585
I-75	28	184+85.8335	-143.7721	2001136.8650	2064428.2404	37.31452912	84.29264951
I-75	29	193+76.7471	204.0497	2002089.6412	2064532.8695	37.31714091	84.29223925
I-75	30	207+50.5706	-281.5838	2003080.9434	2063520.4173	37.31990577	84.29566763
I-75	31	211+17.4071	346.1935	2003780.6341	2063721.3047	37.32181855	84.29493989
I-75	32	207+68.8091	-285.5953	2003090.9805	2063506.8074	37.31993391	84.29571389
I-75	34	221+86.1495	-226.7200	2003993.1801	2062502.4950	37.32245365	84.29911923
I-75	35	215+22.6400	320.5313	2004040.9146	2063361.8597	37.32254845	84.29616198
I-75	36	226+79.1050	-211.0982	2004311.9484	2062107.9418	37.32334559	84.30045900

I-75 DISCHARGE POINTS

ROAD	DDA	STATION	OFFSET	NORTH	EAST	LATTITUDE	LONGITUDE
				PROJECT COORDINATES			
I-75	37	227+84.6781	-178.4611	2004410.7221	2062044.4501	37.32361948	84.30067209
I-75	38	230+69.4651	-224.7312	2004593.8707	2061796.4191	37.32413284	84.30151525
I-75	41	273+13.7363	-166.7629	2008685.7039	2060507.2024	37.33542276	84.30573294
I-75	42	253+35.7791	0.3154	2006813.5479	2061122.6813	37.33025617	84.30371495
I-75	43	274+07.6199	176.5109	2008883.7773	2060802.8793	37.33595423	84.30470572
I-75	44	261+97.4856	-0.0713	2007654.4008	2060934.2545	37.33257298	84.30431863
I-75	45	270+95.4351	0.0077	2008528.5416	2060729.4078	37.33498188	84.30497707
I-75	46	273+50.2308	-171.4919	2008717.8662	2060491.6354	37.33551173	84.30578478
I-75	48	277+97.9063	232.4419	2009281.2164	2060710.7200	37.33704943	84.30500174
I-75	49	282+51.4174	176.7389	2009678.2373	2060468.2855	37.33814978	84.30581459
I-75	50	284+66.4972	152.8549	2009862.9283	2060355.5068	37.33866166	84.30619273
I-75	51	285+40.0717	156.9578	2009930.2433	2060328.6949	37.33884762	84.30628139
I-75	52	294+52.8018	-285.4990	2010661.6181	2059612.6639	37.34088592	84.30870547
I-75	54	303+70.0885	-227.7209	2011627.8993	2059543.8060	37.34354210	84.30889158
US 25	55	054+81.3152	-76.8853	2010640.2434	2060307.5787	37.34079809	84.30631670
US 25	56	066+39.4404	51.0402	2010497.3316	2061373.4348	37.34036088	84.30265863
US 25	57	066+52.5575	48.0020	2010495.7880	2061386.8104	37.34035608	84.30261271
I-75	58	286+44.1191	717.3732	2010889.2817	2060589.3548	37.34147009	84.30533454
I-75	59	299+87.2331	292.6610	2011286.3751	2060089.8019	37.34258143	84.30703171
I-75	61	306+93.4374	-165.0278	2011959.0309	2059605.1760	37.34444878	84.30866314
I-75	62	319+74.0126	-209.1024	2013242.8487	2059571.6653	37.34797540	84.30871103
I-75	64	323+02.0460	-202.4356	2013571.9266	2059586.2731	37.34887840	84.30864352
I-75	65	325+34.5439	-196.5453	2013804.1900	2059598.2608	37.34951566	84.30859009
I-75	66	328+25.9332	-189.4703	2014095.2934	2059612.9778	37.35031438	84.30852420
I-75	67	333+52.0608	-149.9887	2014620.2041	2059666.2486	37.35175349	84.30831342
I-75	68	337+74.2377	-150.0009	2015042.2360	2059677.3120	37.35291188	84.30825321
I-75	69	342+67.2342	-150.6063	2015535.0787	2059689.6404	37.35426465	84.30818493
I-75	71	346+44.3178	-154.5448	2015912.1359	2059695.5959	37.35529975	84.30814465
I-75	73	350+33.8126	-150.1416	2016292.1980	2059699.4215	37.35634320	84.30811154
I-75	75	355+49.6131	-149.2024	2016792.7700	2059659.9924	37.35771936	84.30822089
I-75	76	295+15.5338	222.6184	2010835.9418	2060094.0909	37.34134441	84.30704063

SCALE: N/A

I-75
EROSION CONTROL
DISCHARGE POINTS

KYTC BMP Plan for Contract ID ######

Kentucky Transportation Cabinet

Highway District 8

And

_____(2), Construction

Kentucky Pollutant Discharge Elimination System
Permit KYR10
Best Management Practices (BMP) Plan
Groundwater Protection Plan
For Highway Construction Activities

For

I-75 Widening in

Rockcastle County

Contract ID ###### (2)

Six Year Plan Item 8-6.2

KYTC BMP Plan for Contract ID ######

Project Information

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

1. Owner — Kentucky Transportation Cabinet, District 8
2. Resident Engineer: (2)
3. Contractor Name: (2)
   Address: (2)
   Phone number: (2)
   Contact: (2)
   Contractor's agent responsible for compliance with the KPDES permit requirements: (3)
4. Contract ID Number: (2)
5. Route (Address): I-75, Rockcastle County, KY
6. Latitude/Longitude (project mid-point)

   37° 20' 46" N - 84° 18' 28" W
7. County (project mid-point): Rockcastle County
8. Project start date (date work will begin): (2)
9. Projected completion date: (2)

1.0 SITE DESCRIPTION.

1) **Nature of construction activity (from letting project description).** Major widening of I-75 to 6 lanes from Mile point 60.1 – 64.5 in Rockcastle County.
2) **Order of major soil disturbing activities.** (2) and (3)
3) **Projected volume of material to be moved.** Approximately 890,000 C Y.
4) **Estimate of total project area (acres).** 220 acres.
5) **Estimate of area to be disturbed (acres).** 192 acres
6) **Post construction runoff coefficient will be included in the project drainage folder. Persons needing information pertaining to the runoff coefficient will contact the resident engineer to request this information.**
7) **Data describing existing soil condition.** According to the US Agriculture Soil Survey for this area, the soils include the Frederick Silt Loam, Caneyville-Hagerstown Silt Loam, the Brookside-Faywood outcrop complex and the Caneyville-Shelocta Silt Loam.
8) **Data describing existing discharge water quality (if any).** Existing discharge is in the form of point discharges with little to no BMPs associated with them.
9) **Receiving water name.** Renfro Creek and several unnamed tributaries to Roundstone Creek.
10) **TMDLs and Pollutants of Concern in Receiving Waters.** There are no TMDLs on Renfro Creek or Roundstone Creek. However, Roundstone Creek is an outstanding resource water.
11) **Site Map. Project layout sheet plus the erosion control sheets in the project plans that depict Disturbed Drainage Areas (DDAs) and related information. These sheets depict the existing project conditions with areas delineated by DDA (drainage area bounded by watershed breaks and right of way limits), the storm water discharge locations (either as a point discharge or as overland flow) and the areas that drain to each discharge point. These plans define the limits of areas to be disturbed and the location of control measures. Controls will be either site specific as designated by the designer or will be annotated by the contractor and resident engineer before disturbance commences. The project layout sheet shows the surface waters and wetlands.**
12) **Potential sources of pollutants. The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris.** (3)

2.0 SEDIMENT AND EROSION CONTROL MEASURES.

2.1 Erosion Control Sheets. 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.

The following non-structural BMPs will be implemented throughout the project duration:

- Sediment control BMPs will be maintained when the sediment reaches 1/3 the depth of the BMP.
- Appropriate stock of straw erosion control blanket (ECB) and straw bales shall be available onsite at all times.
- Straw ECB or seeding mulched with blown straw followed by crimping shall be applied within 7 days of the cessation of the land disturbing activity. If blown straw is used, the blower and crimping equipment shall be kept on-site during land disturbing activities.
- Disturbed areas shall be stabilized prior to a forecasted rain event.
- EPSC/SWPPP inspections shall be performed at least twice a week.

2.2 Annotations. 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 BMPs 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 BMPs in place before being disturbed.

2.3 Disturbed Drainage Areas. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:

A) Construction Access. This is the first land-disturbing activity. As soon as construction begins, bare areas will be stabilized with straw ECB or straw followed by crimping and designated construction entrances will be installed.

B) Sources. At the beginning of the project, all DDAs for the project will be inspected for areas that are a source of storm water pollutants. Areas that are a source of pollutants will receive appropriate cover or BMPs to arrest the introduction of pollutants into storm water. Areas that have not been opened by the contractor will be inspected periodically (once per month) to determine if there is a need to employ BMPs to keep pollutants from entering storm water.

C) Clearing and Grubbing. The following BMPs will be considered and used where appropriate.

1) Leaving areas undisturbed when possible.
2) Silt Basins to provide silt volume for large areas.
2) Silt Traps Type A for small areas.
3) Silt Traps Type C in front of existing and drop inlets which are to be saved.
4) Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.
5) Brush and/or other barriers to slow and/or divert runoff.
6) Silt fences to catch sheet runoff on short slopes. For longer slopes, multiple

rows of silt fence may be considered.
7) Temporary Mulch for areas which are not feasible for the fore mentioned types of protections.
8) Non-standard or innovative methods.
9) Spill Containment Areas to protect sinkholes and outfalls.

D) Cut and FM and Placement of Drainage Structures. The BMP Plan will be modified to show additional BMPs such as:

1) Silt Traps Type B in ditches and/or drainways as they are completed.
2) Silt Traps Type C in front of pipes after they are placed.
3) Channel Lining
4) Erosion Control Blanket
5) ECB and/or straw, seeding and crimping for areas where construction activities will be ceased for seven days or more.
6) Non-standard or innovative methods.

E) Profile and X-Section in Place. The BMP Plan will be modified to show elimination of BMPs which had to be removed and the addition of new BMPs as the roadway was shaped. Probably changes include:

1) 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.
2) Additional Silt Traps Type B and Type C to be placed as final drainage patterns are put in place.
3) Additional Channel Lining and/or Erosion Control Blanket and/or Turf Reinforcement Mats.
4) Temporary Mulch and/or seeding for areas where construction activities will be ceased for seven days or more.

F) Finish Work (Paving, Seeding, Protect, etc.). A final BMP Plan will result from modifications during this phase of construction. Probable changes include:

1) Removal of Silt Traps Type B from ditches and drainways if they are protected with other BMPs which are sufficient to control erosion, i.e. Erosion Control Blanket, Turf Reinforcement Mats or Permanent Seeding and Protection on moderate grades.
2) Permanent Seeding and Protection.
3) Placing Sod.

G) Post Construction. BMPs, including Karst policy BMPs, to be installed during construction to control the pollutants in stormwater discharges that will occur after construction has been completed are:

- Filter ditches: Filter ditches are grass swales placed at the outlets of some of the spill containment areas to promote infiltration and vegetative filtering.

- Spill containment areas: Detention/containment basins for capturing accidental spills on the newly constructed roadway will be provided in accordance with KYTC's Design Policy.

3.0 OTHER CONTROL MEASURES.

1) Solid Materials. 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 are any hazardous wastes being generated at the project site and how these wastes are being managed. Site personnel will be instructed with regard to proper storage and handling of hazardous wastes when required. The Transportation Cabinet will file for generator, registration when appropriate, with the Division of Waste Management and advise the contractor regarding waste management requirements.
4) Spill Prevention. The following material management practices will be used to reduce the risk of spills or other exposure of materials and substances to the weather and/or runoff. (3)

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

1) An effort will be made to store only enough product required to do the job.
2) 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.
3) Products will be kept in their original containers with the original manufacturer's label.
4) Substances will not be mixed with one another unless recommended by the manufacturer.
5) Whenever possible, all of the product will be used up before disposing of the container.
6) Manufacturers' recommendations for proper use and disposal will be followed
7) The site contractor will inspect daily to ensure proper use and disposal of materials onsite.

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

1) Products will be kept in original containers unless they are not re-sealable.
2) Original labels and material safety data sheets (MSDS) will be reviewed and retained.
3) Contractor will follow procedures recommended by the manufacturer when handling hazardous materials.
4) If surplus product must be disposed of, manufacturers' or state/local

recommended methods for proper disposal will be followed.

3.3 The following product-specific practices will be followed onsite:

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

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

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

B) 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.

C) 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.

D) 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.

E) 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:

1) 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.
2) Materials and equipment necessary for spill cleanup will be kept in the material storage area. Equipment and materials will include as appropriate, brooms, dust pans, mops, rags, gloves, oil absorbents, sand, sawdust, and plastic and metal trash containers.
3) All spills will be cleaned up immediately after discovery.
4) The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contract with a hazardous substance.
5) Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.

6) The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
7) Spills of products will be cleaned up promptly. Wastes from spill clean-up will be disposed in accordance with appropriate regulations. Spills will be addressed in the "dry", and will not be "washed away" to clean.

4.0 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. (1)

5.0 MAINTENANCE. The BMP plan shall include a clear description of the maintenance procedures necessary to keep the control measures in good and effective operating condition.

Maintenance of BMPs during construction shall be a result of twice a week and post rain event inspections with action being taken by the contractor to correct deficiencies within three working days.

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. Post-construction BMP maintenance will be covered in the cabinets MS4 permit under MCM 5 activities.

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

1) All erosion prevention and sediment control measures will be inspected by the Contractor at least twice each week.
2) Inspections will be conducted by individuals that have received Kentucky Erosion Prevention and Sediment Control – Roadway Inspector (KEPSC-RI) training or other qualification as prescribed by the Cabinet that includes instruction concerning erosion prevention and sediment control.
3) Inspection reports will be written, signed, dated, and kept on file.
4) Stabilization of disturbed areas shall be performed within 7 days of the cessation of the land disturbing activity.
5) Disturbed areas shall be stabilized prior to a forecasted rain event.
6) Sediment control BMPs will be maintained when the sediment reaches 1/3 the depth of the BMP.
7) All measures will be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours of being reported and completed within three working days.
8) Silt fences will be inspected for bypassing, overtopping, undercutting, depth of sediment, tears, and to ensure attachment to secure posts.
9) 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.

10) 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.

11) 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.

7.0 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:

1) Water from water line flushings.
2) Water form cleaning concrete trucks and equipment.
3) Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
4) 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.

8.0 GROUNDWATER PROTECTION PLAN.

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

Contractor's statement: (3)

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

____ (a) Land treatment or land disposal of a pollutant;

_ (b) Storing, treating, disposing, or related handling of hazardous waste, solid waste or
special waste, or special waste in landfills, incinerators, surface impoundments, 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);

(c) 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;

(d) Storing or related handling of road oils, dust suppressants, or deicing agents at a
central location;

_____ (e) 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);

(f) Installation, construction, operation, or abandonment of wells, bore holes, or core holes, (this does not include bore holes for the purpose of explosive demolition);

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

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

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 3. 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) Groundwater plan activities will be inspected during the EPSC inspections
(g) Certification (see signature page.)

KYTC BMP Plan for Contract ID ######

Contractor and Resident Engineer Plan Certification

The contractor that is responsible for implementing this BMP plan is identified in the Project Information section of this plan.

The following certification applies to all parties that are signatory to this BMP plan:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Further, this plan complies with the requirements of 401 KAR 5:037. By this certification, the undersigned state that the individuals signing the plan have reviewed the terms of the plan and will implement its provisions as they pertain to ground water protection.

Contractor and Resident Engineer Certification:

(3) Signed _____ title

typed or printed name' *signature*

(2) Signed _____ title

typed or printed name[2] *signature*

1. *Contractors Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5: 060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 200 Fair Oaks Lane, Fourth Floor, Frankfort, Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.*

2. *KYTC Note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the resident engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 300 Sower Blvd, Frankfort, Kentucky 40601 Reference the Contract ID number and KPDES number when one has been issued.*

Sub-Contractor Certification

The following sub-contractor shall be made aware of the BMP plan and responsible for implementation of BMPs identified in this plan as follows:

Subcontractor Name:

Address:

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 _____ _____ _____

typed *or*

printed name[1] *title* *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, 300 Sower Blvd., Frankfort, Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.*

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

September 22, 2017

Tamra Wilson
KYTC District 8
1660 S US 27
Somerset, KY 42502

Re: **KYR10 Coverage Acknowledgment**
KPDES No.: **KYR10L846**
Permit Type: Construction
AI ID: **6377**
I-75 Widening from MP 60.1 to 64.5
I-75
Mount Vernon (Rockcastle), Rockcastle County, Kentucky

Dear Tamra Wilson:

The discharges associated with the Notice of Intent you submitted have been approved for coverage under the "Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Storm Water Discharges Associated with Construction Activities (KYR100000)" master general permit. Your coverage becomes effective on the date of this letter, and will automatically terminate: two years from the effective date of coverage unless an extension is requested prior to the termination date, upon the November 30, 2019, expiration of the KYR100000 master general permit, or upon the revocation of coverage by the Division of Water, whichever comes first. During this period of coverage, all discharges shall comply with the conditions of the KYR100000 master general permit. This permit and links to the eNOI (and permit coverage extension) and eNOT forms can be found on our website: http://dep.ky.gov/formslibrary/Documents/KYR10PermitPage.pdf.

Any questions concerning the general permit and its requirements should be directed to the undersigned at 502-782-7048:

Construction Site GPS Coordinates: 37.346111, -84.307778
Receiving Water: Renfro Creek

Sincerely,

Justina Bascombe
Surface Water Permits Branch
Division of Water

MATERIAL SUMMARY

CONTRACT ID: 181001 **102GR18D001-NHPP IM** **DE10200751801**

I-75 WIDEN I-75 TO 6 LANES FROM 1 MILE NORTH OF SAND HILL ROAD UNDERPASS NORTH TO 1.1 MILES NORTH OF THE US-25 INTERCHANGE AT MT. VERNON GRADE, DRAIN & SURFACE WITH BRIDGE, A DISTANCE OF 4.77 MILES.

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0005	00078	CRUSHED AGGREGATE SIZE NO 2	24,444.00	TON
0010	01000	PERFORATED PIPE-4 IN	1,000.00	LF
0015	01001	PERFORATED PIPE-6 IN	1,432.00	LF
0020	01010	NON-PERFORATED PIPE-4 IN	250.00	LF
0025	01015	INSPECT & CERTIFY EDGE DRAIN SYSTEM - 8-6.10	1.00	LS
0030	01877	SPECIAL HEADER CURB	1,198.00	LF
0035	01891	ISLAND HEADER CURB TYPE 2	25.00	LF
0040	01982	DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	473.00	EACH
0045	01983	DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL YELLOW	11.00	EACH
0050	01984	DELINEATOR FOR BARRIER - WHITE	10.00	EACH
0055	01985	DELINEATOR FOR BARRIER - YELLOW	1,022.00	EACH
0060	02003	RELOCATE TEMP CONC BARRIER	70,115.00	LF
0065	02014	BARRICADE-TYPE III	16.00	EACH
0070	02081	JPC PAVEMENT-8 IN SHLD	340.00	SQYD
0075	02159	TEMP DITCH	25,200.00	LF
0080	02160	CLEAN TEMP DITCH	25,200.00	LF
0085	02165	REMOVE PAVED DITCH	640.00	SQYD
0090	02200	ROADWAY EXCAVATION	574,566.00	CUYD
0095	02223	GRANULAR EMBANKMENT	1,200.00	CUYD
0100	02237	DITCHING	25,200.00	LF
0105	02262	FENCE-WOVEN WIRE TYPE 1	5,000.00	LF
0110	02351	GUARDRAIL-STEEL W BEAM-S FACE	2,700.00	LF
0115	02352	GUARDRAIL-STEEL W BEAM-D FACE	137.50	LF
0120	02360	GUARDRAIL TERMINAL SECTION NO 1	1.00	EACH
0125	02363	GUARDRAIL CONNECTOR TO BRIDGE END TY A	2.00	EACH
0130	02366	GUARDRAIL TERMINAL SECTION NO 3	1.00	EACH
0135	02367	GUARDRAIL END TREATMENT TYPE 1	13.00	EACH
0140	02369	GUARDRAIL END TREATMENT TYPE 2A	19.00	EACH
0145	02373	GUARDRAIL END TREATMENT TYPE 3	1.00	EACH
0150	02381	REMOVE GUARDRAIL	30,855.00	LF
0155	02387	GUARDRAIL CONNECTOR TO BRIDGE END TY A-1	2.00	EACH
0160	02391	GUARDRAIL END TREATMENT TYPE 4A	1.00	EACH
0165	02483	CHANNEL LINING CLASS II	7,263.90	TON
0170	02484	CHANNEL LINING CLASS III	1,926.40	TON
0175	02545	CLEARING AND GRUBBING - 96 ACRES- 8-6.10	1.00	LS
0180	02562	TEMPORARY SIGNS	1,669.00	SQFT
0185	02585	EDGE KEY	81.00	LF
0190	02596	FABRIC-GEOTEXTILE TYPE I	1,817.00	SQYD
0195	02599	FABRIC-GEOTEXTILE TYPE IV	84,732.00	SQYD
0200	02650	MAINTAIN & CONTROL TRAFFIC - 8-6.10	1.00	LS
0205	02671	PORTABLE CHANGEABLE MESSAGE SIGN	10.00	EACH
0210	02676	MOBILIZATION FOR MILL & TEXT - 8-6.10	1.00	LS

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0215	02690	SAFELOADING	21.50	CUYD
0220	02696	SHOULDER RUMBLE STRIPS	112,618.00	LF
0225	02701	TEMP SILT FENCE	25,200.00	LF
0230	02703	SILT TRAP TYPE A	260.00	EACH
0235	02704	SILT TRAP TYPE B	260.00	EACH
0240	02706	CLEAN SILT TRAP TYPE A	520.00	EACH
0245	02707	CLEAN SILT TRAP TYPE B	520.00	EACH
0250	02726	STAKING - 8-6.10	1.00	LS
0255	02731	REMOVE STRUCTURE - US-25 BRIDGE- 8-6.10	1.00	LS
0260	02775	ARROW PANEL	6.00	EACH
0265	02898	RELOCATE CRASH CUSHION	8.00	EACH
0270	03171	CONCRETE BARRIER WALL TYPE 9T	56,800.00	LF
0275	03225	TUBULAR MARKERS	150.00	EACH
0280	05950	EROSION CONTROL BLANKET	6,822.00	SQYD
0285	05952	TEMP MULCH	358,160.00	SQYD
0290	05961	FERTILIZER 10-10-10	65.00	TON
0295	05963	INITIAL FERTILIZER	40.00	TON
0300	05985	SEEDING AND PROTECTION	358,160.00	SQYD
0305	05992	AGRICULTURAL LIMESTONE	780.00	TON
0310	06401	FLEXIBLE DELINEATOR POST-M/W	712.00	EACH
0315	06404	FLEXIBLE DELINEATOR POST-M/Y	72.00	EACH
0320	06510	PAVE STRIPING-TEMP PAINT-4 IN	6,000.00	LF
0325	06511	PAVE STRIPING-TEMP PAINT-6 IN	606,204.00	LF
0330	06514	PAVE STRIPING-PERM PAINT-4 IN	10,470.00	LF
0335	06542	PAVE STRIPING-THERMO-6 IN W	81,513.00	LF
0340	06543	PAVE STRIPING-THERMO-6 IN Y	54,794.00	LF
0345	06546	PAVE STRIPING-THERMO-12 IN W	3,832.00	LF
0350	06549	PAVE STRIPING-TEMP REM TAPE-B	20,000.00	LF
0355	06550	PAVE STRIPING-TEMP REM TAPE-W	20,000.00	LF
0360	06551	PAVE STRIPING-TEMP REM TAPE-Y	20,000.00	LF
0365	06556	PAVE STRIPING-DUR TY 1-6 IN W	734.00	LF
0370	06557	PAVE STRIPING-DUR TY 1-6 IN Y	489.00	LF
0375	06568	PAVE MARKING-THERMO STOP BAR-24IN	57.00	LF
0380	06569	PAVE MARKING-THERMO CROSS-HATCH	2,730.00	SQFT
0385	06574	PAVE MARKING-THERMO CURV ARROW	7.00	EACH
0390	06585	PAVEMENT MARKER TY IVA-MW TEMP	3,600.00	EACH
0395	06586	PAVEMENT MARKER TY IVA-MY TEMP	7,400.00	EACH
0400	06588	PAVEMENT MARKER TY IVA-BY TEMP	100.00	EACH
0405	06600	REMOVE PAVEMENT MARKER TYPE V	630.00	EACH
0410	08903	CRASH CUSHION TY VI CLASS BT TL3	6.00	EACH
0415	08904	CRASH CUSHION TY VI CLASS C	2.00	EACH
0420	10020NS	FUEL ADJUSTMENT	370,230.00	DOLL
0425	10030NS	ASPHALT ADJUSTMENT	352,591.00	DOLL
0430	20071EC	JOINT ADHESIVE	201,600.00	LF
0435	20191ED	OBJECT MARKER TY 3	19.00	EACH
0440	20411ED	LAW ENFORCEMENT OFFICER	1,000.00	HOUR
0445	20432ES112	REMOVE CRASH CUSHION	2.00	EACH
0450	20757ED	PAVEMENT REPAIR	5,000.00	SQYD
0455	20758ED	REMOVE AND RESET PERF PIPE HEADWALL	12.00	EACH
0460	21370ED	LONGITUDINAL SAW CUT- 6 IN	50,400.00	LF

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0465	21430ES508	CONC MEDIAN BARRIER TYPE 12C(50)	23,748.00	LF
0470	21587EN	REINFORCED SOIL SLOPE	11,000.00	SQFT
0475	21802EN	G/R STEEL W BEAM-S FACE (7 FT POST)	21,512.50	LF
0480	23274EN11F	TURF REINFORCEMENT MAT 1	1,267.00	SQYD
0485	23696EC	BARRIER WALL - SHOULDER	700.00	LF
0490	23864EC	CHANNEL LINING CLASS III-MOD	2,160.00	TON
0495	23911EC	GROUT	718.00	CUYD
0500	24255EC	REMOVE CABLE GUARDRAIL BARRIER SYSTEM	24,180.00	LF
0505	24461ED	DRAINAGE GEOCOMPOSITE	117.00	SQYD
0510	24470ED	PERMEABLE PAVEMENT DRAIN	288.00	SQYD
0515	24489EC	INLAID PAVEMENT MARKER	2,753.00	EACH
0520	24781EC	INTELLIGENT COMPACTION FOR ASPHALT	138,235.00	TON
0525	24814EC	PIPELINE INSPECTION	2,572.00	LF
0530	24873EC	CONTROL SYSTEM FOR INCIDENT MANAGEMENT - 8-6.10	1.00	L S
0535	24891EC	PAVE MOUNT INFRARED TEMP EQUIPMENT	6,594,522.00	SF
0540	00001	DGA BASE	81,690.00	TON
0545	00008	CEMENT STABILIZED ROADBED	125,034.00	SQYD
0550	00018	DRAINAGE BLANKET-TYPE II-ASPH	63,190.00	TON
0555	00100	ASPHALT SEAL AGGREGATE	515.00	TON
0560	00103	ASPHALT SEAL COAT	62.00	TON
0565	00194	LEVELING & WEDGING PG76-22	4,463.00	TON
0570	00205	CL3 ASPH BASE 1.50D PG64-22	21,481.00	TON
0575	00208	CL4 ASPH BASE 1.50D PG64-22	19,616.00	TON
0580	00214	CL3 ASPH BASE 1.00D PG64-22	23,271.00	TON
0585	00219	CL4 ASPH BASE 1.00D PG76-22	34,145.00	TON
0590	00228	CL4 ASPH BASE 0.75D PG76-22	2,816.00	TON
0595	00279	CL4 ASPH BIND 0.50D PG76-22	3,107.00	TON
0600	00339	CL3 ASPH SURF 0.38D PG64-22	18,190.00	TON
0605	00342	CL4 ASPH SURF 0.38A PG76-22	19,267.00	TON
0610	00358	ASPHALT CURING SEAL	264.00	TON
0615	02542	CEMENT	2,431.00	TON
0620	02677	ASPHALT PAVE MILLING & TEXTURING	3,049.00	TON
0625	02702	SAND FOR BLOTTER	722.00	TON
0630	24965EC	CRUSHED STONE BASE - MODIFIED	86,052.00	TON
0635	00472	CULVERT PIPE-60 IN	33.00	LF
0640	00521	STORM SEWER PIPE-15 IN	1,702.00	LF
0645	00522	STORM SEWER PIPE-18 IN	2,969.00	LF
0650	00524	STORM SEWER PIPE-24 IN	320.00	LF
0655	00526	STORM SEWER PIPE-30 IN	119.00	LF
0660	01000	PERFORATED PIPE-4 IN	196.00	LF
0665	01001	PERFORATED PIPE-6 IN	22,946.00	LF
0670	01002	PERFORATED PIPE-8 IN	2,436.00	LF
0675	01010	NON-PERFORATED PIPE-4 IN	400.00	LF
0680	01011	NON-PERFORATED PIPE-6 IN	974.00	LF
0685	01012	NON-PERFORATED PIPE-8 IN	50.00	LF
0690	01020	PERF PIPE HEADWALL TY 1-4 IN	16.00	EACH
0695	01021	PERF PIPE HEADWALL TY 1-6 IN	2.00	EACH
0700	01022	PERF PIPE HEADWALL TY 1-8 IN	5.00	EACH
0705	01024	PERF PIPE HEADWALL TY 2-4 IN	7.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0710	01025	PERF PIPE HEADWALL TY 2-6 IN	1.00	EACH
0715	01028	PERF PIPE HEADWALL TY 3-4 IN	11.00	EACH
0720	01029	PERF PIPE HEADWALL TY 3-6 IN	3.00	EACH
0725	01032	PERF PIPE HEADWALL TY 4-4 IN	9.00	EACH
0730	01033	PERF PIPE HEADWALL TY 4-6 IN	7.00	EACH
0735	01204	PIPE CULVERT HEADWALL-18 IN	3.00	EACH
0740	01208	PIPE CULVERT HEADWALL-24 IN	1.00	EACH
0745	01210	PIPE CULVERT HEADWALL-30 IN	2.00	EACH
0750	01433	SLOPED BOX OUTLET TYPE 1-18 IN	9.00	EACH
0755	01434	SLOPED BOX OUTLET TYPE 1-24 IN	3.00	EACH
0760	01480	CURB BOX INLET TYPE B	5.00	EACH
0765	01490	DROP BOX INLET TYPE 1	7.00	EACH
0770	01493	DROP BOX INLET TYPE 2	2.00	EACH
0775	01538	DROP BOX INLET TYPE 7	1.00	EACH
0780	01565	DROP BOX INLET TYPE 13GT	9.00	EACH
0785	01642	JUNCTION BOX-18 IN	2.00	EACH
0790	01643	JUNCTION BOX-24 IN	3.00	EACH
0795	01660	SPRING BOX INLET TYPE A	1.00	EACH
0800	01691	FLUME INLET TYPE 2	1.00	EACH
0805	01741	CORED HOLE DRAINAGE BOX CON-6 IN	100.00	EACH
0810	01767	MANHOLE TYPE C	1.00	EACH
0815	02600	FABRIC GEOTEXTILE TY IV FOR PIPE	16,160.00	SQYD
0820	15124	S CIPP LINER 15 INCH	215.00	LF
0825	15125	S CIPP LINER 18 INCH	590.00	LF
0830	21601NN	CONC MED BAR BOX INLET TY 12A2-50	4.00	EACH
0835	21602NN	CONC MED BARR BOX INLET TY 12B2-50	17.00	EACH
0840	23611NN	CONC MED BAR BOX INLET TY 12B1-50	29.00	EACH
0845	23644EC	DROP BOX INLET TY 3-SAG	1.00	EACH
0850	23948EC	RESET MANHOLE FRAME AND LID	1.00	EACH
0855	02231	STRUCTURE GRANULAR BACKFILL	460.00	CUYD
0860	02555	CONCRETE-CLASS B	6.20	CUYD
0865	02998	MASONRY COATING	2,450.00	SQYD
0870	03299	ARMORED EDGE FOR CONCRETE	286.00	LF
0875	08001	STRUCTURE EXCAVATION-COMMON	1,967.00	CUYD
0880	08020	CRUSHED AGGREGATE SLOPE PROT	1,035.00	TON
0885	08033	TEST PILES	529.00	LF
0890	08039	PRE-DRILLING FOR PILES	360.00	LF
0895	08046	PILES-STEEL HP12X53	6,046.00	LF
0900	08094	PILE POINTS-12 IN	194.00	EACH
0905	08100	CONCRETE-CLASS A	687.00	CUYD
0910	08104	CONCRETE-CLASS AA	1,260.80	CUYD
0915	08130	MECHANICAL REINF COUPLER #5	16.00	EACH
0920	08133	MECHANICAL REINF COUPLER #8	32.00	EACH
0925	08150	STEEL REINFORCEMENT	118,953.00	LB
0930	08151	STEEL REINFORCEMENT-EPOXY COATED	321,906.00	LB
0935	08500	APPROACH SLAB	688.00	SQYD
0940	21532ED	RAIL SYSTEM TYPE III	490.00	LF
0945	23055N	REMOVE - 2 BINS OF METAL RETAINING WALL- 8-6.10	1.00	LS
0950	24520EC	PPC I-BEAM HN 48-49	3,845.80	LF
0955	08003	FOUNDATION PREPARATION - 8-6.10	1.00	LS

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0960	08100	CONCRETE-CLASS A	9.00	CUYD
0965	08150	STEEL REINFORCEMENT	1,525.00	LB
0970	04903	REFERENCE MARKER	48.00	EACH
0975	04904	BARRIER MOUNTING BRACKET	24.00	EACH
0980	06400	GMSS GALV STEEL TYPE A	7,010.00	LB
0985	06405	SBM ALUMINUM PANEL SIGNS	911.00	SQFT
0990	06406	SBM ALUM SHEET SIGNS .080 IN	229.00	SQFT
0995	06407	SBM ALUM SHEET SIGNS .125 IN	601.00	SQFT
1000	06410	STEEL POST TYPE 1	1,207.00	LF
1005	06412	STEEL POST MILE MARKERS	10.00	EACH
1010	06441	GMSS GALV STEEL TYPE C	17,442.00	LB
1015	06451	REMOVE SIGN SUPPORT BEAM	34.00	EACH
1020	06490	CLASS A CONCRETE FOR SIGNS	87.00	CUYD
1025	06491	STEEL REINFORCEMENT FOR SIGNS	2,290.00	LB
1030	20418ED	REMOVE & RELOCATE SIGNS	18.00	EACH
1035	20419ND	ROADWAY CROSS SECTION	15.00	EACH
1040	21373ND	REMOVE SIGN	4.00	EACH
1045	21596ND	GMSS TYPE D	66.00	EACH
1050	24631EC	BARCODE SIGN INVENTORY	202.00	EACH
1055	04710	POLE 80 FT MTG HT HIGH MAST	4.00	EACH
1060	04714	POLE 120 FT MTG HT HIGH MAST	5.00	EACH
1065	04761	LIGHTING CONTROL EQUIPMENT	1.00	EACH
1070	04797	CONDUIT-3 IN	1,100.00	LF
1075	04800	MARKER	19.00	EACH
1080	04820	TRENCHING AND BACKFILLING	5,460.00	LF
1085	04860	CABLE-NO. 8/3C DUCTED	1,840.00	LF
1090	04861	CABLE-NO. 6/3C DUCTED	2,985.00	LF
1095	04940	REMOVE LIGHTING - 8-6.10	1.00	LS
1100	20391NS835	ELECTRICAL JUNCTION BOX TYPE A	12.00	EACH
1105	20410ED	MAINTAIN LIGHTING - 8-6.10	1.00	LS
1110	21543EN	BORE AND JACK CONDUIT	1,100.00	LF
1115	23161EN	POLE BASE-HIGH MAST	85.30	CUYD
1120	24749EC	HIGH MAST LED LUMINAIRE	47.00	EACH
1125	24851EC	CABLE-NO. 10/3C DUCTED	9,120.00	LF
1130	04793	CONDUIT-1 1/4 IN	60.00	LF
1135	04795	CONDUIT-2 IN	20.00	LF
1140	04820	TRENCHING AND BACKFILLING	70.00	LF
1145	04829	PIEZOELECTRIC SENSOR	6.00	EACH
1150	04830	LOOP WIRE	2,900.00	LF
1155	04895	LOOP SAW SLOT AND FILL	560.00	LF
1160	20359NN	GALVANIZED STEEL CABINET	2.00	EACH
1165	20360ES818	WOOD POST	4.00	EACH
1170	20391NS835	ELECTRICAL JUNCTION BOX TYPE A	2.00	EACH
1175	04797	CONDUIT-3 IN	50.00	LF
1180	04800	MARKER	1.00	EACH
1185	04820	TRENCHING AND BACKFILLING	700.00	LF
1190	20257NC	SITE PREPARATION - 8-6.10	1.00	LS
1195	21058ND	WINCH LOWERING TOOL	1.00	EACH
1200	21066ND	MODEL 336 ENCLOSURE	1.00	EACH
1205	21069ND	SURGE DEVICE 120 VOLT	1.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1210	21071ND	DATA SURGE DEVICE	1.00	EACH
1215	21079ND	TRANSFORMER 480/120	1.00	EACH
1220	21489ND	RACK MOUNTED UPS	1.00	EACH
1225	21543EN	BORE AND JACK CONDUIT	50.00	LF
1230	22403NN	WEB CAMERA ASSEMBLY	1.00	EACH
1235	23150NN	COMMUNICATION CABLE	50.00	LF
1240	23151NN	POLE WITH LOWERING DEVICE	1.00	EACH
1245	23157EN	TRAFFIC SIGNAL POLE BASE	4.00	CUYD
1250	23941EC	VIDEO SURVEILLANCE CONTROLLER	1.00	EACH
1255	23944EC	ADVANCED GROUNDING SYSTEM	1.00	EACH
1260	24851EC	CABLE-NO. 10/3C DUCTED	750.00	LF
1265	02220	FLOWABLE FILL	150.00	CUYD
1270	14003	W CAP EXISTING MAIN	2.00	EACH
1275	14012	W ENCASEMENT STEEL OPEN CUT RANGE 1 - 6 IN	1,250.00	LF
1280	14047	W PIPE DCTL IRON RSTRND JOINT 06 IN	1,250.00	LF
1285	14089	W TAPPING SLEEVE AND VALVE SIZE 1 - 6 IN X 6 IN	2.00	EACH
1290	02568	MOBILIZATION	1.00	LS
1295	02569	DEMOBILIZATION	1.00	LS
1300	02231	STRUCTURE GRANULAR BACKFILL	1,200.00	CUYD
1305	14023	W FLUSHING ASSEMBLY	1.00	EACH
1310	14028	W METER 3/4 INCH	1.00	EACH
1315	14085	W SERV PE/PLST SHORT SIDE 3/4 IN	1.00	EACH
1320	08269	ELECTRICAL CONDUIT - GALVINIZED- 8-6.10	1.00	LS
1325	02742	TRAINEE PAYMENT REIMBURSEMENT - CEMENT MASON	1,200.00	HOUR

CONTRACT ID: 181001 **102GR18D001-NHPP IM** **DE10200751802**

I-75 (ROCKCASTLE COUNTY) TENNESSEE STATE LINE - LEXINGTON; WIDEN I-75 TO 6 LANES FROM 1.1 MILES N US 25 INTERCHANGE AT MT. VERNON N TO 1.85 MILES N GREEN HILL ROAD OVERPASS GRADE, DRAIN & SURFACE WITH BRIDGE, A DISTANCE OF 4.42 MILES.

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1330	00001	DGA BASE	66,730.00	TON
1335	00008	CEMENT STABILIZED ROADBED	188,611.00	SQYD
1340	00018	DRAINAGE BLANKET-TYPE II-ASPH	28,419.00	TON
1345	00100	ASPHALT SEAL AGGREGATE	1,074.00	TON
1350	00103	ASPHALT SEAL COAT	129.00	TON
1355	00194	LEVELING & WEDGING PG76-22	5,519.00	TON
1360	00205	CL3 ASPH BASE 1.50D PG64-22	15,297.00	TON
1365	00208	CL4 ASPH BASE 1.50D PG64-22	24,452.00	TON
1370	00214	CL3 ASPH BASE 1.00D PG64-22	20,756.00	TON
1375	00219	CL4 ASPH BASE 1.00D PG76-22	18,828.00	TON
1380	00221	CL2 ASPH BASE 0.75D PG64-22	2,200.00	TON
1385	00339	CL3 ASPH SURF 0.38D PG64-22	13,959.00	TON
1390	00342	CL4 ASPH SURF 0.38A PG76-22	15,411.00	TON
1395	00358	ASPHALT CURING SEAL	340.00	TON
1400	02542	CEMENT	3,685.00	TON

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1405	02676	MOBILIZATION FOR MILL & TEXT - 8-6.20	1.00	LS
1410	02677	ASPHALT PAVE MILLING & TEXTURING	4,233.00	TON
1415	02702	SAND FOR BLOTTER	943.00	TON
1420	20071EC	JOINT ADHESIVE	239,801.00	LF
1425	21289ED	LONGITUDINAL EDGE KEY	68,529.00	LF
1430	24781EC	INTELLIGENT COMPACTION FOR ASPHALT	144,175.00	TON
1435	24891EC	PAVE MOUNT INFRARED TEMP EQUIPMENT	4,669,000.00	SF
1440	24965EC	CRUSHED STONE BASE - MODIFIED	61,852.00	TON
1445	00078	CRUSHED AGGREGATE SIZE NO 2 - (FOR PERFORATED PIPE HEADWALLS)	50.00	TON
1450	01000	PERFORATED PIPE-4 IN	14,621.00	LF
1455	01001	PERFORATED PIPE-6 IN	22,839.00	LF
1460	01010	NON-PERFORATED PIPE-4 IN	553.00	LF
1465	01011	NON-PERFORATED PIPE-6 IN	212.00	LF
1470	01015	INSPECT & CERTIFY EDGE DRAIN SYSTEM - 8-6.20	1.00	LS
1475	01020	PERF PIPE HEADWALL TY 1-4 IN	15.00	EACH
1480	01024	PERF PIPE HEADWALL TY 2-4 IN	4.00	EACH
1485	01028	PERF PIPE HEADWALL TY 3-4 IN	28.00	EACH
1490	01032	PERF PIPE HEADWALL TY 4-4 IN	3.00	EACH
1495	01875	STANDARD HEADER CURB	1,380.00	LF
1500	01890	ISLAND HEADER CURB TYPE 1	52.00	LF
1505	01982	DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	357.00	EACH
1510	01983	DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL YELLOW	9.00	EACH
1515	01984	DELINEATOR FOR BARRIER - WHITE	950.00	EACH
1520	01985	DELINEATOR FOR BARRIER - YELLOW	936.00	EACH
1525	02003	RELOCATE TEMP CONC BARRIER	82,550.00	LF
1530	02159	TEMP DITCH	19,875.00	LF
1535	02160	CLEAN TEMP DITCH	7,938.00	LF
1540	02200	ROADWAY EXCAVATION	838,782.00	CUYD
1545	02223	GRANULAR EMBANKMENT	7,000.00	CUYD
1550	02242	WATER - (FOR DUST CONTROL)	1,250.00	MGAL
1555	02262	FENCE-WOVEN WIRE TYPE 1	10,232.00	LF
1560	02363	GUARDRAIL CONNECTOR TO BRIDGE END TY A	4.00	EACH
1565	02369	GUARDRAIL END TREATMENT TYPE 2A	30.00	EACH
1570	02381	REMOVE GUARDRAIL	25,466.00	LF
1575	02387	GUARDRAIL CONNECTOR TO BRIDGE END TY A-1	4.00	EACH
1580	02391	GUARDRAIL END TREATMENT TYPE 4A	12.00	EACH
1585	02429	RIGHT-OF-WAY MONUMENT TYPE 1	43.00	EACH
1590	02432	WITNESS POST	3.00	EACH
1595	02482	CHANNEL LINING CLASS IA	479.00	TON
1600	02483	CHANNEL LINING CLASS II	3,435.00	TON
1605	02484	CHANNEL LINING CLASS III	2,236.00	TON
1610	02545	CLEARING AND GRUBBING - (APPROXIMATELY 96 ACRES) 8-6.20	1.00	LS
1615	02562	TEMPORARY SIGNS	770.00	SQFT
1620	02585	EDGE KEY	35.00	LF
1625	02599	FABRIC-GEOTEXTILE TYPE IV	24,000.00	SQYD
1630	02650	MAINTAIN & CONTROL TRAFFIC - 8-6.20	1.00	LS
1635	02671	PORTABLE CHANGEABLE MESSAGE SIGN	8.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1640	02690	SAFELOADING	54.00	CUYD
1645	02696	SHOULDER RUMBLE STRIPS	54,681.00	LF
1650	02701	TEMP SILT FENCE	15,875.00	LF
1655	02703	SILT TRAP TYPE A	192.00	EACH
1660	02704	SILT TRAP TYPE B	192.00	EACH
1665	02705	SILT TRAP TYPE C	192.00	EACH
1670	02706	CLEAN SILT TRAP TYPE A	192.00	EACH
1675	02707	CLEAN SILT TRAP TYPE B	192.00	EACH
1680	02708	CLEAN SILT TRAP TYPE C	192.00	EACH
1685	02726	STAKING - 8-6.20	1.00	LS
1690	02731	REMOVE STRUCTURE - (I-75 NB OVER LAKE LINVILLE ROAD) 8-6.20	1.00	LS
1695	02731	REMOVE STRUCTURE - (I-75 NB OVER US 25) 8-6.20	1.00	LS
1700	02731	REMOVE STRUCTURE - (I-75 SB OVER LAKE LINVILLE ROAD) 8-6.20	1.00	LS
1705	02731	REMOVE STRUCTURE - (I-75 SB OVER US 25) 8-6.20	1.00	LS
1710	02742	TRAINEE PAYMENT REIMBURSEMENT - CEMENT MASON	1,200.00	HOUR
1715	02742	TRAINEE PAYMENT REIMBURSEMENT - CEMENT MASON	1,200.00	HOUR
1720	02742	TRAINEE PAYMENT REIMBURSEMENT - GROUP 2, 3 OR 4 OPERATOR	1,400.00	HOUR
1725	02775	ARROW PANEL	6.00	EACH
1730	02898	RELOCATE CRASH CUSHION	11.00	EACH
1735	03171	CONCRETE BARRIER WALL TYPE 9T	52,565.00	LF
1740	03425	ADJUST WATER VALVE	1.00	EACH
1745	05950	EROSION CONTROL BLANKET	7,132.00	SQYD
1750	05952	TEMP MULCH	1,858,560.00	SQYD
1755	05953	TEMP SEEDING AND PROTECTION	464,640.00	SQYD
1760	05963	INITIAL FERTILIZER	23.00	TON
1765	05964	20-10-10 FERTILIZER	23.00	TON
1770	05985	SEEDING AND PROTECTION	437,950.00	SQYD
1775	06401	FLEXIBLE DELINEATOR POST-M/W	784.00	EACH
1780	06404	FLEXIBLE DELINEATOR POST-M/Y	77.00	EACH
1785	06511	PAVE STRIPING-TEMP PAINT-6 IN	361,795.00	LF
1790	06540	PAVE STRIPING-THERMO-4 IN W	3,880.00	LF
1795	06541	PAVE STRIPING-THERMO-4 IN Y	7,574.00	LF
1800	06542	PAVE STRIPING-THERMO-6 IN W	79,234.00	LF
1805	06543	PAVE STRIPING-THERMO-6 IN Y	51,450.00	LF
1810	06546	PAVE STRIPING-THERMO-12 IN W	5,322.00	LF
1815	06549	PAVE STRIPING-TEMP REM TAPE-B	10,000.00	LF
1820	06550	PAVE STRIPING-TEMP REM TAPE-W	10,000.00	LF
1825	06551	PAVE STRIPING-TEMP REM TAPE-Y	10,000.00	LF
1830	06568	PAVE MARKING-THERMO STOP BAR-24IN	147.00	LF
1835	06569	PAVE MARKING-THERMO CROSS-HATCH	1,769.00	SQFT
1840	06572	PAVE MARKING-DOTTED LANE EXTEN	20.00	LF
1845	06574	PAVE MARKING-THERMO CURV ARROW	38.00	EACH
1850	06578	PAVE MARKING-THERMO MERGE ARROW	6.00	EACH
1855	06585	PAVEMENT MARKER TY IVA-MW TEMP	10,366.00	EACH
1860	06586	PAVEMENT MARKER TY IVA-MY TEMP	4,476.00	EACH
1865	08100	CONCRETE-CLASS A	3.77	CUYD

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1870	08150	STEEL REINFORCEMENT	163.00	LB
1875	08901	CRASH CUSHION TY VI CLASS BT TL2	2.00	EACH
1880	08903	CRASH CUSHION TY VI CLASS BT TL3	7.00	EACH
1885	10020NS	FUEL ADJUSTMENT	190,100.00	DOLL
1890	10030NS	ASPHALT ADJUSTMENT	208,000.00	DOLL
1895	20191ED	OBJECT MARKER TY 3	12.00	EACH
1900	20411ED	LAW ENFORCEMENT OFFICER	500.00	HOUR
1905	20629NS719	THRIE BEAM TO W BEAM CONNECTOR	2.00	EACH
1910	21380ES719	GUARDRAIL THRIE BEAM	1,182.50	LF
1915	21417ES717	PAVE MARK THERMO CONE CAP-SOLID YELLOW	541.00	SQFT
1920	21430ES508	CONC MEDIAN BARRIER TYPE 12C(50)	21,534.00	LF
1925	21802EN	G/R STEEL W BEAM-S FACE (7 FT POST)	24,850.00	LF
1930	23010EN	PAVE MARK TEMP PAINT STOP BAR-24 IN	147.00	LF
1935	23979EC	CRASH CUSHION TY VI CLASS C TL3	1.00	EACH
1940	24255EC	REMOVE CABLE GUARDRAIL BARRIER SYSTEM	22,412.00	LF
1945	24489EC	INLAID PAVEMENT MARKER	1,769.00	EACH
1950	24707ED	CABLE BARRIER SYSTEM REMOVE & RESTORE - 8-6.20	1.00	LS
1955	24814EC	PIPELINE INSPECTION	12,900.00	LF
1960	24873EC	CONTROL SYSTEM FOR INCIDENT MANAGEMENT - 8-6.20	1.00	L S
1965	00440	ENTRANCE PIPE-15 IN	38.00	LF
1970	00461	CULVERT PIPE-15 IN	180.00	LF
1975	00462	CULVERT PIPE-18 IN	863.00	LF
1980	00464	CULVERT PIPE-24 IN	340.00	LF
1985	00466	CULVERT PIPE-30 IN	77.00	LF
1990	00468	CULVERT PIPE-36 IN	58.00	LF
1995	00474	CULVERT PIPE-72 IN	17.00	LF
2000	00521	STORM SEWER PIPE-15 IN	5,403.00	LF
2005	00522	STORM SEWER PIPE-18 IN	1,817.00	LF
2010	00524	STORM SEWER PIPE-24 IN	923.00	LF
2015	00526	STORM SEWER PIPE-30 IN	224.00	LF
2020	01202	PIPE CULVERT HEADWALL-15 IN	5.00	EACH
2025	01204	PIPE CULVERT HEADWALL-18 IN	10.00	EACH
2030	01208	PIPE CULVERT HEADWALL-24 IN	5.00	EACH
2035	01210	PIPE CULVERT HEADWALL-30 IN	4.00	EACH
2040	01212	PIPE CULVERT HEADWALL-36 IN	3.00	EACH
2045	01381	METAL END SECTION TY 2-18 IN	2.00	EACH
2050	01432	SLOPED BOX OUTLET TYPE 1-15 IN	3.00	EACH
2055	01450	S & F BOX INLET-OUTLET-18 IN	1.00	EACH
2060	01451	S & F BOX INLET-OUTLET-24 IN	4.00	EACH
2065	01452	S & F BOX INLET-OUTLET-30 IN	3.00	EACH
2070	01480	CURB BOX INLET TYPE B	3.00	EACH
2075	01490	DROP BOX INLET TYPE 1	5.00	EACH
2080	01493	DROP BOX INLET TYPE 2	1.00	EACH
2085	01505	DROP BOX INLET TYPE 5B	3.00	EACH
2090	01538	DROP BOX INLET TYPE 7	1.00	EACH
2095	01559	DROP BOX INLET TYPE 13G	5.00	EACH
2100	01568	DROP BOX INLET TYPE 13S	1.00	EACH
2105	01584	CAP DROP BOX INLET	2.00	EACH
2110	01650	JUNCTION BOX	5.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
2115	01719	ADJUST INLET	1.00	EACH
2120	01756	MANHOLE TYPE A	2.00	EACH
2125	01761	MANHOLE TYPE B	1.00	EACH
2130	01767	MANHOLE TYPE C	1.00	EACH
2135	02600	FABRIC GEOTEXTILE TY IV FOR PIPE	15,197.00	SQYD
2140	15007	S CIPP LINER 24 INCH	574.00	LF
2145	15124	S CIPP LINER 15 INCH	1,001.00	LF
2150	15125	S CIPP LINER 18 INCH	361.00	LF
2155	15128	S CIPP LINER 30 INCH	377.00	LF
2160	15129	S CIPP LINER 36 INCH	278.00	LF
2165	15132	S CIPP LINER 54 INCH	136.00	LF
2170	15133	S CIPP LINER 60 INCH	43.00	LF
2175	15135	S CIPP LINER 72 INCH	717.00	LF
2180	21602NN	CONC MED BARR BOX INLET TY 12B2-50	8.00	EACH
2185	21602NN	CONC MED BARR BOX INLET TY 12B2-50 - (ASSYMETRICAL)	2.00	EACH
2190	21799EN	BORE AND JACK PIPE-24 IN	123.00	LF
2195	22620NN	CONC MED BARR BOX INLET TY 12A1-50 - (ASSYMETRICAL)	2.00	EACH
2200	23126EN	BORE AND JACK PIPE-18 IN	361.00	LF
2205	23611NN	CONC MED BAR BOX INLET TY 12B1-50	1.00	EACH
2210	23611NN	CONC MED BAR BOX INLET TY 12B1-50 - (ASSYMETRICAL)	48.00	EACH
2215	24025EC	PIPE CULVERT HEADWALL-72 IN	1.00	EACH
2220	02231	STRUCTURE GRANULAR BACKFILL	2,135.00	CUYD
2225	02403	REMOVE CONCRETE MASONRY	25.00	CUYD
2230	02998	MASONRY COATING	3,011.00	SQYD
2235	03299	ARMORED EDGE FOR CONCRETE	307.00	LF
2240	08001	STRUCTURE EXCAVATION-COMMON	2,869.00	CUYD
2245	08002	STRUCTURE EXCAV-SOLID ROCK	165.00	CUYD
2250	08020	CRUSHED AGGREGATE SLOPE PROT	1,126.00	TON
2255	08033	TEST PILES	221.00	LF
2260	08039	PRE-DRILLING FOR PILES	380.00	LF
2265	08046	PILES-STEEL HP12X53	3,825.00	LF
2270	08094	PILE POINTS-12 IN	147.00	EACH
2275	08100	CONCRETE-CLASS A	981.70	CUYD
2280	08104	CONCRETE-CLASS AA	1,523.80	CUYD
2285	08150	STEEL REINFORCEMENT	134,604.00	LB
2290	08151	STEEL REINFORCEMENT-EPOXY COATED	374,320.00	LB
2295	08500	APPROACH SLAB	851.00	SQYD
2300	21532ED	RAIL SYSTEM TYPE III	550.00	LF
2305	23813EC	DECK DRAIN	4.00	EACH
2310	24463ED	PPC I-BEAM HN 54 49	4,319.00	LF
2315	24943ED	RAIL SYSTEM TYPE 15	550.00	LF
2320	02231	STRUCTURE GRANULAR BACKFILL	879.00	CUYD
2325	02403	REMOVE CONCRETE MASONRY	20.00	CUYD
2330	02998	MASONRY COATING	537.00	SQYD
2335	03299	ARMORED EDGE FOR CONCRETE	286.00	LF
2340	08001	STRUCTURE EXCAVATION-COMMON	221.00	CUYD
2345	08002	STRUCTURE EXCAV-SOLID ROCK	49.00	CUYD
2350	08100	CONCRETE-CLASS A	173.60	CUYD

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
2355	08104	CONCRETE-CLASS AA	457.20	CUYD
2360	08150	STEEL REINFORCEMENT	10,714.00	LB
2365	08151	STEEL REINFORCEMENT-EPOXY COATED	110,135.00	LB
2370	08500	APPROACH SLAB	792.00	SQYD
2375	08633	PRECAST PC I BEAM TYPE 3	1,423.00	LF
2380	21532ED	RAIL SYSTEM TYPE III	165.00	LF
2385	24943ED	RAIL SYSTEM TYPE 15	165.00	LF
2390	02231	STRUCTURE GRANULAR BACKFILL	947.00	CUYD
2395	08001	STRUCTURE EXCAVATION-COMMON	270.00	CUYD
2400	08100	CONCRETE-CLASS A	37.00	CUYD
2405	08150	STEEL REINFORCEMENT	8,090.00	LB
2410	02565	OBJECT MARKER TYPE 2	8.00	EACH
2415	04904	BARRIER MOUNTING BRACKET	25.00	EACH
2420	06400	GMSS GALV STEEL TYPE A	10,419.00	LB
2425	06405	SBM ALUMINUM PANEL SIGNS	1,759.30	SQFT
2430	06406	SBM ALUM SHEET SIGNS .080 IN	270.80	SQFT
2435	06407	SBM ALUM SHEET SIGNS .125 IN	1,090.00	SQFT
2440	06410	STEEL POST TYPE 1	2,187.50	LF
2445	06412	STEEL POST MILE MARKERS	44.00	EACH
2450	06441	GMSS GALV STEEL TYPE C	7,204.30	LB
2455	06451	REMOVE SIGN SUPPORT BEAM	31.00	EACH
2460	06490	CLASS A CONCRETE FOR SIGNS	65.80	CUYD
2465	06491	STEEL REINFORCEMENT FOR SIGNS	3,647.00	LB
2470	20418ED	REMOVE & RELOCATE SIGNS	13.00	EACH
2475	20419ND	ROADWAY CROSS SECTION	19.00	EACH
2480	20912ND	BARRIER WALL POST	3.00	EACH
2485	21373ND	REMOVE SIGN	2.00	EACH
2490	21596ND	GMSS TYPE D	44.00	EACH
2495	24631EC	BARCODE SIGN INVENTORY	203.00	EACH
2500	04792	CONDUIT-1 IN	15.00	LF
2505	04811	ELECTRICAL JUNCTION BOX TYPE B	3.00	EACH
2510	04820	TRENCHING AND BACKFILLING	220.00	LF
2515	04830	LOOP WIRE	2,500.00	LF
2520	04844	CABLE-NO. 14/5C	1,500.00	LF
2525	04850	CABLE-NO. 14/1 PAIR	2,500.00	LF
2530	04886	MESSENGER-15400 LB	400.00	LF
2535	04895	LOOP SAW SLOT AND FILL	800.00	LF
2540	04931	INSTALL CONTROLLER TYPE 170	1.00	EACH
2545	04932	INSTALL STEEL STRAIN POLE	3.00	EACH
2550	20188NS835	INSTALL LED SIGNAL-3 SECTION	8.00	EACH
2555	20266ES835	INSTALL LED SIGNAL- 4 SECTION	2.00	EACH
2560	20390NS835	INSTALL COORDINATING UNIT	1.00	EACH
2565	23157EN	TRAFFIC SIGNAL POLE BASE	16.00	CUYD
2570	24900EC	PVC CONDUIT-1 1/4 IN-SCHEDULE 80	140.00	LF
2575	24901EC	PVC CONDUIT-2 IN-SCHEDULE 80	80.00	LF
2580	04714	POLE 120 FT MTG HT HIGH MAST	4.00	EACH
2585	04797	CONDUIT-3 IN	330.00	LF
2590	04800	MARKER	17.00	EACH
2595	04820	TRENCHING AND BACKFILLING	6,485.00	LF
2600	04860	CABLE-NO. 8/3C DUCTED	4,226.00	LF

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
2605	04940	REMOVE LIGHTING - 8-6.20	1.00	LS
2610	20391NS835	ELECTRICAL JUNCTION BOX TYPE A	9.00	EACH
2615	20410ED	MAINTAIN LIGHTING - 8-6.20	1.00	LS
2620	21543EN	BORE AND JACK CONDUIT	330.00	LF
2625	23161EN	POLE BASE-HIGH MAST	22.00	CUYD
2630	24749EC	HIGH MAST LED LUMINAIRE	20.00	EACH
2635	24851EC	CABLE-NO. 10/3C DUCTED	7,520.00	LF
2640	04820	TRENCHING AND BACKFILLING	1,300.00	LF
2645	20257NC	SITE PREPARATION - 8-6.20	1.00	LS
2650	21058ND	WINCH LOWERING TOOL	2.00	EACH
2655	21066ND	MODEL 336 ENCLOSURE	1.00	EACH
2660	21069ND	SURGE DEVICE 120 VOLT	1.00	EACH
2665	21071ND	DATA SURGE DEVICE	1.00	EACH
2670	21079ND	TRANSFORMER 480/120	1.00	EACH
2675	21489ND	RACK MOUNTED UPS	1.00	EACH
2680	22403NN	WEB CAMERA ASSEMBLY	1.00	EACH
2685	23150NN	COMMUNICATION CABLE	50.00	LF
2690	23151NN	POLE WITH LOWERING DEVICE	1.00	EACH
2695	23157EN	TRAFFIC SIGNAL POLE BASE	4.00	CUYD
2700	23941EC	VIDEO SURVEILLANCE CONTROLLER	1.00	EACH
2705	23944EC	ADVANCED GROUNDING SYSTEM	1.00	EACH
2710	24851EC	CABLE-NO. 10/3C DUCTED	1,500.00	LF
2715	02220	FLOWABLE FILL	80.00	CUYD
2720	14003	W CAP EXISTING MAIN	2.00	EACH
2725	14012	W ENCASEMENT STEEL OPEN CUT RANGE 1	165.00	LF
2730	14023	W FLUSHING ASSEMBLY	1.00	EACH
2735	14057	W PIPE PVC 03 INCH	1,240.00	LF
2740	14089	W TAPPING SLEEVE AND VALVE SIZE 1	2.00	EACH
2745	14092	W TIE-IN 03 INCH	1.00	EACH
2750	14115	W VALVE CUT-IN 03 INCH	1.00	EACH
2755	20757ED	PAVEMENT REPAIR	15.00	SQYD
2760	02568	MOBILIZATION	1.00	LS
2765	02569	DEMOBILIZATION	1.00	LS

GUARDRAIL DELIVERY VERIFICATION SHEET

Contract Id: _____ **Contractor: _____**

Section Engineer: _____ **District & County: _____**

DESCRIPTION	UNIT	QTY LEAVING PROJECT	QTY RECEIVED@BB YARD
GUARDRAIL (Includes End treatments & crash cushions)	LF	_____	_____
STEEL POSTS	EACH	_____	_____
STEEL BLOCKS	EACH	_____	_____
WOOD OFFSET BLOCKS	EACH	_____	_____
BACK UP PLATES	EACH	_____	_____
CRASH CUSHION	EACH	_____	_____
NUTS, BOLTS, WASHERS	BAG/BCKT	_____	_____
DAMAGED RAIL TO MAINT. FACILITY	LF	_____	_____
DAMAGED POSTS TO MAINT. FACILITY	EACH	_____	_____

****Required Signatures before Leaving Project Site***

Printed Section Engineer's Representative_____ & Date_____

Signature Section Engineer's Representative_____& Date_____

Printed Contractor's Representative_____& Date_____

Signature Contractor's Representative_____& Date_____

Required Signatures after Arrival at Bailey Bridge Yard (All material on truck must be counted & the quantity received column completed before signatures)

Printed Bailey Bridge Yard Representative_____ & Date_____

Signature Bailey Bridge Yard Representative_____& Date_____

Printed Contractor's Representative_____& Date_____

Signature Contractor's Representative_____& Date_____

**Payment for the bid item remove guardrail will be based upon the quantities shown in the Bailey Bridge Yard received column. Payment will not be made for guardrail removal until the guardrail verification sheets are electronically submitted to the Section Engineer by the Bailey Bridge Yard Representative.

Completed Form Submitted to Section Engineer Date: _____ By: _____

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

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SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

2.0 MATERIALS.

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

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

2.2 Sign and Controls. All signs must:

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

1I

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

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

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

2.3 Power.

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

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

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

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

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

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

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

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

Code	Pay Item	Pay Unit
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

11D

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.

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).

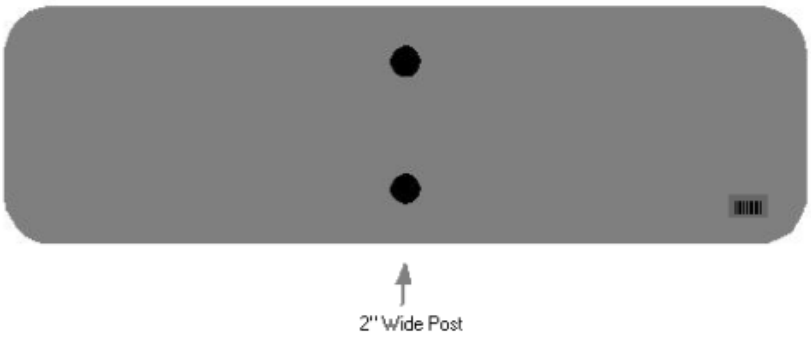
The installation of the permanent sign will be measured in accordance to Section 715.

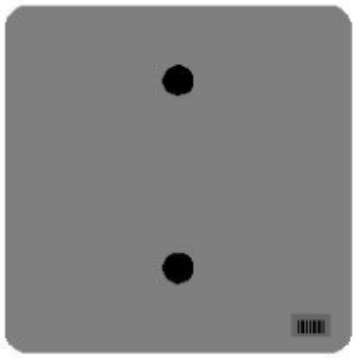
5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
24631EC	Barcode Sign Inventory	Each

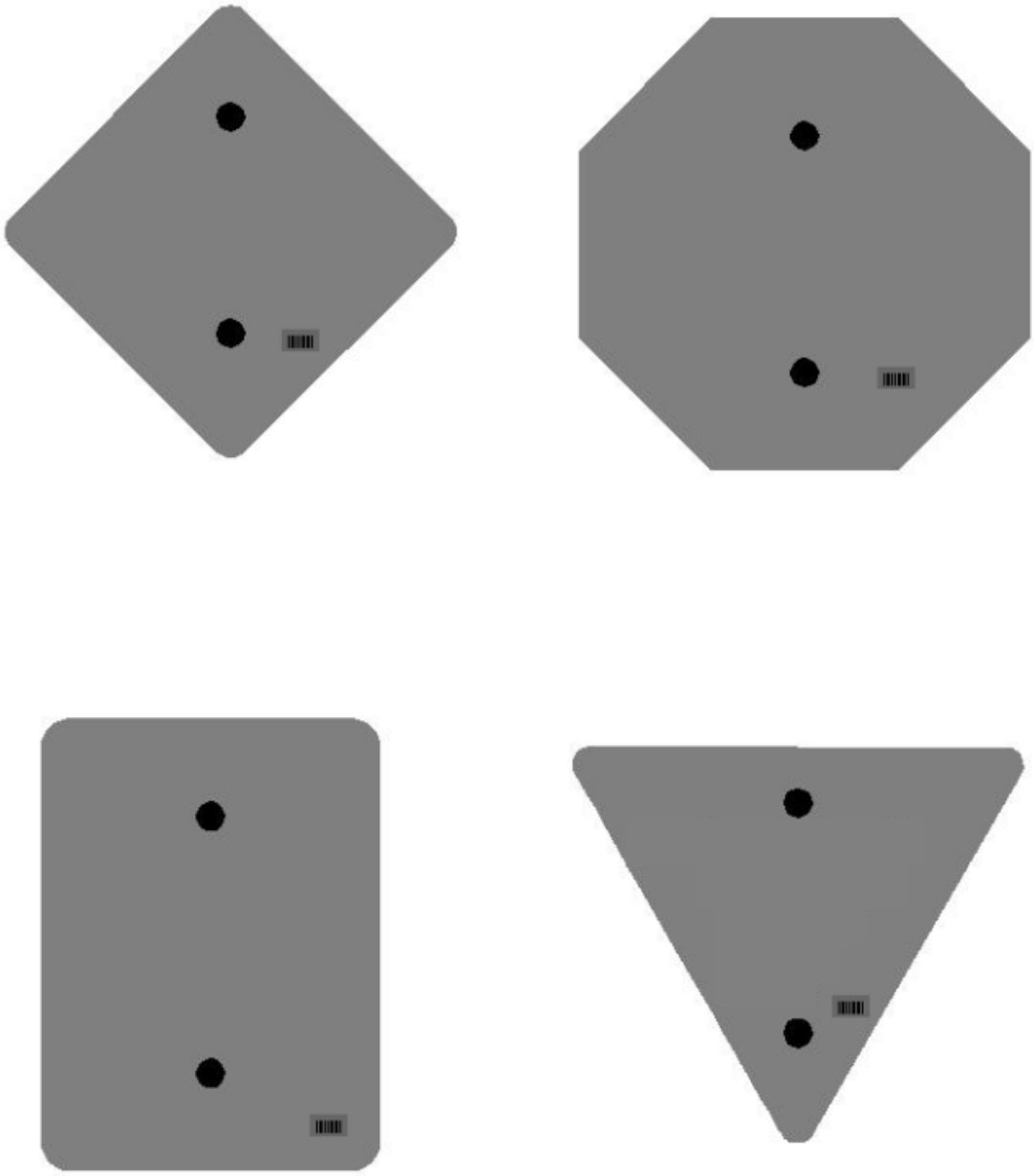
The Department will not make payment for this item until all barcodes are installed and sign inventory is complete on every permanent sign installed on the project. The Department will make payment for installation of the permanent sign in accordance to Section 715. The Department will consider payment as full compensation for all work required under this special note.

One Sign Post

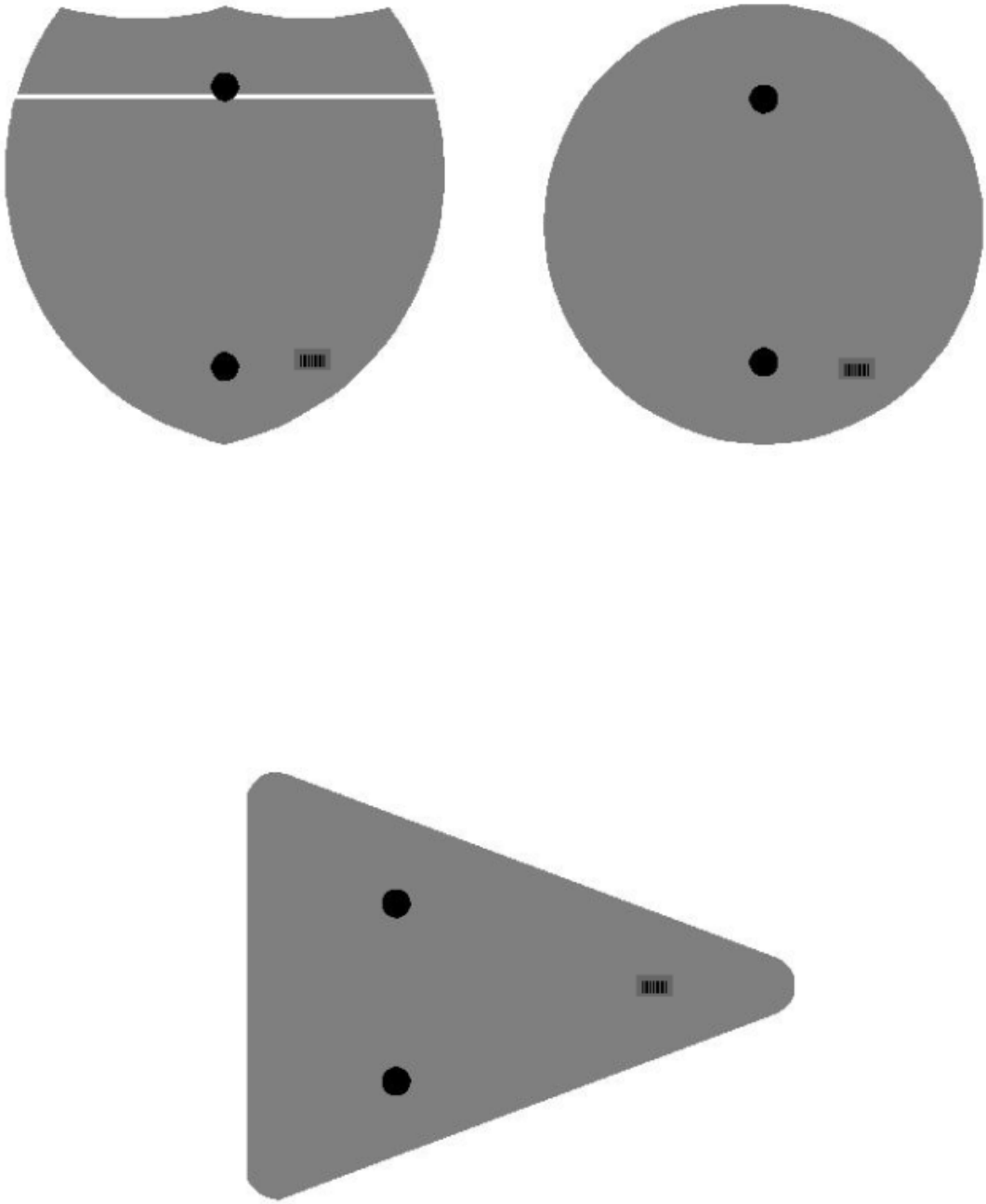




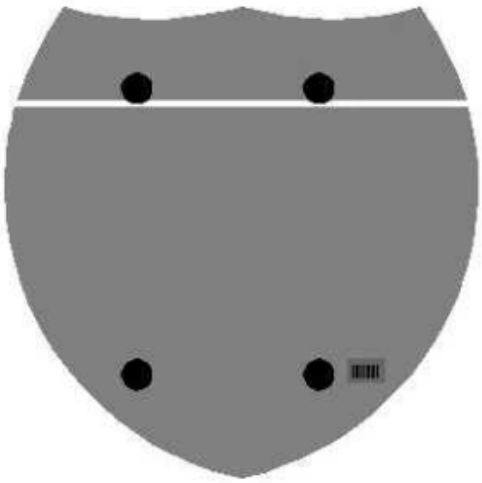
One Sign Post



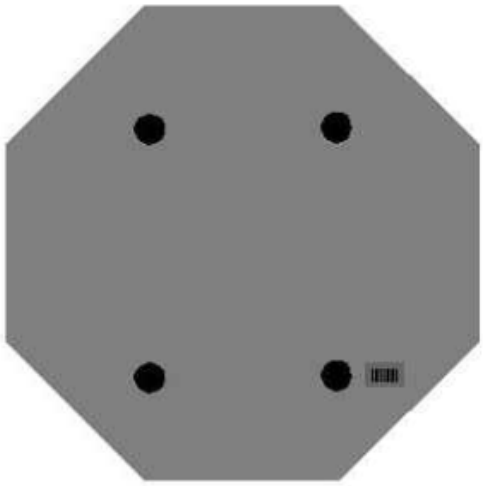
One Sign Post



Double Sign Post

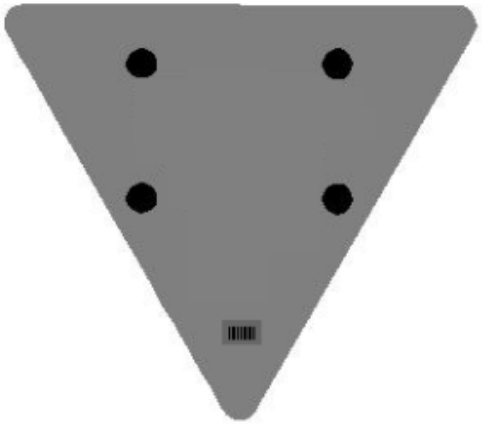


Interstate
Shield



48" Stop

2 Post Signs



11N

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 ^{o} 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.

11N

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)			3.0-3.4	2.5-2.9	2.0-2.4	≤1.9
ASTM D 3236	4.0-10.0	3.5-10.5	10.6-11.0	11.1-11.5	11.6-12.0	≥ 12.1
Cone Penetration, 77 ° F			54-56	51-53	48-50	≤ 47
ASTM D 5329	60-100	57-103	104-106	107-109	110-112	≥ 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	Pay Item	Pay Unit
20071EC	Joint Adhesive	Linear Foot

May 7, 2014

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

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

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).

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.

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.

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).

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.

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.

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.

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 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.

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.

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.

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 contacting 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 administrating agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

Revised: January 25, 2017

Standard Title VI/Non-Discrimination Assurances

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, **Federal Highway Administration**, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the **Federal Highway Administration** to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the **Federal Highway Administration**, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the **Federal Highway Administration** may determine to be appropriate, including, but not limited to:

    a. withholding payments to the contractor under the contract until the contractor complies; and/or
    b. cancelling, terminating, or suspending a contract, in whole or in part.

6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the **Federal Highway Administration** may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

Standard Title VI/Non-Discrimination Statutes and Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq*., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq*.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq*.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq*.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 -- 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

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.

Revised: January 27, 2017

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.

1-1-93

General Decision Number: KY180187 01/05/2018 KY187

Superseded General Decision Number: KY20170187

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 $10.35 for calendar year 2018 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 $10.35 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 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018

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

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
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

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 Rockcastle 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

181001

PROPOSAL BID ITEMS

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Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00001		DGA BASE	148,420.00	TON		$	
0020	00008		CEMENT STABILIZED ROADBED	313,645.00	SQYD		$	
0030	00018		DRAINAGE BLANKET-TYPE II-ASPH	91,609.00	TON		$	
0040	00100		ASPHALT SEAL AGGREGATE	1,589.00	TON		$	
0050	00103		ASPHALT SEAL COAT	191.00	TON		$	
0060	00194		LEVELING & WEDGING PG76-22	9,982.00	TON		$	
0070	00205		CL3 ASPH BASE 1.50D PG64-22	36,778.00	TON		$	
0080	00208		CL4 ASPH BASE 1.50D PG64-22	44,068.00	TON		$	
0090	00214		CL3 ASPH BASE 1.00D PG64-22	44,027.00	TON		$	
0100	00219		CL4 ASPH BASE 1.00D PG76-22	52,973.00	TON		$	
0110	00221		CL2 ASPH BASE 0.75D PG64-22	2,200.00	TON		$	
0120	00228		CL4 ASPH BASE 0.75D PG76-22	2,816.00	TON		$	
0130	00279		CL4 ASPH BIND 0.50D PG76-22	3,107.00	TON		$	
0140	00339		CL3 ASPH SURF 0.38D PG64-22	32,149.00	TON		$	
0150	00342		CL4 ASPH SURF 0.38A PG76-22	34,678.00	TON		$	
0160	00358		ASPHALT CURING SEAL	604.00	TON		$	
0170	02542		CEMENT	6,116.00	TON		$	
0180	02676		MOBILIZATION FOR MILL & TEXT 8-6.10	1.00	LS		$	
0190	02676		MOBILIZATION FOR MILL & TEXT 8-6.20	1.00	LS		$	
0200	02677		ASPHALT PAVE MILLING & TEXTURING	7,282.00	TON		$	
0210	02702		SAND FOR BLOTTER	1,665.00	TON		$	
0220	20071EC		JOINT ADHESIVE	239,801.00	LF		$	
0230	21289ED		LONGITUDINAL EDGE KEY	68,529.00	LF		$	
0240	24781EC		INTELLIGENT COMPACTION FOR ASPHALT	282,410.00	TON		$	
0250	24891EC		PAVE MOUNT INFRARED TEMP EQUIPMENT	11,263,522.00	SF		$	
0260	24965EC		CRUSHED STONE BASE - MODIFIED	147,904.00	TON		$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0270	00078		CRUSHED AGGREGATE SIZE NO 2	24,444.00	TON		$	
0280	00078		CRUSHED AGGREGATE SIZE NO 2 (FOR PERFORATED PIPE HEADWALLS)	50.00	TON		$	
0290	01000		PERFORATED PIPE-4 IN	15,621.00	LF		$	
0300	01001		PERFORATED PIPE-6 IN	24,271.00	LF		$	
0310	01010		NON-PERFORATED PIPE-4 IN	803.00	LF		$	
0320	01011		NON-PERFORATED PIPE-6 IN	212.00	LF		$	
0330	01015		INSPECT & CERTIFY EDGE DRAIN SYSTEM 8-6.10	1.00	LS		$	
0340	01015		INSPECT & CERTIFY EDGE DRAIN SYSTEM 8-6.20	1.00	LS		$	
0350	01020		PERF PIPE HEADWALL TY 1-4 IN	15.00	EACH		$	
0360	01024		PERF PIPE HEADWALL TY 2-4 IN	4.00	EACH		$	
0370	01028		PERF PIPE HEADWALL TY 3-4 IN	28.00	EACH		$	
0380	01032		PERF PIPE HEADWALL TY 4-4 IN	3.00	EACH		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0390	01875		STANDARD HEADER CURB	1,380.00	LF		$	
0400	01877		SPECIAL HEADER CURB	1,198.00	LF		$	
0410	01890		ISLAND HEADER CURB TYPE 1	52.00	LF		$	
0420	01891		ISLAND HEADER CURB TYPE 2	25.00	LF		$	
0430	01982		DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	830.00	EACH		$	
0440	01983		DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL YELLOW	20.00	EACH		$	
0450	01984		DELINEATOR FOR BARRIER - WHITE	960.00	EACH		$	
0460	01985		DELINEATOR FOR BARRIER - YELLOW	1,958.00	EACH		$	
0470	02003		RELOCATE TEMP CONC BARRIER	152,665.00	LF		$	
0480	02014		BARRICADE-TYPE III	16.00	EACH		$	
0490	02081		JPC PAVEMENT-8 IN SHLD	340.00	SQYD		$	
0500	02159		TEMP DITCH	45,075.00	LF		$	
0510	02160		CLEAN TEMP DITCH	33,138.00	LF		$	
0520	02165		REMOVE PAVED DITCH	640.00	SQYD		$	
0530	02200		ROADWAY EXCAVATION	1,413,348.00	CUYD		$	
0540	02223		GRANULAR EMBANKMENT	8,200.00	CUYD		$	
0550	02231		STRUCTURE GRANULAR BACKFILL	1,200.00	CUYD		$	
0560	02237		DITCHING	25,200.00	LF		$	
0570	02242		WATER (FOR DUST CONTROL)	1,250.00	MGAL		$	
0580	02262		FENCE-WOVEN WIRE TYPE 1	15,232.00	LF		$	
0590	02351		GUARDRAIL-STEEL W BEAM-S FACE	2,700.00	LF		$	
0600	02352		GUARDRAIL-STEEL W BEAM-D FACE	137.50	LF		$	
0610	02360		GUARDRAIL TERMINAL SECTION NO 1	1.00	EACH		$	
0620	02363		GUARDRAIL CONNECTOR TO BRIDGE END TY A	6.00	EACH		$	
0630	02366		GUARDRAIL TERMINAL SECTION NO 3	1.00	EACH		$	
0640	02367		GUARDRAIL END TREATMENT TYPE 1	13.00	EACH		$	
0650	02369		GUARDRAIL END TREATMENT TYPE 2A	49.00	EACH		$	
0660	02373		GUARDRAIL END TREATMENT TYPE 3	1.00	EACH		$	
0670	02381		REMOVE GUARDRAIL	56,321.00	LF		$	
0680	02387		GUARDRAIL CONNECTOR TO BRIDGE END TY A-1	6.00	EACH		$	
0690	02391		GUARDRAIL END TREATMENT TYPE 4A	13.00	EACH		$	
0700	02429		RIGHT-OF-WAY MONUMENT TYPE 1	43.00	EACH		$	
0710	02432		WITNESS POST	3.00	EACH		$	
0720	02482		CHANNEL LINING CLASS IA	479.00	TON		$	
0730	02483		CHANNEL LINING CLASS II	10,698.90	TON		$	
0740	02484		CHANNEL LINING CLASS III	4,162.40	TON		$	
0750	02545		CLEARING AND GRUBBING (APPROXIMATELY 96 ACRES) 8-6.20	1.00	LS		$	
0760	02545		CLEARING AND GRUBBING 96 ACRES- 8-6.10	1.00	LS		$	
0770	02562		TEMPORARY SIGNS	2,439.00	SQFT		$	
0780	02585		EDGE KEY	116.00	LF		$	
0790	02596		FABRIC-GEOTEXTILE TYPE I	1,817.00	SQYD		$	
0800	02599		FABRIC-GEOTEXTILE TYPE IV	108,732.00	SQYD		$	
0810	02650		MAINTAIN & CONTROL TRAFFIC 8-6.10	1.00	LS		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0820	02650		MAINTAIN & CONTROL TRAFFIC 8-6.20	1.00	LS		$	
0830	02671		PORTABLE CHANGEABLE MESSAGE SIGN	18.00	EACH		$	
0840	02690		SAFELOADING	75.50	CUYD		$	
0850	02696		SHOULDER RUMBLE STRIPS	167,299.00	LF		$	
0860	02701		TEMP SILT FENCE	41,075.00	LF		$	
0870	02703		SILT TRAP TYPE A	452.00	EACH		$	
0880	02704		SILT TRAP TYPE B	452.00	EACH		$	
0890	02705		SILT TRAP TYPE C	192.00	EACH		$	
0900	02706		CLEAN SILT TRAP TYPE A	712.00	EACH		$	
0910	02707		CLEAN SILT TRAP TYPE B	712.00	EACH		$	
0920	02708		CLEAN SILT TRAP TYPE C	192.00	EACH		$	
0930	02726		STAKING 8-6.10	1.00	LS		$	
0940	02726		STAKING 8-6.20	1.00	LS		$	
0950	02731		REMOVE STRUCTURE (I-75 NB OVER LAKE LINVILLE ROAD) 8-6.20	1.00	LS		$	
0960	02731		REMOVE STRUCTURE (I-75 NB OVER US 25) 8-6.20	1.00	LS		$	
0970	02731		REMOVE STRUCTURE (I-75 SB OVER LAKE LINVILLE ROAD) 8-6.20	1.00	LS		$	
0980	02731		REMOVE STRUCTURE (I-75 SB OVER US 25) 8-6.20	1.00	LS		$	
0990	02731		REMOVE STRUCTURE US-25 BRIDGE- 8-6.10	1.00	LS		$	
1000	02775		ARROW PANEL	12.00	EACH		$	
1010	02898		RELOCATE CRASH CUSHION	19.00	EACH		$	
1020	03171		CONCRETE BARRIER WALL TYPE 9T	109,365.00	LF		$	
1030	03225		TUBULAR MARKERS	150.00	EACH		$	
1040	03425		ADJUST WATER VALVE	1.00	EACH		$	
1050	05950		EROSION CONTROL BLANKET	13,954.00	SQYD		$	
1060	05952		TEMP MULCH	2,216,720.00	SQYD		$	
1070	05953		TEMP SEEDING AND PROTECTION	464,640.00	SQYD		$	
1080	05961		FERTILIZER 10-10-10	65.00	TON		$	
1090	05963		INITIAL FERTILIZER	63.00	TON		$	
1100	05964		20-10-10 FERTILIZER	23.00	TON		$	
1110	05985		SEEDING AND PROTECTION	796,110.00	SQYD		$	
1120	05992		AGRICULTURAL LIMESTONE	780.00	TON		$	
1130	06401		FLEXIBLE DELINEATOR POST-M/W	1,496.00	EACH		$	
1140	06404		FLEXIBLE DELINEATOR POST-M/Y	149.00	EACH		$	
1150	06510		PAVE STRIPING-TEMP PAINT-4 IN	6,000.00	LF		$	
1160	06511		PAVE STRIPING-TEMP PAINT-6 IN	967,999.00	LF		$	
1170	06514		PAVE STRIPING-PERM PAINT-4 IN	10,470.00	LF		$	
1180	06540		PAVE STRIPING-THERMO-4 IN W	3,880.00	LF		$	
1190	06541		PAVE STRIPING-THERMO-4 IN Y	7,574.00	LF		$	
1200	06542		PAVE STRIPING-THERMO-6 IN W	160,747.00	LF		$	
1210	06543		PAVE STRIPING-THERMO-6 IN Y	106,244.00	LF		$	
1220	06546		PAVE STRIPING-THERMO-12 IN W	9,154.00	LF		$	
1230	06549		PAVE STRIPING-TEMP REM TAPE-B	30,000.00	LF		$	
1240	06550		PAVE STRIPING-TEMP REM TAPE-W	30,000.00	LF		$	
1250	06551		PAVE STRIPING-TEMP REM TAPE-Y	30,000.00	LF		$	

PROPOSAL BID ITEMS

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1260	06556		PAVE STRIPING-DUR TY 1-6 IN W	734.00	LF		$	
1270	06557		PAVE STRIPING-DUR TY 1-6 IN Y	489.00	LF		$	
1280	06568		PAVE MARKING-THERMO STOP BAR-24IN	204.00	LF		$	
1290	06569		PAVE MARKING-THERMO CROSS-HATCH	4,499.00	SQFT		$	
1300	06572		PAVE MARKING-DOTTED LANE EXTEN	20.00	LF		$	
1310	06574		PAVE MARKING-THERMO CURV ARROW	45.00	EACH		$	
1320	06578		PAVE MARKING-THERMO MERGE ARROW	6.00	EACH		$	
1330	06585		PAVEMENT MARKER TY IVA-MW TEMP	13,966.00	EACH		$	
1340	06586		PAVEMENT MARKER TY IVA-MY TEMP	11,876.00	EACH		$	
1350	06588		PAVEMENT MARKER TY IVA-BY TEMP	100.00	EACH		$	
1360	06600		REMOVE PAVEMENT MARKER TYPE V	630.00	EACH		$	
1370	08100		CONCRETE-CLASS A	3.77	CUYD		$	
1380	08150		STEEL REINFORCEMENT	163.00	LB		$	
1390	08901		CRASH CUSHION TY VI CLASS BT TL2	2.00	EACH		$	
1400	08903		CRASH CUSHION TY VI CLASS BT TL3	13.00	EACH		$	
1410	08904		CRASH CUSHION TY VI CLASS C	2.00	EACH		$	
1420	10020NS		FUEL ADJUSTMENT	560,330.00	DOLL		$	
1430	10030NS		ASPHALT ADJUSTMENT	560,591.00	DOLL		$	
1440	20071EC		JOINT ADHESIVE	201,600.00	LF		$	
1450	20191ED		OBJECT MARKER TY 3	31.00	EACH		$	
1460	20411ED		LAW ENFORCEMENT OFFICER	1,500.00	HOUR		$	
1470	20432ES112		REMOVE CRASH CUSHION	2.00	EACH		$	
1480	20629NS719		THRIE BEAM TO W BEAM CONNECTOR	2.00	EACH		$	
1490	20757ED		PAVEMENT REPAIR	5,000.00	SQYD		$	
1500	20758ED		REMOVE AND RESET PERF PIPE HEADWALL	12.00	EACH		$	
1510	21370ED		LONGITUDINAL SAW CUT- 6 IN	50,400.00	LF		$	
1520	21380ES719		GUARDRAIL THRIE BEAM	1,182.50	LF		$	
1530	21417ES717		PAVE MARK THERMO CONE CAP-SOLID YELLOW	541.00	SQFT		$	
1540	21430ES508		CONC MEDIAN BARRIER TYPE 12C(50)	45,282.00	LF		$	
1550	21587EN		REINFORCED SOIL SLOPE	11,000.00	SQFT		$	
1560	21802EN		G/R STEEL W BEAM-S FACE (7 FT POST)	46,362.50	LF		$	
1570	23010EN		PAVE MARK TEMP PAINT STOP BAR-24 IN	147.00	LF		$	
1580	23274EN11F		TURF REINFORCEMENT MAT 1	1,267.00	SQYD		$	
1590	23696EC		BARRIER WALL SHOULDER	700.00	LF		$	
1600	23864EC		CHANNEL LINING CLASS III-MOD	2,160.00	TON		$	
1610	23911EC		GROUT	718.00	CUYD		$	
1620	23979EC		CRASH CUSHION TY VI CLASS C TL3	1.00	EACH		$	
1630	24255EC		REMOVE CABLE GUARDRAIL BARRIER SYSTEM	46,592.00	LF		$	
1640	24461ED		DRAINAGE GEOCOMPOSITE	117.00	SQYD		$	
1650	24470ED		PERMEABLE PAVEMENT DRAIN	288.00	SQYD		$	
1660	24489EC		INLAID PAVEMENT MARKER	4,522.00	EACH		$	
1670	24707ED		CABLE BARRIER SYSTEM REMOVE & RESTORE 8-6.20	1.00	LS		$	
1680	24814EC		PIPELINE INSPECTION	15,472.00	LF		$	
1690	24873EC		CONTROL SYSTEM FOR INCIDENT MANAGEMENT 8-6.10	1.00	L S		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1700	24873EC		CONTROL SYSTEM FOR INCIDENT MANAGEMENT 8-6.20	1.00	L S		$	

Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1710	00440		ENTRANCE PIPE-15 IN	38.00	LF		$	
1720	00461		CULVERT PIPE-15 IN	180.00	LF		$	
1730	00462		CULVERT PIPE-18 IN	863.00	LF		$	
1740	00464		CULVERT PIPE-24 IN	340.00	LF		$	
1750	00466		CULVERT PIPE-30 IN	77.00	LF		$	
1760	00468		CULVERT PIPE-36 IN	58.00	LF		$	
1770	00472		CULVERT PIPE-60 IN	33.00	LF		$	
1780	00474		CULVERT PIPE-72 IN	17.00	LF		$	
1790	00521		STORM SEWER PIPE-15 IN	7,105.00	LF		$	
1800	00522		STORM SEWER PIPE-18 IN	4,786.00	LF		$	
1810	00524		STORM SEWER PIPE-24 IN	1,243.00	LF		$	
1820	00526		STORM SEWER PIPE-30 IN	343.00	LF		$	
1830	01000		PERFORATED PIPE-4 IN	196.00	LF		$	
1840	01001		PERFORATED PIPE-6 IN	22,946.00	LF		$	
1850	01002		PERFORATED PIPE-8 IN	2,436.00	LF		$	
1860	01010		NON-PERFORATED PIPE-4 IN	400.00	LF		$	
1870	01011		NON-PERFORATED PIPE-6 IN	974.00	LF		$	
1880	01012		NON-PERFORATED PIPE-8 IN	50.00	LF		$	
1890	01020		PERF PIPE HEADWALL TY 1-4 IN	16.00	EACH		$	
1900	01021		PERF PIPE HEADWALL TY 1-6 IN	2.00	EACH		$	
1910	01022		PERF PIPE HEADWALL TY 1-8 IN	5.00	EACH		$	
1920	01024		PERF PIPE HEADWALL TY 2-4 IN	7.00	EACH		$	
1930	01025		PERF PIPE HEADWALL TY 2-6 IN	1.00	EACH		$	
1940	01028		PERF PIPE HEADWALL TY 3-4 IN	11.00	EACH		$	
1950	01029		PERF PIPE HEADWALL TY 3-6 IN	3.00	EACH		$	
1960	01032		PERF PIPE HEADWALL TY 4-4 IN	9.00	EACH		$	
1970	01033		PERF PIPE HEADWALL TY 4-6 IN	7.00	EACH		$	
1980	01202		PIPE CULVERT HEADWALL-15 IN	5.00	EACH		$	
1990	01204		PIPE CULVERT HEADWALL-18 IN	10.00	EACH		$	
2000	01204		PIPE CULVERT HEADWALL-18 IN	3.00	EACH		$	
2010	01208		PIPE CULVERT HEADWALL-24 IN	5.00	EACH		$	
2020	01208		PIPE CULVERT HEADWALL-24 IN	1.00	EACH		$	
2030	01210		PIPE CULVERT HEADWALL-30 IN	4.00	EACH		$	
2040	01210		PIPE CULVERT HEADWALL-30 IN	2.00	EACH		$	
2050	01212		PIPE CULVERT HEADWALL-36 IN	3.00	EACH		$	
2060	01381		METAL END SECTION TY 2-18 IN	2.00	EACH		$	
2070	01432		SLOPED BOX OUTLET TYPE 1-15 IN	3.00	EACH		$	
2080	01433		SLOPED BOX OUTLET TYPE 1-18 IN	9.00	EACH		$	
2090	01434		SLOPED BOX OUTLET TYPE 1-24 IN	3.00	EACH		$	
2100	01450		S & F BOX INLET-OUTLET-18 IN	1.00	EACH		$	
2110	01451		S & F BOX INLET-OUTLET-24 IN	4.00	EACH		$	
2120	01452		S & F BOX INLET-OUTLET-30 IN	3.00	EACH		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2130	01480		CURB BOX INLET TYPE B	8.00	EACH		$	
2140	01490		DROP BOX INLET TYPE 1	12.00	EACH		$	
2150	01493		DROP BOX INLET TYPE 2	3.00	EACH		$	
2160	01505		DROP BOX INLET TYPE 5B	3.00	EACH		$	
2170	01538		DROP BOX INLET TYPE 7	2.00	EACH		$	
2180	01559		DROP BOX INLET TYPE 13G	5.00	EACH		$	
2190	01565		DROP BOX INLET TYPE 13GT	9.00	EACH		$	
2200	01568		DROP BOX INLET TYPE 13S	1.00	EACH		$	
2210	01584		CAP DROP BOX INLET	2.00	EACH		$	
2220	01642		JUNCTION BOX-18 IN	2.00	EACH		$	
2230	01643		JUNCTION BOX-24 IN	3.00	EACH		$	
2240	01650		JUNCTION BOX	5.00	EACH		$	
2250	01660		SPRING BOX INLET TYPE A	1.00	EACH		$	
2260	01691		FLUME INLET TYPE 2	1.00	EACH		$	
2270	01719		ADJUST INLET	1.00	EACH		$	
2280	01741		CORED HOLE DRAINAGE BOX CON-6 IN	100.00	EACH		$	
2290	01756		MANHOLE TYPE A	2.00	EACH		$	
2300	01761		MANHOLE TYPE B	1.00	EACH		$	
2310	01767		MANHOLE TYPE C	2.00	EACH		$	
2320	02600		FABRIC GEOTEXTILE TY IV FOR PIPE	31,357.00	SQYD		$	
2330	15007		S CIPP LINER 24 INCH	574.00	LF		$	
2340	15124		S CIPP LINER 15 INCH	1,216.00	LF		$	
2350	15125		S CIPP LINER 18 INCH	951.00	LF		$	
2360	15128		S CIPP LINER 30 INCH	377.00	LF		$	
2370	15129		S CIPP LINER 36 INCH	278.00	LF		$	
2380	15132		S CIPP LINER 54 INCH	136.00	LF		$	
2390	15133		S CIPP LINER 60 INCH	43.00	LF		$	
2400	15135		S CIPP LINER 72 INCH	717.00	LF		$	
2410	21601NN		CONC MED BAR BOX INLET TY 12A2-50	4.00	EACH		$	
2420	21602NN		CONC MED BARR BOX INLET TY 12B2-50	25.00	EACH		$	
2430	21602NN		CONC MED BARR BOX INLET TY 12B2-50 (ASSYMETRICAL)	2.00	EACH		$	
2440	21799EN		BORE AND JACK PIPE-24 IN	123.00	LF		$	
2450	22620NN		CONC MED BARR BOX INLET TY 12A1-50 (ASSYMETRICAL)	2.00	EACH		$	
2460	23126EN		BORE AND JACK PIPE-18 IN	361.00	LF		$	
2470	23611NN		CONC MED BAR BOX INLET TY 12B1-50	30.00	EACH		$	
2480	23611NN		CONC MED BAR BOX INLET TY 12B1-50 (ASSYMETRICAL)	48.00	EACH		$	
2490	23644EC		DROP BOX INLET TY 3-SAG	1.00	EACH		$	
2500	23948EC		RESET MANHOLE FRAME AND LID	1.00	EACH		$	
2510	24025EC		PIPE CULVERT HEADWALL-72 IN	1.00	EACH		$	

Section: 0004 - BRIDGE-27678

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2520	02231		STRUCTURE GRANULAR BACKFILL	460.00	CUYD		$	
2530	02555		CONCRETE-CLASS B	6.20	CUYD		$	
2540	02998		MASONRY COATING	2,450.00	SQYD		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2550	03299		ARMORED EDGE FOR CONCRETE	286.00	LF		$	
2560	08001		STRUCTURE EXCAVATION-COMMON	1,967.00	CUYD		$	
2570	08020		CRUSHED AGGREGATE SLOPE PROT	1,035.00	TON		$	
2580	08033		TEST PILES	529.00	LF		$	
2590	08039		PRE-DRILLING FOR PILES	360.00	LF		$	
2600	08046		PILES-STEEL HP12X53	6,046.00	LF		$	
2610	08094		PILE POINTS-12 IN	194.00	EACH		$	
2620	08100		CONCRETE-CLASS A	687.00	CUYD		$	
2630	08104		CONCRETE-CLASS AA	1,260.80	CUYD		$	
2640	08130		MECHANICAL REINF COUPLER #5	16.00	EACH		$	
2650	08133		MECHANICAL REINF COUPLER #8	32.00	EACH		$	
2660	08150		STEEL REINFORCEMENT	118,953.00	LB		$	
2670	08151		STEEL REINFORCEMENT-EPOXY COATED	321,906.00	LB		$	
2680	08269		ELECTRICAL CONDUIT GALVINIZED- 8-6.10	1.00	LS		$	
2690	08500		APPROACH SLAB	688.00	SQYD		$	
2700	21532ED		RAIL SYSTEM TYPE III	490.00	LF		$	
2710	23055N		REMOVE 2 BINS OF METAL RETAINING WALL- 8-6.10	1.00	LS		$	
2720	24520EC		PPC I-BEAM HN 48-49	3,845.80	LF		$	

Section: 0005 - BRIDGE - US 25 DWG. 26371

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2730	02231		STRUCTURE GRANULAR BACKFILL	2,135.00	CUYD		$	
2740	02403		REMOVE CONCRETE MASONRY	25.00	CUYD		$	
2750	02998		MASONRY COATING	3,011.00	SQYD		$	
2760	03299		ARMORED EDGE FOR CONCRETE	307.00	LF		$	
2770	08001		STRUCTURE EXCAVATION-COMMON	2,869.00	CUYD		$	
2780	08002		STRUCTURE EXCAV-SOLID ROCK	165.00	CUYD		$	
2790	08020		CRUSHED AGGREGATE SLOPE PROT	1,126.00	TON		$	
2800	08033		TEST PILES	221.00	LF		$	
2810	08039		PRE-DRILLING FOR PILES	380.00	LF		$	
2820	08046		PILES-STEEL HP12X53	3,825.00	LF		$	
2830	08094		PILE POINTS-12 IN	147.00	EACH		$	
2840	08100		CONCRETE-CLASS A	981.70	CUYD		$	
2850	08104		CONCRETE-CLASS AA	1,523.80	CUYD		$	
2860	08150		STEEL REINFORCEMENT	134,604.00	LB		$	
2870	08151		STEEL REINFORCEMENT-EPOXY COATED	374,320.00	LB		$	
2880	08500		APPROACH SLAB	851.00	SQYD		$	
2890	21532ED		RAIL SYSTEM TYPE III	550.00	LF		$	
2900	23813EC		DECK DRAIN	4.00	EACH		$	
2910	24463ED		PPC I-BEAM HN 54 49	4,319.00	LF		$	
2920	24943ED		RAIL SYSTEM TYPE 15	550.00	LF		$	

Section: 0006 - BRIDGE-CULVERT-27679

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
2930	08003		FOUNDATION PREPARATION 8-6.10	1.00	LS		$	
2940	08100		CONCRETE-CLASS A	9.00	CUYD		$	
2950	08150		STEEL REINFORCEMENT	1,525.00	LB		$	

Section: 0007 - BRIDGE - LAKE LINVILLE ROAD - DWG. 26372

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2960	02231		STRUCTURE GRANULAR BACKFILL	879.00	CUYD		$	
2970	02403		REMOVE CONCRETE MASONRY	20.00	CUYD		$	
2980	02998		MASONRY COATING	537.00	SQYD		$	
2990	03299		ARMORED EDGE FOR CONCRETE	286.00	LF		$	
3000	08001		STRUCTURE EXCAVATION-COMMON	221.00	CUYD		$	
3010	08002		STRUCTURE EXCAV-SOLID ROCK	49.00	CUYD		$	
3020	08100		CONCRETE-CLASS A	173.60	CUYD		$	
3030	08104		CONCRETE-CLASS AA	457.20	CUYD		$	
3040	08150		STEEL REINFORCEMENT	10,714.00	LB		$	
3050	08151		STEEL REINFORCEMENT-EPOXY COATED	110,135.00	LB		$	
3060	08500		APPROACH SLAB	792.00	SQYD		$	
3070	08633		PRECAST PC I BEAM TYPE 3	1,423.00	LF		$	
3080	21532ED		RAIL SYSTEM TYPE III	165.00	LF		$	
3090	24943ED		RAIL SYSTEM TYPE 15	165.00	LF		$	

Section: 0008 - BRIDGE - CULVERT #1 - LAKE LINVILLE SPILLWAY - DWG. 26373

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3100	02231		STRUCTURE GRANULAR BACKFILL	947.00	CUYD		$	
3110	08001		STRUCTURE EXCAVATION-COMMON	270.00	CUYD		$	
3120	08100		CONCRETE-CLASS A	37.00	CUYD		$	
3130	08150		STEEL REINFORCEMENT	8,090.00	LB		$	

Section: 0009 - SIGNING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3140	02565		OBJECT MARKER TYPE 2	8.00	EACH		$	
3150	04903		REFERENCE MARKER	48.00	EACH		$	
3160	04904		BARRIER MOUNTING BRACKET	49.00	EACH		$	
3170	06400		GMSS GALV STEEL TYPE A	17,429.00	LB		$	
3180	06405		SBM ALUMINUM PANEL SIGNS	2,670.30	SQFT		$	
3190	06406		SBM ALUM SHEET SIGNS .080 IN	499.80	SQFT		$	
3200	06407		SBM ALUM SHEET SIGNS .125 IN	1,691.00	SQFT		$	
3210	06410		STEEL POST TYPE 1	3,394.50	LF		$	
3220	06412		STEEL POST MILE MARKERS	54.00	EACH		$	
3230	06441		GMSS GALV STEEL TYPE C	24,646.30	LB		$	
3240	06451		REMOVE SIGN SUPPORT BEAM	65.00	EACH		$	
3250	06490		CLASS A CONCRETE FOR SIGNS	152.80	CUYD		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3260	06491		STEEL REINFORCEMENT FOR SIGNS	5,937.00	LB		$	
3270	20418ED		REMOVE & RELOCATE SIGNS	31.00	EACH		$	
3280	20419ND		ROADWAY CROSS SECTION	34.00	EACH		$	
3290	20912ND		BARRIER WALL POST	3.00	EACH		$	
3300	21373ND		REMOVE SIGN	6.00	EACH		$	
3310	21596ND		GMSS TYPE D	110.00	EACH		$	
3320	24631EC		BARCODE SIGN INVENTORY	405.00	EACH		$	

Section: 0010 - SIGNALIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3330	04792		CONDUIT-1 IN	15.00	LF		$	
3340	04811		ELECTRICAL JUNCTION BOX TYPE B	3.00	EACH		$	
3350	04820		TRENCHING AND BACKFILLING	220.00	LF		$	
3360	04830		LOOP WIRE	2,500.00	LF		$	
3370	04844		CABLE-NO. 14/5C	1,500.00	LF		$	
3380	04850		CABLE-NO. 14/1 PAIR	2,500.00	LF		$	
3390	04886		MESSENGER-15400 LB	400.00	LF		$	
3400	04895		LOOP SAW SLOT AND FILL	800.00	LF		$	
3410	04931		INSTALL CONTROLLER TYPE 170	1.00	EACH		$	
3420	04932		INSTALL STEEL STRAIN POLE	3.00	EACH		$	
3430	20188NS835		INSTALL LED SIGNAL-3 SECTION	8.00	EACH		$	
3440	20266ES835		INSTALL LED SIGNAL- 4 SECTION	2.00	EACH		$	
3450	20390NS835		INSTALL COORDINATING UNIT	1.00	EACH		$	
3460	23157EN		TRAFFIC SIGNAL POLE BASE	16.00	CUYD		$	
3470	24900EC		PVC CONDUIT-1 1/4 IN-SCHEDULE 80	140.00	LF		$	
3480	24901EC		PVC CONDUIT-2 IN-SCHEDULE 80	80.00	LF		$	

Section: 0011 - LIGHTING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3490	04710		POLE 80 FT MTG HT HIGH MAST	4.00	EACH		$	
3500	04714		POLE 120 FT MTG HT HIGH MAST	9.00	EACH		$	
3510	04761		LIGHTING CONTROL EQUIPMENT	1.00	EACH		$	
3520	04797		CONDUIT-3 IN	1,430.00	LF		$	
3530	04800		MARKER	36.00	EACH		$	
3540	04820		TRENCHING AND BACKFILLING	11,945.00	LF		$	
3550	04860		CABLE-NO. 8/3C DUCTED	6,066.00	LF		$	
3560	04861		CABLE-NO. 6/3C DUCTED	2,985.00	LF		$	
3570	04940		REMOVE LIGHTING 8-6.10	1.00	LS		$	
3580	04940		REMOVE LIGHTING 8-6.20	1.00	LS		$	
3590	20391NS835		ELECTRICAL JUNCTION BOX TYPE A	21.00	EACH		$	
3600	20410ED		MAINTAIN LIGHTING 8-6.10	1.00	LS		$	
3610	20410ED		MAINTAIN LIGHTING 8-6.20	1.00	LS		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3620	21543EN		BORE AND JACK CONDUIT	1,430.00	LF		$	
3630	23161EN		POLE BASE-HIGH MAST	107.30	CUYD		$	
3640	24749EC		HIGH MAST LED LUMINAIRE	67.00	EACH		$	
3650	24851EC		CABLE-NO. 10/3C DUCTED	16,640.00	LF		$	

Section: 0012 - TRAFFIC LOOPS

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3660	04793		CONDUIT-1 1/4 IN	60.00	LF		$	
3670	04795		CONDUIT-2 IN	20.00	LF		$	
3680	04820		TRENCHING AND BACKFILLING	70.00	LF		$	
3690	04829		PIEZOELECTRIC SENSOR	6.00	EACH		$	
3700	04830		LOOP WIRE	2,900.00	LF		$	
3710	04895		LOOP SAW SLOT AND FILL	560.00	LF		$	
3720	20359NN		GALVANIZED STEEL CABINET	2.00	EACH		$	
3730	20360ES818		WOOD POST	4.00	EACH		$	
3740	20391NS835		ELECTRICAL JUNCTION BOX TYPE A	2.00	EACH		$	

Section: 0013 - INTELLIGENT TRANSPORTATION SYSTEMS

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
3750	04797		CONDUIT-3 IN	50.00	LF		$	
3760	04800		MARKER	1.00	EACH		$	
3770	04820		TRENCHING AND BACKFILLING	2,000.00	LF		$	
3780	20257NC		SITE PREPARATION 8-6.10	1.00	LS		$	
3790	20257NC		SITE PREPARATION 8-6.20	1.00	LS		$	
3800	21058ND		WINCH LOWERING TOOL	3.00	EACH		$	
3810	21066ND		MODEL 336 ENCLOSURE	2.00	EACH		$	
3820	21069ND		SURGE DEVICE 120 VOLT	2.00	EACH		$	
3830	21071ND		DATA SURGE DEVICE	2.00	EACH		$	
3840	21079ND		TRANSFORMER 480/120	2.00	EACH		$	
3850	21489ND		RACK MOUNTED UPS	2.00	EACH		$	
3860	21543EN		BORE AND JACK CONDUIT	50.00	LF		$	
3870	22403NN		WEB CAMERA ASSEMBLY	2.00	EACH		$	
3880	23150NN		COMMUNICATION CABLE	100.00	LF		$	
3890	23151NN		POLE WITH LOWERING DEVICE	2.00	EACH		$	
3900	23157EN		TRAFFIC SIGNAL POLE BASE	8.00	CUYD		$	
3910	23941EC		VIDEO SURVEILLANCE CONTROLLER	2.00	EACH		$	
3920	23944EC		ADVANCED GROUNDING SYSTEM	2.00	EACH		$	
3930	24851EC		CABLE-NO. 10/3C DUCTED	2,250.00	LF		$	

Section: 0014 - WATERLINE

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
3940	02220		FLOWABLE FILL	230.00	CUYD		$	
3950	14003		W CAP EXISTING MAIN	4.00	EACH		$	
3960	14012		W ENCASEMENT STEEL OPEN CUT RANGE 1	165.00	LF		$	
3970	14012		W ENCASEMENT STEEL OPEN CUT RANGE 1 6 IN	1,250.00	LF		$	
3980	14023		W FLUSHING ASSEMBLY	2.00	EACH		$	
3990	14028		W METER 3/4 INCH	1.00	EACH		$	
4000	14047		W PIPE DCTL IRON RSTRND JOINT 06 IN	1,250.00	LF		$	
4010	14057		W PIPE PVC 03 INCH	1,240.00	LF		$	
4020	14085		W SERV PE/PLST SHORT SIDE 3/4 IN	1.00	EACH		$	
4030	14089		W TAPPING SLEEVE AND VALVE SIZE 1	2.00	EACH		$	
4040	14089		W TAPPING SLEEVE AND VALVE SIZE 1 6 IN X 6 IN	2.00	EACH		$	
4050	14092		W TIE-IN 03 INCH	1.00	EACH		$	
4060	14115		W VALVE CUT-IN 03 INCH	1.00	EACH		$	
4070	20757ED		PAVEMENT REPAIR	15.00	SQYD		$	

Section: 0015 - TRAINEES

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
4080	02742		TRAINEE PAYMENT REIMBURSEMENT CEMENT MASON	1,200.00	HOUR		$	
4090	02742		TRAINEE PAYMENT REIMBURSEMENT CEMENT MASON	1,200.00	HOUR		$	
4100	02742		TRAINEE PAYMENT REIMBURSEMENT CEMENT MASON	1,200.00	HOUR		$	
4110	02742		TRAINEE PAYMENT REIMBURSEMENT 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
4120	02568		MOBILIZATION	1.00	LS		$	
4130	02569		DEMOBILIZATION	1.00	LS		$	