



CALL NO. 111

CONTRACT ID. 121349

BOONE COUNTY

FED/STATE PROJECT NUMBER STP 8200 (014)

DESCRIPTION CAMP ERNST ROAD (KY 237) SECTION 3

WORK TYPE GRADE, DRAIN & SURFACE WITH BRIDGE

PRIMARY COMPLETION DATE 6/30/2015

LETTING DATE: October 19, 2012

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME October 19, 2012. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT TIME.

ROAD PLANS

DBE CERTIFICATION REQUIRED - 7%

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

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PART I
SCOPE OF WORK

CONTRACT ID - 121349

ADMINISTRATIVE DISTRICT - 06

PROJECT(S) IDENTIFICATION AND DESCRIPTION:

COUNTY - BOONE

PCN - DE00802371249

STP 8200 (014)

CAMP ERNST ROAD (KY 237) SECTION 3 RECONSTRUCT AND WIDEN KY 237 FROM ROGERS LANE TO KY 18,
A DISTANCE OF 1.35 MILES. GRADE, DRAIN & SURFACE WITH BRIDGE. SYP NO. 06-08001.25.
GEOGRAPHIC COORDINATES LATITUDE 39^01'02" LONGITUDE 84^42'08"

COMPLETION DATE(S):

COMPLETION DATE - June 30, 2015

APPLIES TO ENTIRE CONTRACT

CONTRACT NOTES

PROPOSAL ADDENDA

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

BID SUBMITTAL

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

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

JOINT VENTURE BIDDING

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

UNDERGROUND FACILITY DAMAGE PROTECTION

The contractor is advised that the Underground Facility Damage Protection Act of 1994, became law January 1, 1995. It is the contractor's responsibility to determine the impact of the act regarding this project, and take all steps necessary to be in compliance with the provision of the act.

SPECIAL NOTE FOR PIPE INSPECTION

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

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

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

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

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

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

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

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

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

INSTRUCTIONS FOR EXCESS MATERIAL SITES AND BORROW SITES

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

ACCESS TO RECORDS

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

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

09/26/2012



Steven L. Beshear
Governor

Commonwealth of Kentucky
Finance and Administration Cabinet
OFFICE OF THE SECRETARY
Room 383, Capitol Annex
702 Capital Avenue
Frankfort, KY 40601-3462
(502) 564-4240
Fax (502) 564-6785

Lori H. Flanery
Secretary

SECRETARY'S ORDER 11-004

FINANCE AND ADMINISTRATION CABINET

Vendor Document Disclosure

WHEREAS, in order to promote accountability and transparency in governmental operations, the Finance and Administration Cabinet believes that a mechanism should be created which would provide for review and assistance to an Executive Branch agency if said agency cannot obtain access to documents that it deems necessary to conduct a review of the records of a private vendor that holds a contract to provide goods and/or services to the Commonwealth; and

WHEREAS, in order to promote accountability and transparency in governmental operations, the Finance and Administration Cabinet believes that a mechanism should be created which would provide for review and assistance to an Executive Branch agency if said agency cannot obtain access to documents that it deems necessary during the course of an audit, investigation or any other inquiry by an Executive Branch agency that involves the review of documents; and

WHEREAS, KRS 42.014 and KRS 12.270 authorizes the Secretary of the Finance and Administration Cabinet to establish the internal organization and assignment of functions which are not established by statute relating to the Finance and Administration Cabinet; further, KRS Chapter 45A.050 and 45A.230 authorizes the Secretary of the Finance and Administration Cabinet to procure, manage and control all supplies and services that are procured by the Commonwealth and to intervene in controversies among vendors and state agencies; and

NOW, THEREFORE, pursuant to the authority vested in me by KRS 42.014, KRS 12.270, KRS 45A.050, and 45A.230, I, Lori H. Flanery, Secretary of the Finance and Administration Cabinet, do hereby order and direct the following:

- I. Upon the request of an Executive Branch agency, the Finance and Administration Cabinet ("FAC") shall formally review any dispute arising where the agency has requested documents from a private vendor that holds a state contract and the vendor has refused access to said documents under a claim that said documents are not directly pertinent or relevant to the agency's inquiry upon which the document request was predicated.
- II. Upon the request of an Executive Branch agency, the FAC shall formally review any situation where the agency has requested documents that the agency deems necessary to

conduct audits, investigations or any other formal inquiry where a dispute has arisen as to what documents are necessary to conclude the inquiry.

- III. Upon receipt of a request by a state agency pursuant to Sections I & II, the FAC shall consider the request from the Executive Branch agency and the position of the vendor or party opposing the disclosure of the documents, applying any and all relevant law to the facts and circumstances of the matter in controversy. After FAC's review is complete, FAC shall issue a Determination which sets out FAC's position as to what documents and/or records, if any, should be disclosed to the requesting agency. The Determination shall be issued within 30 days of receipt of the request from the agency. This time period may be extended for good cause.
- IV. If the Determination concludes that documents are being wrongfully withheld by the private vendor or other party opposing the disclosure from the state agency, the private vendor shall immediately comply with the FAC's Determination. Should the private vendor or other party refuse to comply with FAC's Determination, then the FAC, in concert with the requesting agency, shall effectuate any and all options that it possesses to obtain the documents in question, including, but not limited to, jointly initiating an action in the appropriate court for relief.
- V. Any provisions of any prior Order that conflicts with the provisions of this Order shall be deemed null and void.

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
102.08 Irregular Proposals 102.14 Disqualification of Bidders
102.09 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.

FHWA 1273

Contrary to Paragraph VI of FHWA 1273, contractors on National Highway System (NHS) projects of \$1 million or more are no longer required to submit Form FHWA-47.

Contrary to Form FHWA-1273, Section V, paragraph 2.b personal addresses and full social

security numbers (SSN) shall not be included on weekly payroll submissions by contractors and subcontractors. Contractors and subcontractors shall include the last four digits of the employee's SSN as an individually identifying number for each employee on the weekly payroll submittal. This in no way changes the requirement that contractors and subcontractors maintain complete SSN and home addresses for employees and provide this information upon request of KYTC, FHWA, and the U.S. Department of Labor.

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 63-35 DBE, within 10 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 WIL BE ISSUED

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

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

the bid, and/or other circumstances beyond the control of the prime contractor.

CONSIDERATION OF GOOD FAITH EFFORTS REQUESTS

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

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

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

- 1 Whether the bidder attended any pre-bid meetings that were scheduled by the Cabinet to inform DBEs of subcontracting opportunities;
- 2 Whether the bidder provided solicitations through all reasonable and available means;
- 3 Whether the bidder provided written notice to all DBEs listed in the DBE directory at the time of the letting who are prequalified in the areas of work that the bidder will be subcontracting;
- 4 Whether the bidder followed up initial solicitations of interest by contacting DBEs to determine with certainty whether they were interested. If a reasonable amount of DBEs within the targeted districts do not provide an intent to quote or no DBEs are prequalified in the subcontracted areas, the bidder must notify the DBE Liaison in the Office of Minority Affairs to give notification of the bidder's inability to get DBE quotes;
- 5 Whether the bidder selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise perform these work items with its own forces;
- 6 Whether the bidder provided interested DBEs with adequate and timely information about the plans, specifications, and requirements of the contract;
- 7 Whether the bidder negotiated in good faith with interested DBEs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any

rejection should be so noted in writing with a description as to why an agreement could not be reached;

8 Whether quotations were received from interested DBE firms but were rejected as unacceptable without sound reasons why the quotations were considered unacceptable. The fact that the DBE firm's quotation for the work is not the lowest quotation received will not in itself be considered as a sound reason for rejecting the quotation as unacceptable. The fact that the bidder has the ability and/or desire to perform the contract work with its own forces will not be considered a sound reason for rejecting a DBE quote. Nothing in this provision shall be construed to require the bidder to accept unreasonable quotes in order to satisfy DBE goals;

9 Whether the bidder specifically negotiated with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be subcontracted includes potential DBE participation;

10 Whether the bidder made any efforts and/or offered assistance to interested DBEs in obtaining the necessary equipment, supplies, materials, insurance and/or bonding to satisfy the work requirements of the bid proposal; and

11 Any other evidence that the bidder submits which may show that the bidder has made reasonable good faith efforts to include DBE participation.

FAILURE TO MEET GOOD FAITH REQUIREMENT

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

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

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

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

SANCTIONS FOR FAILURE TO MEET DBE REQUIREMENTS OF THE PROJECT

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

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

PROMPT PAYMENT

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

CONTRACTOR REPORTING

All contractors must keep detailed records and provide reports to the Cabinet on their progress in meeting the DBE requirement on any highway contract. These records may include, but shall not be limited to payroll, lease agreements, cancelled payroll checks, executed subcontracting agreements, etc. Prime contractors will be required to submit certified reports on monies paid to each DBE subcontractor or supplier utilized to meet a DBE goal.

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>

Photocopied payments and completed form to be submitted 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.

09/14/11

TRAINEES

In Compliance with the "TRAINING SPECIAL PROVISION" included in Part III of the Proposal, the Contractor will be required to employ 1 trainee(s) (EQUIPMENT OPERATOR GROUP 2) for this contract.

FUEL AND ASPHALT PAY ADJUSTMENT

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

OPTION A

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

SPECIAL NOTE FOR MECHANICALLY STABILIZED EARTH (MSE) WALLS

1. DESCRIPTION

1.01 This work includes design, fabrication of precast facing panels and other appurtenances and construction of Mechanically Stabilized Earth (MSE) walls in accordance with the Contract documents.

2. REFERENCES

2.01 All references to the Standard Specifications are to the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction (a.k.a. "Standard Specifications"), current edition with current Supplemental Specifications. All references to AASHTO are to the current edition of the AASHTO LRFD Bridge Design Specifications, 5th ed, including current interims.

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

3. WALL TYPES

3.01 Mechanically Stabilized Earth (MSE) Walls; only walls preauthorized by the Specifications Branch of the Division of Construction are permitted.

Approved Wall Systems:

- Reinforced Earth (Reinforced Earth and Retained Earth)
- VSL Retained Earth
- Hilfiker RSE
- Strengthened Earth Walls
- Keystone KeySystem I
- Tricon Retained Soil Wall System
- ISOGRID Retaining Wall System

Any wall system used must use inextensible reinforcement.

3.02 The wall type selected by the contractor shall be used throughout. Short Cast-In-Place sections may be provided at the ends of the MSE Wall.

3.03 Acceptance of the contractor's design calculations and construction plans does not constitute endorsement nor approval of the work submitted. The acceptance is an acknowledgment of the work performed and authorization for the contractor to proceed with the project.

4. CALCULATIONS AND PLANS

4.01 Design calculations and construction plans clearly showing conformance with the Standard Specifications, AASHTO, and contract plans shall be submitted to the Department for review. Wall designs and construction plans shall be dated, sealed, and signed by a registered professional engineer licensed to practice in Kentucky. The Division of Structural Design requires four sets of the design calculations and five sets of the construction plans for each submission and resubmission. Reduced-size prints (11"x17") are acceptable and preferred for review purposes. The Contractor shall allow 30 working days for the Department to review each submission. The thirty-day period begins when the design calculations and construction plans are received in the Division of Structural Design. 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.

4.02 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 final wall tracings, with drawing number, shall be submitted electronically as an Adobe file or physically on 3 mil or thicker 22" X 36" mylar film. The final tracings of the accepted construction plans submitted to the Division of Structural Design shall be dated, sealed, and signed on Sheet 1 by the engineer performing the work.

4.03 Shop drawings shall not be developed until after the Department has reviewed and accepted the construction plans. The wall design engineer providing the design for the wall shall submit shop drawings for the wall for review and approval. The Division of Structural Design requires nine copies of the approved shop drawings for distribution. Each sheet of two copies of the shop drawings shall be dated, sealed and signed by the wall design engineer providing the design for the wall. The wall design engineer shall approve the shop drawings and provide the Department with a statement of assurance that the shop drawings are accurate and that they satisfy the project requirements.

4.04 All submissions shall be through the Contractor to the Project Resident Engineer. The Project Resident Engineer shall forward the plans, calculations, and shop drawings to the Division of Structural Design. Contact the Division of Structural Design before beginning any work on the wall designs and construction plans.

5. DESIGN

5.01 The wall design shall be in accordance with AASHTO. Exceptions to these requirements are listed in this note or shown elsewhere in the contract plans.

5.02 Earth reinforcement elements in MSE Walls shall be designed to have a corrosion resistance/durability to ensure a minimum design life of 100 years.

5.03 Construction and traffic live loads shall be converted into an equivalent live load surcharge in accordance with Tables 3.11.6.4-1 and 3.11.6.4-2 in AASHTO.

5.04 The MSE Wall volume limits and reinforcement lengths shown on the contract plans are the minimums required by AASHTO and/or the minimums required to satisfy desired external stability. The MSE Wall supplier's design may require increased reinforcement lengths and MSE volume to satisfy their design. The material required for the MSE Wall volume shall extend one foot, minimum, beyond the ends of the MSE reinforcement.

5.05 The footing or leveling pad may be leveled and stepped in the MSE Wall supplier's design, however, the top of the leveling pad or footing must maintain a minimum of two feet below the finish grade in front of the wall or as directed by the Engineer. All elevations and locations of steps must be shown in the shop plans and are subject to review and approval by the Engineer.

5.06 The shop plans must show the limits and depths of granular foundation replacement as required in the contract plans Geotechnical Notes for MSE Walls to fit the MSE Wall Supplier's design.

5.07 The plans do not show a coping on the wall because of the number of wall types permitted to be used. The wall manufacturer, however, is required to design a coping to fit their wall type and shall show the coping on the shop plans. The coping submitted by the wall manufacturer is subject to review and acceptance by the Engineer. The top of the coping/retaining wall must maintain 6 inches above the grade elevations as shown in the plans.

6. GEOTECHNICAL DESIGN PARAMETERS

6.01 Use the Geotechnical Design Parameters shown in the project Geotechnical Notes for MSE Walls in the road and/or bridge plans as applicable.

6.02 Lateral earth pressure coefficients or equivalent fluid pressures may be determined by Coulomb or Rankine theories.

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

7. GENERAL

7.01 Comply with all dimensions shown on the contract plans and accommodate all other project features as shown on the contract plans. Construct the panel wall so that the resulting front face of the wall is vertical and in conformance with the plan layout. Survey control is the front face of the wall at its intersection with the leveling pad.

7.02 Section 107.05 of the Standard Specifications shall apply to the use of patented devices, materials, wall systems, and processes. Concrete for precast elements (facing panels, copings, etc.) shall attain a minimum 28-day compressive strength of 4000 psi unless otherwise specified by the wall supplier. The concrete shall be air entrained containing 5.5 +/- 1.5 percent entrained air at the time the concrete is placed in the forms. A proposed mix design shall be submitted.

7.03 All embedded items and lifting devices shall be set in place in the precast elements prior to concrete placement. Conform to the dimensions and tolerances shown on the approved contract or shop plans or as approved by the Engineer.

7.04 Acceptability of completed precast elements will be determined on the basis of the entrained air in the concrete mix, compression tests, and visual inspection by the Engineer. The Contractor or his supplier shall furnish facilities and a Certified Concrete Technician. The Certified Concrete Technician shall perform all necessary sampling and testing in an expeditious and satisfactory manner.

7.05 Forms for the precast facing elements shall be constructed of steel in a manner that will assure the production of uniform elements. Forms shall remain in place until such time that they can be removed without damage to the finished elements.

7.06 Precast facing panels shall be cast front face down. Each unit will be cast without interruption. Consolidation shall be with a vibrator supplemented by such hand tamping as may be necessary to force the concrete into the corners of the forms and to prevent formation of honeycombed concrete or cleavage planes. Clear form oil of the same manufacture shall be used throughout the casting operation.

7.07 The rear panel face shall be a face floated surface finish and screeded to eliminate open pockets of aggregate and surface distortions in excess of one quarter inch.

7.08 All materials used in the manufacture of the precast elements, including cement, aggregates, water, admixtures, concrete mixes, steel reinforcement, and structural steel with galvanizing will be sampled and tested according to the Department's standard procedures for those items. Fabrication shall not begin until these materials have been approved. At least 1000 psi compressive strength shall be attained before precast face panels may be handled. Other precast elements, such as copings, shall not be handled until they attain the compressive strength required by the wall supplier.

7.09 Clearly scribe, or paint with waterproof paint, the date of manufacture, lot number and piece-mark on the rear face of each precast facing panel. Precast elements shall be handled, stored, and shipped in such a manner as to eliminate the danger of chipping, cracking, fracturing, and/or excessive bending.

7.10 The supplier shall examine all precast elements before shipment. All excessive voids, honeycombed areas, and other surface defects on both sides of precast elements shall be properly patched as required to conform to the balance of the work with respect to appearance, strength, and durability. Precast elements shall not be shipped before attaining the required final concrete strength.

7.11 Fabrication of precast elements is subject to random inspection by the Department, an approved independent laboratory, or the precast fabricator as approved by the Engineer. The Engineer will normally witness tests performed by the precast fabricator. Results of all tests performed by the precast fabricator shall be furnished to the Engineer.

7.12 Precast elements damaged during handling, transporting, storage, erection, or backfilling or any element that cannot be satisfactorily placed in the wall shall be repaired or rejected and replaced as directed by the Engineer. Precast elements shall be installed in accordance with the approved construction plans. Facing panels shall be placed in successive horizontal lifts according to the sequence shown on the approved construction plans. The facing elements shall be maintained in such position while MSE volume placed behind the facing elements so that the finished wall is vertical.

7.13 Placement of the MSE Wall volume and earth reinforcement shall closely follow the erection of each lift of panels. See the Geotechnical Notes for additional restrictions for placement of the MSE volume. The maximum lift thickness shall not exceed ten inches. Level and compact the backfill before placing and attaching the MSE reinforcement to the facing elements. The lowest layer of MSE reinforcement shall be installed a minimum of twelve inches below the finish grade in front of the wall. Heavy equipment shall not come within three feet of the back face of MSE facing elements. Compaction within three feet of the back face of MSE facing elements shall be achieved by no less than three passes of a lightweight mechanical tamper, roller, or vibratory system.

7.14 Fabric Geotextile Type IV is required to be used as a separator between all soil-granular interfaces encountered during granular foundation replacement, MSE Volume construction, and granular backfill replacement as indicated in the geotechnical notes in the plans or as directed by the Engineer. Fabric Geotextile Type IV required around the MSE Volume shall be incidental to the unit price bid per square foot of Retaining Wall. All Fabric Geotextile Type IV required during the granular foundation replacement and granular backfill replacement shall be incidental to the unit price bid for Granular Embankment. The contractor shall have the option, at no additional cost to the Department, of constructing that portion of the embankment above the MSE Volume with the same material as used in the MSE Volume and eliminating the Fabric Geotextile Type IV above the MSE Volume.

7.15 Tie strip earth reinforcement shall be shop fabricated of hot rolled steel conforming to the minimum requirements of ASTM A570, Grade 36 or Grade 50, or equivalent.

7.16 Steel mesh earth reinforcement shall meet the requirements of ASTM A82 for cold drawn wire. The wires shall be welded into the finished mesh according to ASTM A185. Wire size and mesh configuration shall be as shown on the shop plans.

7.17 Ribbed earth reinforcement shall be hot rolled from bars to the required shape and dimensions. Physical and mechanical properties shall conform to AASHTO M223, Grade 65.

7.18 Ladder reinforcing strips shall be fabricated from cold drawn steel wire conforming to ASTM A82. The wires shall be welded into the finished mesh according to ASTM A185.

7.19 All earth reinforcement shall be cut to length and tolerances shown on the construction plans or approved shop drawings. Anchors and connection pins shall conform to ASTM A82. Welding shall be according to ASTM A185.

7.20 Clevis connectors, loops, and connector bars used with steel mesh reinforcement shall be fabricated from cold drawn steel conforming to ASTM A82. Welding shall be in accordance to ASTM A185.

7.21 Fasteners used with ribbed or ladder reinforcing strips shall consist of hexagonal cap screw bolts and nuts conforming to AASHTO M-164 or equivalent.

7.22 U shaped reinforcing connectors used with ribbed or ladder reinforcing strips as yokes to connect the strips to modular blocks shall be shop fabricated from cold drawn steel wire conforming to ASTM A82.

7.23 Pins used to align face panels during construction shall be 5/8 inch diameter, mild steel, round, smooth bars. All steel components shall be hot dip galvanized after fabrication to conform to the minimum requirements of AASHTO M111. Included are tie strip reinforcement, ribbed earth reinforcement, ladder earth reinforcement anchors, connection pins, steel mesh, clevis connectors, loops, connector bars, fasteners, U shaped connectors, and alignment pins. Holes for bolts shall be punched in the locations shown before galvanizing.

7.24 Bearing pads and joint filler for MSE Walls shall be as recommended by the wall supplier. Vertical slip joints shall be provided at 100-foot intervals +/- three feet unless otherwise shown on the plans. Slip joints between wall sections shall be covered by a geotextile fabric. The fabric shall be a non-woven needle punch polyester or woven monofilament polypropylene as recommended by the wall supplier. All joints between MSE Wall panels shall be covered on the back side with Type I geotextile fabric. The minimum width and lap is:

Vertical Joints 18"

Horizontal Joints 12"

All Laps 4"

The adhesive used to hold geotextile fabric at the rear of the MSE Wall units shall be as recommended by the wall supplier.

7.25 Wall elements including coping and face panels exposed in the final structure shall have a surface finish as specified in Section 601.03.18 of the Standard Specifications.

7.26 Supplier's Representative:

- A representative of the wall system supplier is required to be on site a minimum of two full days within the first week of MSE reinforced backfill construction to provide training and assistance to the contractor's personnel and project inspectors.
- A one-day minimum follow-up visit by the supplier's representative will be required within two weeks of the initial visit, or as approved by the Engineer, in order to monitor progress.
- After each on-site visit, the Contractor is required to submit a letter to the Resident Engineer written by the manufacturer's representative documenting the observations of each visit with documentation that the licensed professional engineer responsible for the design has reviewed the letter.

7.27 Reinforced Backfill:

Use reinforced backfill in the MSE Volume consisting of quarry-run limestone conforming to Section 805.12 of the Standard Specifications.

8. METHOD OF MEASUREMENT AND BASIS OF PAYMENT

8.01 The design plan quantity of Roadway Excavation required for wall construction, foundation replacement and backfill replacement was calculated using available geotech information and the average end area method from roadway cross sections. The final quantity of Roadway Excavation shall be the design plan quantity increased or decreased by authorized changes according to Section 204 of the Standard Specifications.

8.02 The design plan quantity of Granular Embankment for foundation replacement beneath the MSE Wall and for backfill replacement was calculated using available geotechnical information and the average end area method from roadway cross sections. The final quantity of Granular Embankment shall be the design plan quantity increased or decreased by authorized changes according to Section 204.04.02 of the Standard Specifications.

8.03 The quantity of MSE Wall will be the gross area in square feet, not including footings or leveling pads for precast walls, lying in the vertical plane of the outside front face of the structure as shown on the plans or as directed by the Engineer. No field measurement will be made. The final quantity will be the design plan quantity increased or decreased by authorized changes.

8.04 The ground line elevations and depth of foundation replacement shown are interpolated from the available geotechnical information. When required, the plan depth of foundation replacement shall be measured from the bottom of wall as constructed.

Changing the limits or quantities of the retaining wall or structure excavation, except as directed by the Engineer shall not be cause for changing the plan pay quantities. Lowering the bottom of wall elevations to accommodate the wall design or configuration of pre-fabricated concrete units shall not be cause for changing the plan pay quantities.

The MSE Wall supplier's design may require additional excavation, embankment, and MSE Wall materials to satisfy their design. The design MSE earth reinforcement lengths shall be equal to or greater than the length shown on the plans or as required by the AASHTO Specifications for the height of the wall plus live load surcharge. The lengths of the MSE Reinforcement shall be constant from the bottom to the top of the section. Extension of the plan limits to accommodate the wall design, configuration of pre-fabricated concrete units, or

lengths of earth reinforcement for MSE Walls shall not be cause for changing the plan pay quantities. Additional quantities of excavation, MSE Reinforcement, MSE volume, excavation for foundation replacement, granular embankment, and labor necessary to satisfy the MSE Wall supplier's design shall be incidental to the unit price bid for the Retaining Wall.

The MSE volume, using reinforced backfill, that extends twelve inches, minimum, beyond the ends of the reinforced volume for MSE Walls shall be incidental to the unit price bid per square foot of Retaining Wall.

All materials, equipment, and labor necessary to provide and install the geotextile fabric shall be incidental to the unit price bid per square foot of Retaining Wall or the unit price bid for Granular Embankment as applicable.

All work associated with providing the design, details and construction for the coping shall be incidental to the unit price bid per square foot of Retaining Wall.

All materials, equipment, and labor necessary to provide the specified surface finish for the wall system shall be incidental to the unit price bid per square foot of Retaining Wall.

Sheeting, shoring, temporary walls or other earth retention systems necessary to stabilize the excavation for the wall during construction shall be the responsibility of the Contractor. All designs, labor, materials, etc. required to complete this work shall be incidental to the unit price bid per square foot of Retaining Wall.

<u>PAY ITEM</u>	<u>UNIT</u>
Retaining Wall	Square Foot
Granular Embankment	Cubic Yard
Roadway Excavation	Cubic Yard

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

Item Number: 6-8001.25

County: Boone

Description: Camp Ernst/KY18/Rogers Lane

Cabinets	Master code	Description of Item
2	T-01-0000	Aluminum Cabinet (Beacon)
2	T-01-0020	Base Mounted 332 Cabinet
2	T-01-0100	170 Controller
2	T-01-0200	School Clock
2	T-01-0510	Isolator, Model 242 (for ped detector and railroad)
14	T-01-0600	Loop Detector, Model 222
17	T-01-0700	Load Switches

Signals		
20	T-02-0009	Siemens 3 Section Signal
10	T-02-0032	Siemen 3 section backplate
2	T-02-0040	Siemen 5 section, 12 inch signal (poly)
2	T-02-0041	Siemen 5 section backplate
4	T-02-0080	12 inch red/yellowbeacon
12	T-02-0090	Pedestrian signal housing
10	T-02-0300	LED Module 12" red arrow
12	T-02-0310	LED Module 12" yellow arrow
12	T-02-0320	LED Module 12" green arrow
12	T-02-0330	LED Module 12" red ball
16	T-02-0340	LED Module 12" yellow ball
12	T-02-0350	LED Module 12" green ball
12	T-02-0365	LED Countdown Pedestrian Module

Special items			
2	T-02-0400	Video Detection System Camera Detector, SP	# of left turns put here
2	T-02-0401	Camera Mounting System	
2	T-02-0520	Antenna 10 db yagi	
2	T-03-0240	Jumper 60' N-N RG-213	
4	T-02-0650	Pedstl.top mntg.bkt One-way	
4	T-02-0661	Post Top for Pedestal (each)	
4	T-02-0670	Pedestal	
12	T-06-0705	Ped Detector Flat Mount FSA Box	
12	T-06-0730	Ped Button w/o Plunger	
12	T-17-0015	9 X 15 Countdown Ped Sign DBL Sided	

Poles		
8	T-04-0030	Steel Strain Pole 32 foot
4	T-04-0054	Steel Strain Pole 38 foot

Electrical Contractor Name

Electrical Contractor Supervisor

Project Engineer

Project Engineer attests that the mentioned contractor is the actual electrical contractor on this project

Signature of Project Engineer or Designee

Contact number for Supervisor

Contact number for Project Engineer

SPECIAL PROVISION FOR WASTE AND BORROW SITES

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

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

Right-of-Way Certification Form

Revised 2/22/11

☐ Federal Funded

☒ Original

☒ State Funded

☐ Re-Certification

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

Date: _____

Project Name: KY 237

Letting Date: _____

Project #: FD04 C008 6979201R

County: Boone

Item #: 6-8001.25

Federal #: _____

Description of Project: Reconstruct and widen KY 237 from Rogers Lane to KY 18

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

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

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

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

☒ **Condition 1.** All necessary rights-of-way, including control of access rights when applicable, have been acquired including legal and physical possession. Trial or appeal of cases may be pending in court but legal possession has been obtained. There may be some improvements remaining on the right-of-way, but all occupants have vacated the lands and improvements, and KYTC has physical possession and the rights to remove, salvage, or demolish all improvements and enter on all land. Fair market value has been paid or deposited with the court.

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

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

Right-of-Way Certification Form

Revised 2/22/11


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

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

Approved: Daniel R. White
Printed Name

 Right-of-Way Supervisor
Signature

Approved: DAVID L. ORR
Printed Name

 KYTC, Director of ROW & Utilities
Signature

Approved: _____
Printed Name

Signature FHWA, ROW Officer (when applicable)

Right-of-Way Certification Form

Revised 2/22/11

Date: _____

Project Name: KY 237
Project #: FD04 C008 6979201R
Item #: 6-8001.25
Letting Date: _____

County: Boone
Federal #: _____

This project has 49 total number of parcels to be acquired, and 8 total number of individuals or families to be relocated, as well as 6 total number of businesses to be relocated.

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

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

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

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

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

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

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

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

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

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

BOONE COUNTY
FD04 008 69792 01U
RECONSTRUCT & WIDEN KY-237/CAMP ERNST ROAD
FROM ROGERS LANE TO KY-18
ITEM NUMBER 06-8001.25

GENERAL PROJECT NOTE ON UTILITY PROTECTION

Utility coordination efforts determined that there are utilities that will require relocation to accommodate this construction

The information provided below in these Special Notes for Utility Clearance, Impact on Construction may not be exact or complete. The information provided is for the contractor's use in planning the execution of the work. It shall be the road contractor's responsibility to verify the completeness and/or accuracy of all such information being furnished.

UTILITY PLANS (Utility Coordination Plans) have been included in the proposal documents, sheets U68 thru U 87. These Utility Plans show ALL the proposed utility relocations on one set of roadway plan sheets and are intended as a composite view of the utilities. They are NOT INTENDED to be used for construction purposes.

Flowable Fill Requirement

The road contractor MUST use flowable fill as the backfill media any place telephone or water lines cross under existing or proposed roadway surfaces. Compact earth or flowable fill shall be used in all other ditches within the project limits. It should also be noted that the cost of the flowable fill shall be incidental to the cost of the utility line being installed.

Maintenance of Utility Services

All existing utility facilities are to be maintained throughout road construction. Temporary utility services to maintain service are to be provided and paid for by the road contractor as incidental to road construction. No additional compensation will be paid the contractor for temporary work and materials to maintain existing utility services. No unauthorized discharge of sewage due to the road contractor's work will be allowed.

Damage to Utilities

Any intentional or accidental disruption of service due to damage to any utility service mains caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five thousand dollars per day (\$5,000/day) per occurrence against the contractor until such time as the utility service is restored.

Any intentional or accidental disruption of any individual utility service caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five hundred dollars per day (\$500/day) per occurrence against the contractor until such time as service is restored.

In the case of a main disruption or electric service, liquidated damages shall be charged at the main and/or electric service disruption rate only. Liquidated damages shall not be charged in addition for service disruptions when a main disruption is involved.

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

BOONE COUNTY
FD04 008 69792 01U
RECONSTRUCT & WIDEN KY-237/CAMP ERNST ROAD
FROM ROGERS LANE TO KY-18
ITEM NUMBER 06-8001.25

Utility Inspection

The Utility Owners will provide inspection when utility work is being performed by the contractor on their respective utility owner's facilities. It will be the road contractor's responsibility to notify the appropriate utility owner for inspection.

Utility Shutdowns

The contractor shall notify the utility owner(s) of all planned shutdowns of utility mains or utility service to customers at least three business days in advance. Advance notice will allow for customers to be notified by the utility owner. Any unannounced disruption of any utility service that inconveniences any customer is to be avoided.

Abandoned Utilities

The contractor shall safeload the entire length of all abandoned pipes 6 inches in diameter and larger under proposed pavement and under any existing pavement that is to remain. The contractor shall safeload the entire length of all abandoned pipes 15 inches and larger which will be located outside of proposed pavement but within project limits. Appropriate bid items have been included in the road contract. The safeloading criteria above shall be observed unless otherwise directed by the Resident Engineer or his representative.

External Utility Permits

The Kentucky Division of Water permits for water and sanitary sewer relocations were not available before letting. These items will be distributed at the preconstruction meeting.

Utility Phasing

The contractor should be aware that some phases of the road construction will need to be completed first to accommodate the relocation of utilities and that some utilities will need to be relocated first to accommodate the relocation of others. The contractor should review the plans and draw his own conclusions as to the phasing of the road work and of various utilities. The contractor should pay close attention to the proximity of construction of new facilities when working in the vicinity of existing water mains and sanitary sewers to prevent blow-outs.

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

BOONE COUNTY
FD04 008 69792 01U
RECONSTRUCT & WIDEN KY-237/CAMP ERNST ROAD
FROM ROGERS LANE TO KY-18
ITEM NUMBER 06-8001.25

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

Mid-Valley Pipeline (Sunoco Pipeline) has a high pressure oil transmission line crossing KY 18 at Sta. 119+70, running north & south. This facility also shows up on the McGrath Lane Plan & Profile sheet. This oil pipeline does NOT conflict with proposed road construction and is to remain undisturbed.

The FAA has a Greater Cincinnati Airport Radar Facility on KY 237, right of Sta. 259+00 that is NOT in conflict with the proposed road construction and is to remain undisturbed.

Boone County Water District, Sanitation District No 1, Duke Energy Electric, Duke Energy Gas, Owen Electric, Cincinnati Bell Telephone and Insight Communications have facilities that require relocation . Please see the notes below pertaining to their relocations.

The Contractor is fully responsible for protection of all utilities listed above

THE FOLLOWING COMPANIES ARE RELOCATING/ADJUSTING THEIR UTILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION

N/A

THE FOLLOWING COMPANIES HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE COMPANY OR THE COMPANY'S SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT

Duke Energy Electric, Owen Electric, Cincinnati Bell Telephone & Insight Communications

All these companies have both overhead and underground facilities to relocate and work is expected to begin around October 22, 2012 and completion is expected to be April 1, 2013.

All of the above, except Insight Communications also have some duct facilities to install. This underground work is shown on the **Utility Pans** and is expected to be completed by April 1, 2013.

The Department will consider submission of a bid as the Contractor's agreement to not make any claims for additional compensation due to delays or other conditions created by the operations of **Duke Energy Electric, Owen Electric, Cincinnati Bell Telephone & Insight Communications**.

Working days will not be charged for those days on which work on **Duke Energy Electric, Owen Electric, Cincinnati Bell Telephone & Insight Communications** facilities are delayed, as provided in the current edition of the KY Standard Specifications for Road and Bridge Construction. Should a difference of opinion arise as to the rights of the Contractor and others working within the limits of, or adjacent to the project, the KYTC Resident Engineer will decide as to the respective rights of the various parties involved in order to assure the completion of the Department's work in general harmony and in a satisfactory manner, and his decision shall be final and binding upon the Contractor. .

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

BOONE COUNTY
FD04 008 69792 01U
RECONSTRUCT & WIDEN KY-237/CAMP ERNST ROAD
FROM ROGERS LANE TO KY-18
ITEM NUMBER 06-8001.25

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

DUKE ENERGY (GAS) facilities shall be relocated by the road contractor using plans inserted into the grade and drain plans and specifications inserted in the project proposal. Gas Main relocation and installation has been proposed to be completed in two phases, as shown on the gas plans. It will be the contractor's responsibility to coordinate this installation and phasing with Duke Energy Gas Division.

Only those contractors preapproved by the gas company and listed at the end of the gas specifications inserted in the proposal can perform gas relocation construction on this project.

The prequalified contractors listed may or may not be prequalified by the Transportation Cabinet. It will be the bidder's responsibility to verify prequalification with the Cabinet. Duke Energy provided this listing. The fact that a contractor is included on this list does not preclude that contractor from having to be prequalified by the Transportation Cabinet.

Alignment changes to proposed gas facilities to accommodate unforeseen field conditions are possible. However, it is the responsibility of the roadway contractor to communicate any proposed gas main alignment changes to the Cinergy gas inspector and the KYTC Resident Engineer or their designated representative prior to actually modifying the proposed gas main alignment.

The unit cost for gas relocation items has been preset in the road contract as follows:

Description of Work	Est. Unit	Units	Unit Price
Length of 2" PL Gas Main	45	Lin. Ft.	\$ 46.00
Length of 3" PL Gas Main	140	Lin. Ft.	\$ 60.00
Length of 4" PL Gas Main	80	Lin. Ft.	\$ 50.00
Length of 6" PL Gas Main	4600	Lin. Ft.	\$ 60.00
Length of 8" PL Gas Main	2690	Lin. Ft.	\$ 58.00
Length of 8" SWPC Gas Main	855	Lin. Ft.	\$ 88.00
Valve Assembly 2" PL	1	Each	\$ 310.00
Valve Assembly 3" PL	1	Each	\$ 385.00
Valve Assembly 4" PL	2	Each	\$ 410.00
Valve Assembly 6" PL	2	Each	\$ 575.00
Install M-C Short-Side Service Piping - 1" or 1-1/4"	3	Each	\$ 360.00
Install M-C Short-Side Service Piping - 3"	1	Each	\$ 655.00

SPECIAL NOTES FOR UTILITY CLEARANCE
IMPACT ON CONSTRUCTION

BOONE COUNTY
FD04 008 69792 01U
RECONSTRUCT & WIDEN KY-237/CAMP ERNST ROAD
FROM ROGERS LANE TO KY-18
ITEM NUMBER 06-8001.25

A **"Gas Utility Coordination"** item is shown on the General Summary Sheet and has been established in the road contract for consideration by the road contractor. This item is provided, if needed, as compensation for any additional coordination to accommodate the inclusion of gas utility work with the roadway construction. The road contractor can freely bid this item.

BOONE COUNTY WATER DISTRICT & SANITATION DISTRICT NO. 1 facilities are to be relocated by the road contractor as shown on their respective plans inserted in the roadway plans and specifications contained in the proposal. Please note the phasing details of these utilities as shown on their respective plans inserted into the roadway contract set.

Any alignment changes to proposed water and/or sanitary sewer facilities to accommodate unforeseen field conditions are possible. However, it is the responsibility of the roadway contractor to communicate any proposed main alignment changes to the utility's respective inspector and the KYTC Resident Engineer or their designated representative prior to actually modifying the proposed main alignment.

RAILROADS are not involved in this project.

AREA UTILITIES CONTACT LIST

<u>Utility Company/Agency</u>	<u>Contact Name</u>	<u>Contact Information</u>
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CONTACT INFORMATION WILL BE PROVIDED AT

THE PRECONSTRUCTION MEETING

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

BOONE COUNTY
FD04 008 69792 01U
RECONSTRUCT & WIDEN KY-237/CAMP ERNST ROAD
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SPECIAL CAUTION NOTE – PROTECTION OF UTILITIES

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

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

BEFORE YOU DIG

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

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

Specifications for Gas Main Replacement within STATE OF KENTUCKY ROAD PROJECTS

Revised for:

KYTC Item 6-8001.25

KY 237 – Camp Ernst Road, Rogers Road to KY 18

Duke Energy Job No.
2829130 – Camp Ernst Road

May 2012

1.0 GENERAL

1.1 Scope of Work

Gas main relocation work required for the proposed KY 237 Reconstruction, Camp Ernst Rd., Rogers to KY 18, consists of the following work:

- Installing approximately 8,270' of 2", 4", 6" and 8" gas main
- Renewing C-M and M-C services as needed
- Completing 7 tie-ins (Tie-ins to be completed or paid for by Duke Energy)

A Gas Contractor, approved by both Duke Energy and KYTC, shall perform the gas facility relocation work. **The General Contractor, awarded the KYTC road project, shall hire an approved Gas Contractor.** A Duke Energy Inspector will oversee all piping work performed by the Gas Contractor. Transportation Cabinet inspectors will primarily oversee vertical and horizontal placement of the main, all backfill, traffic control work, and record pay quantities for gas work in the road contract in consultation with the gas inspector.

1.2 Acceptable Gas Contractors

Installation of gas facilities on this project is limited to the following seven (7) Gas Contractors due to their pre-qualification for such work with Duke Energy:

1. AMS Construction
2. Brewer Company
3. Henkles & McCoy
4. Miller Pipeline
5. RLA Investments

At the end of these specifications is a phone list for the Duke Energy approved Gas Contractors. Of these 5 Gas Contractors, as of January 29, 2007, four have been pre-approved by KYTC (Brewer, Henkles & McCoy and RLA Investments). Any Duke Energy approved gas contractor intended to be used for gas construction by the prime road contractor must also be pre-qualified with the Kentucky Transportation Cabinet. Any gas contractor desiring to be pre-qualified by the Cabinet may do so by making application to the Cabinet's Division of Contract Procurement by calling 502-564-3500. It shall be the bidder's responsibility to verify a gas contractor's pre-qualifications. **Department of Transportation regulations prohibit any non-qualified contractor from performing any gas main work. This includes, but is not limited to excavation, main lowering, pipe installation, service installation, and back filling.**

1.3 Standards

In addition to these specifications, all facilities must be installed in accordance with the 2007 Advanced Main Replacement Program (AMRP) Specifications, the Cincinnati Gas & Electric Company's Gas Division Specifications (GD-150 Composite), CFR part 192, and all applicable specifications. These General and Technical Provisions shall be made a part of this project contract by reference. Copies are available from Duke Energy. Where the following specifications and those referenced are in conflict, the following specifications shall govern and take precedence.

1.4 Definitions

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

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

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

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

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

1.5 Video Taping

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

1.6 Permits & Fees

All permits for the replacement work will be obtained by Duke Energy, and will be provided to the Gas Contractor by the Gas Inspector prior to the start of work. Duke Energy will pay all permit fees except cut/fill fees. Cut/fill fees required for dumpsites will not be paid by Duke Energy except for material dumped for main tie-ins where the Gas Contractor is paid directly by

Duke Energy on a time and material (T&M) basis. The Gas Contractor will be responsible for all tree damage unless the damage was a result of a direct order by the Engineer. Clean up and restoration on all projects must be in compliance with KYTC and local governmental agencies and must be approved by the Duke Energy Inspector. It is the sole responsibility of the Gas Contractor to check with governing agencies for work hour restrictions. No compensation will be given for restricted work hours or crews working at night.

1.7 Training

Duke Energy will require the Gas Contractor to qualify all necessary personnel on polyethylene fusion and mechanical connections. Duke Energy will provide training to the Gas Contractor on the renewal of services by insertion and mechanical, installation of meter sets, turn off, turn on and appliance light up. Gas Contractors will be trained for free on Duke Energy policies associated with spotting unacceptable meter locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. Safety procedures, grounding procedures, and a review for sizing services will also be covered in the training.

1.8 Security

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

2.0 MATERIAL

2.1 Duke Energy Supplied Materials

Duke Energy will provide all:

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

All 2", 4", and 6" mains shall be yellow medium density polyethylene (MDPE) or epoxy coated steel, Grade B or stronger.

2.1.1 Material Delivery and Tracking

Duke Energy supplied material will be delivered, as the Gas Contractor needs it. Material for the entire project will not be delivered all at once. It will be the responsibility of the Gas Contractor to meet the delivery truck, to track material received, and to provide weekly reports showing material received, material used, and material remaining. The material assigned to a specific project is to be used on that project only. All surplus materials, at the end of the project, are to be returned to the storeroom or a credit requisition completed allocating the material to another job. The material must be returned or requisitioned to another job in the same condition that it was received. A certain percentage of waste will be applied to the pipe. All other unaccounted, damaged or material left unprotected will be the responsibility of the Gas Contractor.

Service Material will be delivered to each Gas Contractor yard. Each Gas Contractor will be required to provide an adequate shelter area with shelves to organize all the service material. The Gas Contractor will provide a person to receive material, organize and reorder material as needed.

2.2 Contractor Supplied Materials

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

Pipe Bedding

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

Flowable Fill / Low Strength Mortar Mix

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

Surface Restoration Materials (Temporary and Permanent)

All restoration materials shall meet the requirements of the appropriate sections of Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

2.3 Contractor Requirements for Coiled MDPE Pipe Delivery & Handling

Pipe trailers will be a requirement for handling coiled pipe. Brecon, Duke Energy's material storage facility, does not have the equipment necessary to deliver 6" coiled pipe to the job site. Duke Energy will make every effort to have the large diameter coils delivered to the Gas Contractors' material holding area at the start of each project. If Duke Energy is unable to make these arrangements, it will be necessary for the Gas Contractor to pick up these large diameter coils at Brecon. Duke Energy will pay the Gas Contractor for pick up and delivery in these cases.

The coil dimensions of the current Performance Pipe (Driscopipe/Plexco) product that the trailer will need to be able to accommodate is:

Pipe Size	Coil Footage	Wt. Per Coil	Min. Coil ID	Max. Coil OD	Width
2"	500'	315 lbs.	51"	78"	13"
3"	315'	422 lbs.	68"	96"	15"
4"	500'	1110 lbs.	68"	94"	41"
6"	500'	2040 lbs.	84"	120"	50"

The capacity of the trailer must be able to accept all current known coil sizes from all major manufacturers of 2", 3", 4" and 6" PE pipe.

2.3.1 Loading System

The trailer will need to have some form of loading mechanism in which the trailer can be field loaded from a Brecon material truck at the job site or loaded at the pipe yard at the Brecon facility. If the trailer does not have a loading mechanism then the Gas Contractor should make provisions to have the necessary equipment available to safely load the coils without damaging the pipe.

2.3.2 Rerounding/Taming equipment

The Trailer shall be equipped with the necessary equipment to re-round the coiled pipe and remove the curvature conditions created in the pipe by the coiling process. There are no definable parameters to the approved straightness, however pipe should be able to lie flat in a trench when straightening is complete as well as not cause additional stress to pipe when inserting.

3.0 JOINING PIPE

3.1 Welding Steel Pipe

All welds will be made in accordance with Duke Energy's Gas Division welding specifications. The Gas Contractor is responsible for ensuring that the proper Welding Specification is used for the grades and wall thicknesses of pipes being welded together.

Specification No. 501-2	Standard Welding Procedure SA-II-A-II: For Steel Pipe With O.D. from 2 3/8" to, and including 12 3/4 " and wall thickness 0.188" to, but not including 0.250"
Specification No. 501-3	Standard Welding Procedure SA-III-A-III: For Steel Pipe with O.D. greater than 12 3/4 " and wall thickness 0.250" to, but not including 0.344"
Specification No 501-20	Standard welding Procedure SA-F1-A-V: for fillet welds on steel pipe for socket –weld couplings, slip-on flanges, and full encirclement welding sleeves.

All welders must be pre-qualified in accordance with Duke Energy's Gas Division specifications prior to the start of construction. All testing for welders will be in accordance with API Standard 1104, Section 3.3 at the Gas Contractor's cost. The Inspector will visually inspect all welds.

3.2 Joining Plastic Pipe

Butt fusion will be considered the primary method of joining longitudinal sections of MDPE main. Rotary scrapers will be required when joining 4" and larger pipe in the trench. Electro-fusion may be used at the discretion of the Inspector. Electro-fusion couplings are the second choice in joining MDPE pipe. Two couplings are required per Duke Energy Gas Standards when joining directionally drilled pipe.

Bar clamps must be used to secure 2" pipe and larger pipe when joined by electrofusion. Personnel found joining pipe without the proper line up clamps and fusion equipment will lose their fusion cards. **NO SECOND CHANCES WILL BE GIVEN FOR SHORT CUTS TAKEN WHEN JOINING PIPE.**

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

4.0 GAS MAINS

4.1 Inspection

The road contractor must contact Duke Energy (Chuck Allen 513-287-2588) 1 month prior to the beginning of any gas main work so that Duke Energy can plan for the construction project. Duke Energy will provide a Gas Inspector on all main replacement projects. The Inspector will have multiple projects to cover and will not be on site at all times. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Gas Inspector AND the KYTC Resident Engineer or his inspector. The Gas Inspector will record the as-built location of the gas main, track the pay and non-pay item quantities, and provide general guidance to the Gas Contractor and assistance to the Resident Engineer. **The Gas Inspector works for Duke Energy and not the Road Contractor.**

4.2 Depth and Location of Main

As of October 27, 2004, KYTC requires that all newly installed underground utilities be buried at a minimum depth of 42" under roadways, ramps, and ditch lines, and 30" in all other areas within state right-of-way.

All mains are to be installed at the depth or elevation, and location specified on the project drawings. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or the Gas Inspector AND the KYTC Resident Engineer or his inspector. The Duke Energy Engineer has designed the proposed gas main location to avoid conflicts with proposed and existing utilities and grades. Changes to the planned alignment without the consent of the Duke Energy Engineer AND KYTC Resident Engineer may result in conflicts with other proposed facilities. **It is the responsibility of the Road Contractor to stake the proposed alignment of the gas mains for the Gas Contractor.** Spreadsheets containing the coordinates (Station and Offset) and top of main elevations of the proposed alignment are attached to end of these specifications.

4.3 Installation Methods

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

4.3.1 Direct Bury

The trench shall be excavated to accommodate the minimum specified cover over the main from proposed final grade, the pipe outside diameter, and a minimum of 4 inches of bedding material below the pipe. Where the main is being constructed within proposed ditch lines, across final pavements, and along final roadways, the trench shall be excavated to accommodate a minimum of 48 inches of cover over the main from final grade. The minimum cover shall be increased to 60 inches when crossing streams. Plastic mains crossing State of Kentucky maintained roadways shall be encased in steel pipe of sufficient diameter (see GD-150) to contain the main. The

minimum trench width shall be 24 inches + the outside diameter the gas pipe. The Gas Contractor shall string the pipe along the trench and join the pipe. Services shall be installed with a minimum horizontal separation from the existing service of 12 inches.

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

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

4.3.2 Directional Drilling

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

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

4.4 Backfill

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

4.4.1 Flowable Fill (Low Strength Mortar Material)

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

4.5 Lowering Main in Place

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

- Excavate trench along both sides the existing main so it transitions down from the bottom of the main at one end of the trench to below the required top of pipe elevation at the point or length to be lowered, and then transitions back up to the bottom of the main at the opposite end of the trench. Excavate the soil from over and under the main as the trench is excavated. Additional trench depth should be excavated to accommodate sand bedding.
- Support the exposed steel mains at a minimum of 50-foot intervals and MDPE mains at a minimum of 100-foot intervals (unless specified otherwise on the plans) using side booms, track-hoes, blocking/skids, or sling supported from a beam or section of pipe placed across the trench width.
- Clean the pipe and visually check line for any damage. The protective coating on steel mains should be jeeped for holidays. Make repairs as needed per Duke Energy standards.
- Bed the bottom of the trench with 6" of sand.
- Lift the pipe using slings and side booms or track-hoes. Remove the pipe supports and lower the main into the trench. Adjust supports before lifting the main so they are not at or near girth welds.
- Check the top of main elevation at the point or over the points to be lowered to see if the top has been lowered to or below the elevation specified.

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

4.6 Damage to Gas Facilities

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

4.7 Casing Pipe

4.7.1 Casing Under State of Kentucky Roads

All plastic piping placed under existing or proposed State of Kentucky Roads shall be encased in coated steel pipe, unless an exception has been received from KYTC. The top of the casing pipe shall be a minimum of 4 feet below final grade of all roads between opposing roadside ditch

lines. All welded joints shall be water tight and coated. The casing shall be cathodically protected with anodes. The ends of the casing pipe shall be sealed with link seals, foam, or other water resistant material. A test connection and test box shall be located at one end of the casing pipe.

4.7.2 Casing under Railroad Tracks

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

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

4.8 Leak Testing

Leak Testing shall be performed on all newly installed gas main. The contractor must supply all test gauges and the appropriate certification to Duke Energy prior to performing any air leak test on installed piping facilities. The testing equipment must be certified annually and the certification sent to Duke Energy Gas Engineering. The contractor will also be required to have certified purging equipment.

4.9 Hydrostatic Testing

The contractor must supply all labor, equipment, and material to perform and complete the hydrostatic testing of all installed feeder line. Dead weight testers, temperature, and pressure recorders (8" diameter minimum chart size) must be certified for accuracy within the last 6 months of their use date. The contractor will also be required to have certified purging equipment. The minimum test pressure is 750 psi (1.5 x design MAOP) and the preferred test media is water. The maximum test pressure should not exceed 50% of the pipes SMYS. If elevation differences between the low and high spot along a test section are significant, pressure gauges should be placed at these locations to ensure that the minimum test pressure of 750 psi is reached for the entire length of main. The minimum hydrostatic test length is 8-hours. All hydrostatic test waters shall be disposed of in accordance with local and state regulations.

4.10 Gas Main Tie-Ins

The Gas Contractor will be required to complete most tie-ins. However, **Duke Energy reserves the right to perform all tie-ins to the existing gas mains.** On steel mains, tie-ins will require the installation and tapping of TD Williamson fittings. Tie-ins on polyethylene mains will

require squeezing off the main and installing the appropriate saddles. The Gas Contractor will be required to have the following equipment:

- T D Williamson equipment for 2" through 6" steel mains. The Gas Contractor is not required to purchase 8" and 12" T D Williamson and other pertinent equipment; however, Duke Energy would like the Gas Contractor to own this equipment.
- Squeeze-off equipment for 2-inch through 8-inch polyethylene,
- Stopper bags for 2-inch through 12- inch cast iron.
- 4-inch and smaller guillotine saws,
- Electro-fusion equipment,
- Air Test and Hydrostatic Testing Equipment, and
- Other pertinent equipment necessary to tie in 2-inch through 6-inch steel and polyethylene mains.

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

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

The Gas Contractor must supply all labor, equipment, and material necessary to abandon mains that are replaced in the road project. This work includes purging, capping, sealing, cutting, or removing and disposing of sections of abandoned main.

Tie-ins on many Duke Energy mains are pressure and/or temperature dependant. Duke Energy will not allow tie-ins to be made on most mains between November 1 and April 30 if the temperature is below 45 degrees Fahrenheit. During this time of year tie-ins will be looked at on a case by case basis by Duke Energy's Gas Control and Pressure Departments to evaluate the feasibility of completing the tie-in.

Any tie-in completed by the gas contractor will be paid for by Duke Energy. Tie-in work will not be included in the road contract.

4.11 Restoration

All gas facility replacement work will likely be performed within the limits of the KYTC Road Project during its active construction by the Road Contractor. **Final restoration of all areas is the responsibility of the Road Contractor;** however, the Gas Contractor may have to perform some restoration to maintain traffic and insure public safety. All areas, which are disturbed during gas main construction, which are outside of road construction limits, shall be replaced in-kind. All restoration shall be performed to the satisfaction of the KYTC Resident Engineer. The

KYTC Resident Engineer shall approve all temporary and permanent restoration materials and their placement. Contractors will be responsible for maintenance of any restoration they install.

5.0 GAS SERVICES

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

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

5.1 Main to Curb (M-C) Services

M-C services are broken up between short-side and long-side M-C. M-C short side services are less than 15 feet in length, regardless of the installation conditions. M-C long side services are over 15 feet in length and usually cross under roadways. It is possible to have all long side (crossover) services on a project. The main to curb portion of the service lines must be installed at the depth of the relocated main, this is particularly critical when crossing existing or proposed roads with the long-side piping.

5.2 Curb to Meter (C-M) Services

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

Existing polyethylene services shall be reconnected to the new mains if it passes testing. The Gas Contractor will be required to turn off and to re-light customer appliances in accordance with the planned service replacement work and the Duke Energy approved procedures. The Gas Contractor shall red tag all customer bad appliances and notify the Gas Inspector of the problem. Duke Energy will deal with the customer. Contact the gas inspector whenever anything unacceptable is found.

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

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

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

6.0 DESCRIPTION OF PAY ITEMS

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

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

6.1 Pay Items Billed to the Road Contractor

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

6.1.1 Length of Gas Main Installed

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

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

- Mobilization,
- Saw cutting pavement,
- Traffic Control (flag-persons, arrow-boards, signs, plates, etc). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Excavating the trench to the proper depth and width or drilling **in rock or soil**,
- Removal and disposal of spoil,
- Bores required to install 6-inch and smaller mains,
- Stringing the pipe along trench,
- Fusing or welding the pipe,
- Test welds or fusions,
- Sand bedding material,
- Flowable Fill or Low Strength Mortar backfill under existing and proposed roads and as required,
- Bedding the pipe,
- Lifting the joined pipe into trench,

- Coating welds and couplings,
- Excavation for utility location, including test holes,
- Installing tracer wire and test boxes,
- Installing anodes and test boxes,
- Backfilling the trench,
- Air testing,
- All temporary restoration
- All final restoration outside the disturbed road limits (including seed) as required in accordance with the plans and specifications.

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

6.1.2 Lower Main In Place

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

6.1.3 Boring – No Casing

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

6.1.4 Boring With Steel Casing

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the bore regardless of the size of the bore and shall include joining, excavation, the installation of all insulators, seals and vents in accordance with Engineering Standard 2.12.1. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed. No additional payment will be made for boring through rock.

6.1.5 Steel Casing – No Bore (Open Cut)

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

6.1.6 Valve Assembly

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

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

6.1.7 Main Tie-Ins

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

- All time associated with separating the existing facilities and reconnecting to the new main,
- Preparation of any and all by-pass requirements,
- Installation of fittings, such as TD Williamson,
- Excavation, without regard to the classification of the materials.
- Preparing cast iron mains by installing appropriate saddles and making appropriate taps in accordance with standards,
- Abandonment of the existing facilities to include purge and sealing the main ends in accordance with standards,
- Transportation and cleaning of the T D Williamson equipment,
- Traffic Control (Flag-persons, arrow- boards, signs, and plates). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Backfill material including Low Strength Mortar as required
- Surface restoration

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

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

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

M-C service work shall include all costs for the Gas Contractor's completion of all associated paperwork (JCF's, etc). Any temporary or permanent hard or soft surface restoration required for main to curb or curb to meter service installations outside the limits of road construction shall

be considered incidental to the contract. No separate payment shall be made for restoration outside the limits of road construction. The Gas Inspector must be notified after a failed service line has been repaired so a record of the event can be logged and the inspector can verify that the repair was adequate.

6.1.9 Gas Facility Coordination

A bid item has been established in the road contract for “Gas Utility Coordination” which can be freely **bid by the Road Contractor**; this is not a bid item for the Gas Contractor. KYTC will pay the Road Contractor this bid amount **for coordinating the gas facility work within the Road Project**.

KYTC and Duke Energy have established unit prices for gas facility items listed in the Road Project Bid. These are the unit prices that Duke Energy agrees to pay KYTC and KYTC will use to pay the Road Contractor for actual quantities installed by the Gas Contractor. The Road Contractor may likely want to pay the Gas Contractor according to these negotiated rates; however, it is not required. The Road Contractor may pay the Gas Contractor at whatever unit price is negotiated between them (either higher or lower than the preset unit price).

6.2 Pay Items Billed to Duke Energy

The Gas Contractor shall invoice Duke Energy directly for all work, requested by Duke Energy, not included in the road contract including all tie-ins, Curb to Meter service renewal related work and any additional work determined necessary by the Duke Energy Engineer. The Gas Contractor will be paid for, if possible, according to the current calendar years negotiated rates submitted for the Accelerated Main Replacement Program (AMRP).

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

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

6.2.1 Services - Curb to Meter (C-M)

Curb to Meter service renewal will be **paid on a lump sum basis** by line size (1" or 1-1/4", 2", 3", 4", etc) and type of installation (direct bury, drill, or insertion). The curb to meter price shall apply to a service up to seventy (70) feet. Any footage required over 70 feet will be paid at the price of \$ 7.00 per foot (excluding insertions). Payment for curb to meter services will be made when they are placed into service and the restoration and appropriate paperwork is complete on a street.

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

6.2.2 Test & Re-Light

Test & Re-Light work will be **paid on a lump sum basis** for polyethylene C-M service lines that pass the required pressure test. The Test & Re-Light work includes turning on and off the gas service, separating existing facilities for testing, air testing, re-connecting the meter set, and re-lighting the customer appliances.

If flexible risers are encountered, they will be replaced at the test and relight unit price plus an agreed unit price of \$75.00 for each additional hole excavated. If additional holes are necessary, they shall be added to the road contract by change order at the agreed unit price of \$75 each.

Duke Energy may also arrange for direct payment to the contractor for additional holes in lieu of a change to the road contract.

6.2.3 Meter Relocation

The cost to move meters from an unacceptable location shall be included in the C-M service unit cost; no additional payment will be made. Any house-line piping that must be relocated will be negotiated and paid for directly to the Gas Contractor by Duke Energy on a time and material basis. In the case where the meter is in an acceptable location and the customer asks the Gas Contractor to relocate the meter outside, the Gas Contractor must negotiate a price with the customer for any house line piping that must be relocated.

When moving remote meters to the outside, the Contractor must reuse the existing meter, re-attach the remote reader and verify that reads of the meter and the remote are the same. When moving meters outside make sure to replace a non-temperature compensated meter with a temperature compensated meter.

6.2.4 Pressure Conversion Projects

Replacement projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping. The installation of regulator vent piping will be paid on an agreed pre-set lump sum price of \$55.00 for piping up to 10-feet in length and be paid on an agreed pre-set linear foot or meterage price of \$2.50 per foot for lengths over ten feet . Any additional holes will be paid at an agreed pre-set price of \$75.00 each.

6.2.5 Large C-M Service Reconnection to M-C

The reconnection of polyethylene or coated steel C-M services 2" and larger to the M-C portion of the service line will be negotiated and paid for directly by Duke Energy on an hourly basis.

7.0 INVOICING

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

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

The Gas Contractor shall invoice Duke Energy for all work performed to complete items not included in the road contract and for any extra items (contract addendums) directly negotiated and intended to be paid by Duke Energy. These invoices shall be sent to: Duke Energy at 139 E. 4th Street, Room 460A, Cincinnati, OH, 45201, to the attention of the sponsoring engineer. These addendum items should not be invoiced with items that were bid.

7.1 Weekly Pay Sheets

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

Duke Energy Pre-qualified Gas Contractor Phone Numbers (REVISED 1/2/09)

AMS Construction - 8915 Blue Ash Road, Cincinnati Ohio 45242

Phone- 513-794-0410 Fax: 513-794-0414

Owner: Kim Stephenson, Cell Phone - 513-503-9370

Henkels & McCoy Inc. - 13338 E. Broad Street , Rt 16, Pataskala, OH 43062

Office: 740-927-1737ext#24 FAX: 740-927-9632

Miller Pipeline - 4990 Scioto Darby Road, Hilliard Ohio 43026

Office: 1-614-777-8377 Fax: 614-777-4224

Contact: Steve Ferrell, Cell Phone - 1-614-270-6048

RLA Investments – 603 Sheperd Lane, Cincinnati, Ohio 45215

Office: 513-554-1469 Fax: 513-554-1221

Contact: Scott Moody, Cell Phone – 513-623-4258

WATER MAIN SPECIFICATIONS

- **Owner:** Boone County Water District
2475 Burlington Pike
Burlington, Kentucky 41005-0018
Ph. (859) 586-7270
- **Description:** Water Main Relocation
- **Location:** Boone County
KY 237-Rogers Lane to North of Ky. 18
Kentucky Transportation Cabinet
Road Widening Project
FD52 008 0237 005-007
Item No. 06-8001.25
- **Date:** September, 2012

Water Specifications

Section I

DESCRIPTION OF BID ITEMS

1. **RELOCATE FIRE HYDRANT:** Includes allowing for Boone County Water District's Inspector to inspect the existing fire hydrant prior to reuse, returning unusable fire hydrants to the Boone County Water District Warehouse and picking up a replacement hydrant for use if the existing fire hydrant is determined unfit for reuse; also includes all labor, equipment, excavation, materials and backfill to relocate existing fire hydrant to valve, pipe, and anchoring tee as indicated on plans and on standard drawings contained in the plans. The pipe, valve and anchoring tee shall be paid under separate bid items when required. The Contractor to supply and install all anchoring couplings, fire hydrant extensions, concrete blocking, restoration, granular drainage material, etc. needed to install the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. No additional payment will be made for rock excavation. Paid EACH (EA).
2. **DUCTILE IRON PIPE AND MECHANICAL JOINT PIPE (ALL SIZES):** Includes the specified pipe, polyethylene wrap, labor, equipment, excavation, bedding, restoration, disinfection, testing, backfill, etc. required to install the specified pipe at the location 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. Paid LINEAR FOOT (LF).
3. **POLYVINYL CHLORIDE PIPE (ALL SIZES):** Includes the specified pipe, labor, equipment, excavation, bedding, restoration, disinfection, testing, backfill, etc. required to install the specified pipe at the location 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. Paid LINEAR FOOT (LF).
4. **TEES, BENDS, REDUCERS, AND INCREASERS (ALL SIZES):** Includes the specified ductile iron or mechanical joint fitting, polyethylene wrap, labor, equipment, excavation, blocking, anchoring, disinfection, backfill, restoration, etc. to install the specified fitting at the locations shown on the plans in accordance with the specifications and standard drawing complete and ready for use. Paid EACH (EA).
5. **VALVES (ALL SIZES):** Includes the specified resilient seat gate valve for valve sizes of 300 mm (12") and smaller, and butterfly valves for larger valves, polyethylene wrap, labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, 600 mm x 600 mm x 100 mm (2'x2'x4") concrete pad, restoration, testing, disinfection, etc. required to install the specified valve at

the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Paid EACH (EA).

6. **ADJUST EXISTING WATER VALVE BOX TO GRADE:** Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, 600 mm x 600 mm x 100 mm (2'x2'x4") concrete pad, restoration, etc. to adjust the top of the box to finished grade complete and ready for use. Paid EACH (EA).
7. **COPPER SERVICE (ALL SIZES):** Includes the specified copper service, labor, equipment, excavation, backfill, testing, disinfection, and restoration to install the pipe 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 or for bedding required in rock excavation. Paid LINEAR FOOT (LF) when complete.
8. **RECONNECT TO SERVICE:** Includes all labor and materials, including fittings and bends necessary to connect new service line to existing service line. Paid EACH (EA).
9. **RELOCATE WATER METERS (ALL SIZES):** Includes all labor, equipment, excavation, additional fittings, disinfection, testing, restoration, etc. to relocate the existing water meter (whatever size exists), meter yoke, meter box, casting, etc. from its old location to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. The required new service pipe will be paid under separate bid items. Paid EACH (EA).
10. **RECONNECT TO MAIN:** Includes all labor and materials, including fittings and bends and valve necessary to connect service line to the water main. Where the reconnect is made to an existing main this item includes reusing the existing service tap or abandoning the existing service tap by shutting off the curbstop at the existing main and disconnecting the copper service which is being abandoned. Paid EACH (EA).
11. **ADJUST WATER METER BOX TO GRADE:** Include all labor, equipment, excavation, materials, backfill, restoration, etc. to adjust the meter casting to finished grade (whatever size exists) at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. Paid EACH (EA).

12. **TIE-IN TO (ALSO CONNECT TO) EXISTING MAIN (ALL SIZES):** Includes all labor, equipment, excavation, fittings, sleeves, couplings, blocking, anchoring, restoration, disinfection, testing and backfill required to make the 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 and shall be measured thru tie-in fittings. Paid EACH (EA).
13. **PLUG AND BLOCK (ALL SIZES):** This item shall include the specified plug and any labor, equipment, excavation, concrete, backfill and restoration required to install the plug and blocking at the location shown on the plans or as directed in accordance with the specifications. Paid EACH (EA).
14. **ADJUST FIRE HYDRANT TO GRADE:** 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 Boone County Water District's Inspector to inspect the existing fire hydrant prior to adjusting, returning unusable fire hydrants to the Boone County Water District Warehouse and picking up a replacement hydrant and piping for use if the existing fire hydrant is determined unfit for adjustment. If it is determined by the Boone County Water District that the existing hydrant is unfit for adjustment the District will supply the hydrant and piping necessary to make adjustment. The Contractor shall furnish the equipment, labor and materials (other than fire hydrant and piping) to install the hydrant, piping, 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. No additional payment will be made for rock excavation. Paid EACH (EA).
15. **FIRE HYDRANT ASSEMBLY:** Includes all labor, equipment, excavation, materials and backfill to install fire hydrant. The Contractor will supply and install all anchor couplings, bends, fire hydrant extension, concrete blocking, restoration, granular drainage material, etc, needed to install the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. No additional payment will be made for rock excavation. Paid EACH (EA).

16. **CONCRETE ENCASEMENT** Includes all labor, equipment, excavation, backfill, concrete, restoration, material, etc. to construct the concrete encasement of the water main stream crossing as shown on the plans, and in accordance with the specifications and standard drawings. Work is to comply with Boone County Water District's Standards. Paid LINEAR FOOT (LF).
17. **CASING PIPE** Includes the casing pipe (K.D.O.T. Spec.), labor, equipment, excavation, bedding, restoration, backfill, etc. required to install the casing pipe at the location 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. Paid LINEAR FOOT (LF).
 - A. Crossings in Conduit. The unit price bid for each crossing in pipe conduit or tunnel liner shall include all costs in connection with excavation and backfilling, pipe conduit or tunnel liner, the excess cost of installing pipe in pipe conduit or tunnel liner above the amount bid for the pipe laid in open trench, all skids, jointing materials, jacking pipe, boring and jacking pits, sand backfill, end closures, backfilling and recompacting bore pit, and all other work for and in connection with the crossing, not paid for separately.
18. **TAPPING SLEEVE AND VALVE** Includes tapping sleeve and valve, labor and materials, equipment, excavation, backfill, and incidental items, as shown on plan in accordance with the specifications and standard drawings. Paid EACH (EA).
19. **PROPOSED WATER METER SETTING:** Includes meter box & lid, meter yoke, and enough copper water service pipe with cap and locator stick for future connection, labor, equipment, excavation, backfill, and restoration to install new meter setting at location indicated on plan or as directed, in accordance with the specifications and standard drawings, and ready for use. Paid EACH (EA).
20. **COPPER SERVICE SPLIT:** Includes copper fitting, labor, equipment, excavation, backfill, and restoration to install at location indicated on plan in accordance with specifications and standard drawings, complete and ready for use. Paid EACH (EA).

Section II

GENERAL INSTRUCTIONS AND SPECIAL NOTES

1. **WATER SHUTDOWNS:** No customer of Boone County Water District shall be without water for a period longer than 4 hours unless approved by Boone County Water District. All customers to be without water shall be notified 24 hours in advance. No active water main shall be shut down without prior approval of Boone County Water District. Tie-ins on this project may have to be scheduled at night, on weekends or other off peak hours.
2. **PROTECTION OF EXISTING UTILITIES:** The existing utilities shown on the plans are shown as best known at the time the plans were developed and are to be used as a guide only by the Contractor. The Contractor shall use all means at his disposal to accurately locate all affected utilities, whether shown on the plans or not, prior to excavation and protect these utilities during construction. Any damage to existing utilities during construction that are shown or not shown on the plans shall be repaired at the Contractor's expense.
3. **STATIONS AND DISTANCES:** All stations and distances indicated in the plans or specifications are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions.
4. **FIRE HYDRANT DISCONNECTION:** No fire hydrant shall be removed from service without prior approval of Boone County Water District, and the proper fire authority.
5. **RESIDENT ENGINEER:** "Resident Engineer" as referred to in the specifications or in the plans shall mean the Kentucky Department of Highways Engineer in charge of the project and his inspectors.
6. **WATER MAIN INSPECTION:** Boone County Water District and their inspectors, and the resident engineer and his inspectors shall be jointly responsible for inspection of water line facilities installation. Where the phrase "as directed" appears in these specifications without defining who is doing the directing, it shall be understood "as directed" means jointly directed by the Resident Engineer and Boone County Water District.
7. **PRIOR INSPECTION OF EXISTING METER SETTINGS:** The Contractor with the Boone County Water District's inspector shall make an inspection of all meter settings to adjusted or relocated prior to construction. Any meter setting not up to Boone County Water District standard shall be noted and parts furnished to the Contractor by the Boone County Water District for installation as needed. Any water meter setting, fire hydrant or any other water facilities that are to be relocated, adjusted, reused or remain and are damaged by the Contractor shall be repaired at the contractor's expense. Any old water meter settings removed and not reused shall be turned over to the Boone County Water District.

8. **SPECIAL BACKFILL NOTE:** No sand or granular material shall be used for backfill above 300 mm (12") over the top of the pipe or around structures. Only compacted soil or flowable fill shall be used unless approved or otherwise directed by the Resident Engineer.
9. **GENERAL SAFETY:** For the security and safety of people in and adjacent to trenches or construction operations, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors Association of America, the "Manual On Uniform Traffic Control Devices" published by the Federal Highway Administration, and the safety regulations of the appropriate state and local agencies shall be followed when specifically applicable, or by similarity of operation or as necessary for adequate protection.
10. **MATERIAL HANDLING:** Pipe, fittings, valves, hydrants, and accessories shall be loaded, unloaded, and handled by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe.
11. **PROTECTION OF PAVEMENT:** Where main construction is located in or adjacent to pavements, all construction equipment shall have rubber tires. Crawler equipment will be permitted when there is no danger of damaging pavement.
12. **NOISE, DUST AND ODOR CONTROL:** The Contractors construction activities shall be conducted so as to eliminate all unnecessary noise, dust, and odors. The use of oil or other materials, for dust control, which may cause tracking, will not be permitted.
13. **EXCAVATION AND CONSTRUCTION MATERIALS:** All excavated material and all construction materials in prosecution of the work shall be deposited so as not to endanger the work, create unnecessary annoyance to the public, or interfere with natural drainage courses. During the course of the work, all material piles shall be kept trimmed up and maintained in a neat, workmanlike manner. All material piles shall be kept a reasonable distance away from roadways so as not to cause a hazard and block the motorist's view.
14. **PROTECTION OF TREES, SHRUBS, AND OTHER ITEMS TO REMAIN:** Special care shall be taken by the Contractor to avoid unnecessary damage to trees or shrubs and their root systems or any other items shown to remain. Should the Contractor do unnecessary damage to any item shown to remain, the item shall be repaired or replaced at the contractor's expense. Should unnecessary damage be caused to items to remain and is determined not repairable, the Contractor shall compensate the owner for the loss if any.
15. **UNACCEPTABLE EXCAVATED TRENCH MATERIAL:** Any excavated trench material which is determined unacceptable for backfill shall be removed from the area and wasted at a location acquired by the Contractor and approved by the Resident Engineer. Acceptable backfill material shall be acquired by the Contractor at a location approved by the Resident Engineer. The disposition and handling of unacceptable material and the acquisition and handling of acceptable material shall be at the Contractors expense.

16. **BLASTING ROCK:** No blasting of rock shall be performed without specific permission of the Resident Engineer. Blasts shall be properly covered and all utilities and structures in the area shall be properly protected. Warning shall be given to all persons in the area who could be affected by the blasting. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property caused by the blasting. All blasting shall be performed in accordance with all regulations of the Kentucky Department of Mines and Minerals and all other governing agencies having jurisdiction. The Kentucky Department of Mines and Minerals, area emergency response agencies, utility companies with utilities in the area shall be notified of the blasting sufficiently in advance.
17. **ABANDONED VALVES:** The valve boxes shall be removed from all abandoned valves prior to final roadway paving. This shall be done to the satisfaction of the Engineer. Paving over a valve box without removing same will not be acceptable. No separate payment will be made for removal of valve boxes but shall be considered incidental to water line construction.
18. **SALVAGED AND STOCKPILED ITEMS:** The Contractor shall salvage all items in a workmanlike manner. Any item damaged by the Contractor thru negligence shall be replaced with new items at the contractor's expense. All salvaged items to be stockpiled and picked up by BCWD, shall be stored in a safe place until pickup. The Contractor is to notify BCWD at (859) 586-7270 when salvaged items are available for pickup.
19. **CONSTRUCTION PROCEDURE:** The successful contractor to prepare construction procedure with respect to the installation of water utilities. The Sequence and Procedure of Water Utilities Construction shall be approved by the Boone County Water District's Engineering Department prior to the beginning of the water utilities relocations.

Section III

MATERIAL SPECIFICATIONS

1. **CONCRETE:** All concrete shall be Class A in accordance with KYDOH Standard Specs. for Road and Bridge Construction current edition and shall be placed in accordance with same unless otherwise noted. The concrete shall be placed to the dimensions as required in the plans or specifications. Reinforcing steel shall be placed in the concrete as required in the plans or specifications.
2. **CONCRETE REINFORCING STEEL:** All reinforcing steel shall be Grade 40. The size, location, placement, and quantity shall be as required in the plans or specifications.
3. **WATER MAIN**

A-1. **DUCTILE IRON PIPE:** Ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151)

1. **Material:** The chemical constituents shall meet the physical property recommendations of ASTM A536 to ensure that the iron is suitable for satisfactory drilling and cutting.
2. **Minimum Thickness:** Unless otherwise shown on the plans, the minimum thickness of the barrel of the pipe shall be Class 50. All pipe shall be clearly marked as to class by the manufacturer.
3. **Coating and Lining:** The pipe shall be coated outside with a bituminous coating in accordance with ANSI A 21.51 (AWWA C151) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA- C104).
4. **Fittings & Glands:** Fittings and glands shall be ductile iron as specified in Section 3A, "Ductile Iron Fittings".
5. **Polyethylene Encasement:** Ductile Iron Pipe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105)

A-2. **POLYVINYL CHLORIDE PIPE** – Polyvinyl Chloride Pipe shall meet the requirements of ANSI/AWWA C900-81, "Polyvinyl Chloride (PVC) Pressure Pipe (DR 14), 4 in. through 12 in., for water."

Three inch Blue Magnetically Detectable Tape is required in the trench above water main as specified on detail.

B. **PIPE JOINTS**

1. **Push on and Mechanical:** Push-on and mechanical joints including accessories shall conform to ANSI A21.11 (AWWA-C111). Bolts shall be high strength COR-10 tee head with hex nuts. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by the Manufacturer.
2. **Flanged:** Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) or ANSI B16.1
 - a. **Gaskets:** All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
 - b. **Bolts:** Bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.
3. **Restrained:** If restrained joint system is required on the plans, all pipes, bends, valves, etc. shall be restrained. Restrained joints shall consist of a device to provide a flexible, tied joint. Acceptable devices would be a clamp type joint or bell-bolt flexible tied joint or approved equal. Method of restraining and laying schedule shall be approved by the Engineer prior to the start of the project. Manufacturer installation instructions shall be followed. Restrained joints shall be capable of withstanding a maximum joint pressure of 14 kg/sq.cm (200 psi.) unless otherwise noted.
 - a. **Bell and Spigot:** Bell and spigot joints shall conform to ANSI A21.6.
 - b. **Push-on:** Restrained push-on joints shall conform to ANSI A21.11 (AWWA C111). When bolts and nuts are required, they shall be corrosion resistant high strength steel. **Mechanical joints with retainer gland and Lok-Set joints are not acceptable unless otherwise specified.**

4. **FITTINGS**

- A. **DUCTILE IRON FITTINGS:** Ductile Iron Compact Fittings and accessories shall conform to AWWA C153 and Full Body Fittings - and accessories to AWWA C110. Bolts and nuts shall be high strength, corrosion resistant alloy, such as "Cor-Ten" or approved equal.
 1. **Working Pressures:** All fittings and accessories shall be Ductile Iron, rated for a minimum of 14 kg/sq.cm (200 psi) working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the District's service area require materials used, to be of a higher working pressure than 14 kg/sq.cm (200 psi.)

2. **Coating and Lining:** The fittings shall be coated outside with a bituminous coating in accordance with ANSI A21.10 (AWWA C110) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA C104).
3. **Fittings and Glands:** All pipe fittings shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111.
4. **Polyethylene Encasement:** Ductile Iron Fittings shall be encased with polyethylene film conforming to ANSI A21.5 (AWWA C105)

B. **JOINTS**

1. **Mechanical:** Mechanical joints including accessories shall conform to ANSI A21.11 (AWWA C111). Glands shall be ductile iron. Bolts shall be high strength COR-10 tee head with hex nuts.
2. **Flanged:** Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) OR ANSI B16.1 and be used with the express approval of the Engineer.
 - a. **Gaskets:** All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
 - b. **Bolts:** Bolts shall be stainless steel and have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.
3. **Restrained:** If restrained joints is shown on the plans, all pipe, bends, valves, etc. shall be restrained.
 - a. **Bell and Spigot:** Bell and spigot joints shall conform to ANSI A21.6.

5. **POLYETHYLENE WRAP**

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

- A. **MATERIAL:** Polyethylene wrap shall be a minimum of a 8-mil polyethylene tube.

- B. **INSTALLATION:** The contractor shall cut the roll in tubes 600 mm (2 feet) longer than a standard length of pipe. Each tube shall be slipped over the length of pipe, centering to allow a 300 mm (1') overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit and the overlay shall be secured with polyethylene tape.

Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately placed in the trench, fittings shall be wrapped prior to installing blocking or pads. (see Standard Drawing #104) Polyvinyl chloride pipe requires no wrap. Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appliances and bringing the edges together, folding twice, and taping down.

6. **FIRE HYDRANTS**

- A. **DESCRIPTION:** The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all fire hydrants complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.
- B. **FIRE HYDRANTS:** Fire hydrants shall conform to AWWA C502. Hydrants shall conform to the standards of the Boone County Water District as SHOWN on the plans. All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method.

Hydrants shall be designed to 14 kg/sq.cm (200 psi) working pressure and shall be shop tested to 21 kg/sq.cm (300 psi) hydrostatic pressure with the main valve both open and closed. The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 1/4 inches, a 6 inch mechanical joint inlet to be suitable for setting in a trench 1,000 mm (3' 6") deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrants shall have a dry top and shall be self draining, when the main valve is closed. Self draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants located in areas determined by the Engineer (flood zones) shall have all drain holes plugged prior to installation. Hydrants shall be rotatable in a minimum of eight (8) positions in 360 degrees. All hydrants shall have two (2)- two and one half (2 1/2) inch hose nozzles and one (1) steamer or pumper connection threaded to conform to Boone County Water District Standards: steamer nozzle shall be National Standard Thread and 2 1/2" outlets shall be Boone County Water District Standard Thread (Old Cincinnati Thread).

The operating nut and the nuts of the nozzle caps shall be square in shape, measuring one (1) inch from side to side. Hydrant body shall be painted yellow for areas designed for 10.5 kg/sq.cm (150 psi) working pressure and red for areas in excess of 10.5 kg/sq.cm (150 psi). Hydrants used in areas in excess of 10.5 kg/sq.cm (150 psi) working pressure shall be designed to operate at the higher pressures and shall have independent operating valves on each 2 1/2" outlet.

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

- C. **INSTALLATION:** The installation of fire hydrants shall be in conformance with "Mains Installation" section, paragraph "Setting Hydrants".
- D. **POLYETHYLENE ENCASEMENT:** Fire hydrant tee, anchoring pipe and part of the fire hydrant shoe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105). . (See Standard Drawing)

7. **VALVES**

- A. **DESCRIPTION:** The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all valves and accessories complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.
- B. **GATE VALVES:** Gate valves shall conform to AWWA C509 and shall be cast iron or ductile body, resilient wedge, non-rising stem with rubber "O" ring packing seals. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the Engineer. All valves shall be designed for a working pressure of 17.5 kg/sq.cm (250 psi) unless otherwise noted on the plans or in the "Supplemental Specifications". An extension stem shall be furnished if required, to bring the operating nut within 1,000 mm (3-1/2 feet) of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation.
- C. **BUTTERFLY VALVES:** Unless otherwise specified valves 400 mm (16 inches) and larger shall be butterfly valves rated at 17.5 kg/sq.cm (250 psi) working pressure and conform to the applicable portions of AWWA Standard C504, latest edition. Engineer shall approve all butterfly valves before installation. The contractor shall be required to transport all butterfly valves to the District's Warehouse for testing and pick them up after testing is completed. Valve testing will be completed at a rate of one valve per day under normal conditions, with prior notice given to the District.

1. **Body:** The valves shall be AWWA Class 250B designed for tight shut-off against a differential pressure of 17.5 kg/sq.cm (250 psi). Valve bodies shall be constructed of ductile iron. Two trunnions for shaft bearing shall be integral with the valve body. The valves and appurtenances shall be suitable for buried service.
 2. **Ends:** Valves shall have mechanical joint ends and shall be furnished with high strength COR-10 tee head with hex nuts, ductile iron glands, and rubber gaskets for each mechanical joint end.
 - a. **Prestressed Concrete Pipe:** Valves for use with prestressed concrete pipe shall be furnished with victualic ends for victualic coupling Style 44, unless otherwise shown on the plans. The use of mechanical joint type valves with the proper adapter pieces on both sides of the valves are acceptable in lieu of the victualic style valve with prestressed concrete pipe.
 3. **Discs:** Valve discs of cast steel, fabricated steel, or cast bronze are not acceptable.
 4. **Seats:** Seats bonded on the discs are not acceptable.
 5. **Shaft Seals:** If stuffing boxes are utilized for shaft seals they shall be constructed of cast iron, ASTM A126. Gland assemblies shall be of cast bronze, ASTM B132. The packing gland shall be housed in a solid walled cast iron, ASTM A48, Class 40 one piece structure or equal.
 6. **Operators:** The valve operating mechanism shall be for counterclockwise opening. There shall be no external moving parts on valve or operator except the operator input shaft. Input shaft is to be operated by a 50 mm (2") square operating nut. Maximum required input force on the operator shaft to open and close the valve shall be 40 pounds. The total number of turns applied to the operating nut required to completely open the valve from a completely closed position shall not be less than twice the normal valve diameter. An extension stem shall be furnished to bring the operating nut within 1,000 mm (3 1/2 feet) of the finished grade. Extension stems shall be securely fastened to the valve stem.
- D. **TAPPING SLEEVES AND VALVES:** Tapping sleeves and valves shall be designed for a working pressure of 17.5 kg/sq.cm (250 psi). The tapping sleeve together with the tapping valve shall be tested at 17.5 kg/sq.cm (250 psi) for visible leakage and pressure drop before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at 24.5 kg/sq.cm (350 psi).
1. **Tapping Sleeves:** Tapping sleeves shall be two piece with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe.

2. **Tapping Valves:** Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the outlet with slotted standard flange or other adapters for connection to the tapping machine. The valves shall open by turning counterclockwise. Tapping valves shall conform to AWWA C509.
- E. **VALVE BOXES:** All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.
- F. **AIR RELEASE AND VACUUM VALVES:** Air release valves shall be constructed at high points in the water line as indicated on the plans. These valves shall permit the air in the pipeline to escape as the pipe line fills and allows the air to re-enter as the line empties. These valves shall be APCO Air Release Valves Model #200-A, 17.5 kg/sq.cm (250 psi) working pressure, 25 mm (1"), cast iron body and cover. 400 mm (16") and larger water mains shall be a 50 mm (2") air release valve and curb stop. Refer to Standard Drawing for reference.
8. **STEEL CASING PIPE**
Casing pipe shall be steel pipe with a minimum yield strength of 2450 kg/sq.cm (35,000 psi) with a minimum wall thickness as listed below:

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

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

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

9. **MATERIAL APPROVAL:** Material certification and test samples shall be provided by the Contractor, at the contractor's expense, as required by Boone County Water District and the Kentucky Department of Highways. No material shall be used until approved. All rejected material be removed from the project and approved material acquired by the Contractor at the Contractor's expense.
10. **PAVING MATERIALS FOR REPLACEMENT IN-KIND:** All materials for replacement in-kind of streets, sidewalks, curbs, walls etc. shall meet the requirements of the applicable sections of KYDOH Standard Specifications For Road And Bridge Construction.
11. **FLOWABLE FILL:** This material shall meet the requirements Section 601.03.03 of the Kentucky Department of Highways' Standard Specifications for Road and Bridge Construction.

Section IV

CONSTRUCTION

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

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

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

- B. **HANDLING:** Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. The interior of all pipes, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling P.V.C. pipe, care should be taken to avoid abrasion damage, gouging of the pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.
- C. **TREE REMOVAL:** Stumps of trees designated for removal 25 mm (12") in diameter and smaller shall be physically removed. Any stump larger than 25 mm (12") shall be ground down to 15 mm (6") below final grade level.
- D. **DEWATERING:** Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage.
- E. **CONSTRUCTION EQUIPMENT:** Where mains are located in or adjacent to pavements, all backfilling and material handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavement.
- F. **TRENCH SUPPORT:** Supporting open cuts for mains shall be the responsibility of the Contractor where trenching may cause unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the

Contractor shall, at his expense, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing, or other approved means. Such trench support material and equipment shall remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property.

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

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

I. **TRENCH EXCAVATION AND BOTTOM PREPARATION**

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

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

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

The Contractor shall excavate whatever material encountered. Trenches shall be excavated to the widths shown in the table headed "Trench Width" or as otherwise indicated in the plans, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe or conduit on undisturbed soil at every point along its entire length, except for bell holes and for the proper sealing of the pipe joints. Bell holes and

depressions in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, shall be only of such length, depth, and width as required for properly making the particular type of joint. Additional depth shall be excavated in rock as described elsewhere herein.

Except in cases where the elevations of the water lines are indicated on the plans, trenches for water line shall be of a depth that will provide a minimum cover over the top of the pipe of 900 mm (36 inches) from the indicated finished grade, and avoid interference of the water lines with other existing or proposed utilities. Where the note occurs, "Slope to Drain", the Contractor shall manage to keep a positive slope in that direction in order that air may travel to the air vent. Where paved surfaces are to be disturbed by an open cut, the Contractor shall provide suitable machinery to cut the edges of the pavement in a smooth straight line.

2. **Rock:** The word "rock" wherever used as the name of an excavated material, shall mean boulders and solid masonry larger than .3823 cubic meter (1/2 cubic yard) in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.
3. **Blasting Rock:** No blasting of rock shall be done within 12 m (40 feet) of pipes or structures without specific permission from the Engineer. Blasts shall be properly covered and the pipe or structure properly protected. Warnings shall be given to all persons in the immediate vicinity. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property. Necessary permits shall be secured and paid for by the Contractor.
4. **Trench Width:** Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

Earth

- a. Minimum - outside diameter of the pipe barrel plus 200 mm (8 inches), 100 mm (4 inches) each side of pipe.

Maximum - nominal pipe diameter plus 600 mm (24 inches).

Rock

Minimum – 600 mm (24") or less, nominal pipe size: outside diameter of pipe barrel plus 300 mm (12"), @ 150 mm (6") each side.

Minimum - Larger than 600 mm (24"), nominal pipe size: outside diameter of pipe barrel plus 350 mm (18"), @ 325 mm (9") each side.

Maximum - nominal pipe diameter plus 600 mm (24").

- b. **Butterfly Valves:** Trench width shall be over excavated 600 mm (24") on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.
 - c. **Structures:** The minimum excavation limits for structures shall be as indicated. In rock, the excavation limits shall not exceed 300 mm (12 inches) from the outside wall and 150 mm (6 inches) below the footer.
- 5. **Excessive Trench Width:** If, for any reason the trench width exceeds the maximum trench width defined in paragraph "Trench Width", the Contractor, subject to approval of the Engineer, shall provide compacted stone bedding, additional strength pipe or concrete encasement, at the contractor expense.
- 6. **Bottom Preparation:** The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted layer of sand bedding material shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as practicable. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint.
 - a. **Earth:** The trench shall be excavated to the depth required, so as to provide a uniform and continuous bearing and support for the pipe barrel. A minimum of a 80 mm (6") sand shall be installed on the solid and undisturbed ground. The finished trench bottom shall be accurately prepared by means of hand tools.
 - b. **Rock:** Where excavation is made in rock or boulder, the trench shall be excavated 6 inches below the pipe barrel for pipe 600 mm (24 inches) in diameter or less, and inches for pipe larger than 600 mm (24 inches) in diameter. All loose material shall be removed from the trench bottom. After preparation of the trench bottom, a pipe bed shall be prepared using sand and thoroughly compacted. The bedding material shall be spread the full width of the trench bottom.
- 7. **Water Main Depth:** Mains 300 mm (12") and less in size shall be not less than 900 mm (36") in depth and no more than 1,200 mm (48") in depth, unless otherwise specified. Mains larger than 300 mm (12") shall be installed as shown on the plans.
- 8. **Excessive Trench Depth:** If, for any reason, the trench depth exceeds the trench depth shown on the Plans, the Contractor is responsible for any and all additional cost incurred for the excessive depth.

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

J. **PIPE, VALVE, HYDRANT AND METER SETTING INSTALLATION**

The provisions of AWWA C600 shall apply in addition to the following:

1. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work except when permitted by the Engineer. Unless otherwise indicated in the plans or in Section I, Bid Item Explanations, the material shall be new and unused. The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved methods. Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the Engineer. After placing a length of pipe in the trench, the spigot end shall be centered in the bell of the pipe and forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of pipe joints in excess of the manufacturer's recommendations will not be permitted. A watertight pipe plug or bulkhead shall be provided and used to prevent the entrance of foreign material whenever pipe laying operations are not in progress. Any pipe that has the grade or joint disturbed after laying shall be taken up and relayed. Any section of pipe found to be defective before or after laying shall be removed and replaced at the Contractor's expense.
2. **Pipe Cutting:** The cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted. All pipe cutting shall be at the Contractor's expense.
3. **Push-On Joints:** The surfaces with which the rubber gaskets comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot end is pushed home.
4. **Mechanical Joints:** Mechanical joints require that the spigot be centrally located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed over the gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space. P.V.C. pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings.

- a. **Bolt Torque:** The normal range of bolt torque to be applied to standard cast iron bolts in a joint are:

RANGE OF TORQUE	
Size	In Foot - Pounds
5/8"	40 - 60
3/4"	60 - 90
1"	70 - 100
1-1/4"	90 - 120

5. **Restrained Joints**

- a. **Ball and Socket:** Ball and Socket joints shall be assembled and installed according to the manufacturer's recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.
- b. **Push-On:** Assemble and install the push-on joint according to the manufacturer's recommendations. Restrained joint-type pipe and fittings shall only be used as approval by the Engineer. Retaining glands, field lock gaskets, or retaining flanges shall not be considered as providing a restrained joint. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.
6. **Setting Valves:** Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the street property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum of 600 mm x 600 mm x 100 mm (2'x2'x4") concrete pad as shown in Standard Drawing.
7. **Setting Hydrants:** Hydrants shall be located as shown on the plans or as directed by the Engineer. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the traffic flange within 100 mm (4") above final grade in accordance to Standard Drawing. Each hydrant shall be controlled by an independent gate valve with valve box. All valves used for hydrant control shall be anchored to the branch tee.

8. **Thrust Blocking:** All bends over five (5) degrees, plugs, caps, and tees shall be securely blocked against movement with concrete thrust blocks placed against undisturbed earth in accordance with Standard Drawing. Thrust blocks shall be approved by the Engineer prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking.

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

- a. **Concrete Blocking:** Concrete blocking shall be K.D.O.T. Class A concrete as specified in Section "Concrete". Blocking shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the fitting and on the ground in each instance shall be that shown herein. The blocking shall, unless otherwise shown, be so placed that the pipe and fitting joints will be accessible for repair.
- b. **Tie Rods:** If shown or specified, movement shall be prevented by attaching suitable metal rods, clamps or restrained fittings. Steel tie rods or clamps, where permitted, shall be of adequate strength to prevent movement. Steel tie rods or clamps shall be painted with three coats of an approved bituminous paint or coal tar enamel. A minimum of 3/4" welded eye bolts @ a 90 degree bend and 3/4" threaded rods may only be used with the approval of the Engineer for temporary restraint only. Duc-Lucs are prohibited for use.
- c. **Restrained Fittings:** Restrained fittings, where permitted, shall be subject to the approval of the Engineer. (Mega Lug)
9. **Meter Setting Installation**
The Contractor shall furnish all labor, equipment, excavation, backfill, testing, disinfection, and restoration to install the pipe 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 or for bedding required in rock excavation. It will be the Contractors responsibility to remove and reset the service at his own expense if he fails to notify and receive the approval from the District. Contractors work shall be warranted for a period of one year of the date of activation of each service (meter set date).

- a. **Inspection & Notification:** The Contractor shall notify all affected District customers prior to interrupting water service. The Contractor shall make 24 hours notification. Routine service inspection and final inspections will be made by the District upon request by the Contractor and in a timely manner. The Contractor shall provide the District 24 hours notification for inspection by the District. It is the Contractors responsibility to post "No Parking" signs and safety devices.
- b. **Installation of Service Lines:** The Contractor shall be familiar with copper piping, fittings and connections, and have available equipment to work with said materials. No sweat type fittings shall be permitted. Service line shall be installed as shown on the plans or as directed by the District. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 36 inches cover from final grade. The trench width shall be as excavated to a maximum of 2 feet. The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards in the plans or contained herein.
 1. **Water Service Taps:** The Contractor shall maintain a minimum of 36" cover over any tap. The corporation installed into the main shall have no more the 4 threads showing between the top of the water main and the bottom of the corporation.
 2. **Service Line:** The Contractor shall maintain a constant cover of 36" over any water line. Methods of pushing or jacking under the existing street must avoid bending or kinking the pipe. No open cuts of the pavement will be permitted unless pre-approved by the District. All copper shall be cut using a copper-tubing cutter. All connections shall be flared connections. No oil base or other contaminating materials will be used in lubricants, caulking and sealers. The Contractor shall be responsible for making all joints watertight.
 3. **Meter Vault:** All meter vaults shall be located inside existing right-of-ways or water main easements of record or as directed by the District. Typically the meter vault shall sit 5' behind the back edge of curb or edge of pavement. The Contractor shall contact the customer and determine a suitable location of the setting within the above guidelines. It is the Contractors responsibility to notify the District's Inspector if these conditions cannot be met. The District's Inspector will inspect any questionable meter setting location prior to the Contractor installing.

Meter vaults shall be set to allow the meter cover to be level with the back edge of the existing curb or the back edge of paving along roadways without curbs. It is the Contractor's responsibility to ensure that the meter vault does not settle due to poor compaction or any other reason within the Contractor's control. The Contractor at no additional expense to the District shall adjust any meter vault that sinks below grade due to poor workmanship by the Contractor to grade.

K. **TRENCH BACKFILL**

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

1.
by the Engineer, flowable fill shall be per Special Note 7X of the Ky. **BACKFILL**

- a. **Trench Bottom Preparation:** The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than 80 mm (6") of sand bedding shall be used.
- b. **Backfill to 300 mm (12") Over Pipe Barrel:** All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand shall be used to backfill the trench from the bottom of the pipe barrel to the 300 mm (12") over the pipe barrel. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified under Bulkheads Section.
- c. **Remaining Trench Backfill:** From 300 mm (12") above the pipe barrel to the surface, compacted earth or flowable fill may be used as backfill material. No material shall be used for backfill that contains frozen earth, vegetation or organic material, debris, rocks **200 mm (8")** or larger measured in any direction, or earth with an exceptionally high void content.
- d. **Compaction:** All backfill shall be placed in uniform loose layers, not to exceed 300 mm (12") layers, and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698). The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.
- e. **Bulkheads:** When a granular bedding is provided in rock or when granular backfill is used, the Contractor shall place bulkheads of clay soil across the trench at 30.48 m (100') intervals to resist the movement of groundwater through the granular material. Such bulkheads shall be carefully compacted and shall extend approximately 900 mm (3 feet) in a direction parallel to the pipe and shall extend from the bottom of the trench to a point 100 mm (4") below final grade level.

- f. **Flowable Fill as Backfill:** As required Department of Highways Standard Specifications for Road and Bridge Construction.
 - g. **Surface Conditions:** The trench surface shall be periodically attended to during the course of the contract. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.
- L. **INSTALLATION OF PIPE BY BORING OR JACKING:** At certain locations where designated on the plans, the Contractor will be required to install pipe under paved areas or other obstacles by boring a hole large enough to pull the pipe through without obstructing the designated area, or by jacking, whichever is the most feasible.
- M. **WATER METERS:** Water Meters shall be installed at locations shown on the plans. The meter shall be constructed as shown on Standard Drawings contained herein or in the plans.
- N. **CONNECTIONS (TIE-INS) TO EXISTING WATER LINES:** All connections to existing water lines shall be made at location shown on the plans. Care shall be taken in each case that none of the sterilizing water may enter the system during the sterilizing operation. Each connection shall be preceded with a one inch corporation stop and drain to allow bleeding of the water line of air and sterilizing water. This corporation stop shall be furnished and installed at the Contractor's expense. All sections of pipe and appurtenances to be used for tie-ins and not sterilized shall be thoroughly cleaned by scrubbing with a chlorine solution prior to installation. All tie-ins of mains shall be done with transitional or straight solid sleeves. Mains shall be flushed of sterilizing water before tie-ins to existing mains are made.
- O. **INSTALLATION OF SERVICE LINES:** Service line shall be installed as shown on the plans or as directed. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 900 mm (36") cover from final grade. The trench width shall be as excavated to a maximum of 600 mm (2'). The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards in the plans or contained herein. Backfill shall meet the same requirements as that described in PIPE TRENCH BACKFILL.
- P. **APPLICABLE SPECIFICATIONS & STANDARDS**
The following specifications and standards form a part of these Specification:
 - 1. **American Water Works Association (AWWA) Standards**
 - 2. **Boone County Water District Standard Drawings & Specifications**

3. **"Manual of Accident Prevention in Construction"** published by the **Associated General contractors of America**
4. **Kentucky Occupational Safety and Health Administration's "Kentucky Occupational Safety and Health Standards for General Industry"** current edition.
5. **American National Standards Institute (ANSI)**
6. **American Society for Testing & Materials (ASTM)**
7. **Kentucky Division of Water Quality**
8. **"Recommended Standards for Water Works"** current edition

Section V

DISINFECTION AND LEAKAGE TEST

- A. **SCOPE:** This section covers the disinfection of the new water mains, fittings, temporary services and associated appurtenances. The Contractor shall provide all labor, materials, tools, equipment, and incidentals required to test the mains for water tightness and disinfect the mains as directed by the District and as specified herein. Gauges for the test shall be furnished by the Contractor.
- B. **TEST SECTION:** After the main has been installed and backfilled all newly installed pipe or any valved section thereof shall be considered a test section.
- C. **WITNESS:** All tests performed for each test section shall be witnessed and approved by the District before acceptance. In the event the Contractor performs any test without witness by the District, the Contractor will be required to test the section again in conformance with this specification at no cost to the District.
- D. **GENERAL:** All disinfection work shall conform to the requirements of the latest revision of ANSI/AWWA C651 and the requirements of the Kentucky Division of Water. If any State requirements conflict with the provisions of this section, the State requirements shall govern.

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

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

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

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

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

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

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

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

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

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

Residual Chlorine Concentration mg/L	Sulfur Dioxide (SO ₂)	Sodium Bisulfate (NaHSO ₃)	Sodium Sulfite (Na ₂ SO ₃)	Sodium Thiosulfate (Na ₂ S ₂ O ₃ @5H ₂ O)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

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

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

- H. **CHLORINE RESIDUAL TESTS:** Upon completion of final flushing, the District will perform chlorine residual tests to ensure the chlorine residual in the main and temporary services is not higher than that generally prevailing in the remainder of the water distribution system and is acceptable to the District.
- I. **BACTERIOLOGICAL TESTS**
- After flushing has been completed and the chlorine residual is not greater than 1.2 ppm, a bacteriological sample shall be taken in accordance with the Kentucky Department of Environmental Protection Agency, Safe Drinking Water Act.
 - The mouth of the valve, hydrant, blow-off, etc. shall be sterilized using a propane torch or equivalent and then allowed to flow for a period of not less than 5 minutes.

- c. The standard sample shall be collected in sterile bottles, by the representative of the certified laboratory, care being taken not to contaminate the neck of the bottle or stopper during collection.
 - d. This sample will then be delivered to a certified laboratory by the individual collecting the sample.
 - e. Copies of the analysis shall be sent to the Boone County Water District inspector directly from the laboratories.
 - f. In the event that the laboratory analysis shows bacteria present, the line shall be re-chlorinated, sterilized, flushed, and a new sample taken until such time that the line meets the Safe Drinking Water Act Standards.
- J. **REDISINFECTION:** Should the bacteriological tests indicate the presence of coliform organisms at any sampling point, the main and temporary services shall be re-flushed, re-sampled, and re-tested. If check samples show the presence of coliform organisms, the main and temporary services shall be re-chlorinated at no additional cost to the District until results acceptable to the District are obtained.

Re-disinfection shall be completed by the continuous feed or by the slug method. Unless otherwise permitted, the chlorination agent shall be injected into the main and temporary services at the supply end through a corporation cock installed in the top of the pipe. All materials, equipment and labor necessary for the re-disinfection shall be supplied by Contractor at no additional cost to the District.

- K. **HYDROSTATIC TESTING:** Hydrostatic Testing will be in accordance with AWWA C600. The water main being tested shall have all air expelled by additional flushing or installation of taps on high points in the line. The pressure of the water main shall be gradually increased to obtain a minimum pressure of 7.0 kg/sq.cm (100 psi) over the design pressure 17.5 kg/sq.cm (250 psi). at the lowest elevation point of the water main or as directed by the Engineer. The test will be for a two (2) hour duration and will not vary by more than .35 kg/sq.cm (5 psi). All tests performed for each test section shall be witnessed and approved by a representative of the Engineer, in the event any test is performed without a representative of the Engineer, the Contractor shall be required to test the section again. Leakage is defined as the amount of water used to maintain the test pressure.

Section VI

VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL

1. **REFERENCE MATERIALS:** Traffic shall be maintained in accordance with the "Manual on Uniform Traffic Control" published by the Federal Highway Administration, current edition of Kentucky Department of Highways Standard Specifications for Road & Bridge Construction and current KYDOH Standard Drawings.
2. **PEDESTRIAN TRAFFIC:** Should the Contractor be required to remove sidewalk or any other pavement used by pedestrians, the Contractor shall construct an approved, safe, alternate route with acceptable paving materials. Approval for alternate routes and temporary paving materials shall be acquired from the Engineer. The Contractor shall also construct temporary barricades and fences as required. No extra payment will be made for construction of temporary pedestrian walkways, fences or barricades required for water line construction, but shall be considered incidental to water line construction.
3. **VEHICULAR TRAFFIC:** Vehicular traffic shall be maintained as required by the referenced materials listed above. The cost of all temporary paving materials for pavement restoration due to water line construction shall be considered incidental to the contract. The cost for all traffic control materials including signs, barricades, etc. shall be considered incidental to the contract. The Contractor shall be required to keep the construction area safe at all times and check that traffic control devices are in place. Should temporary paving materials used for water line construction fail to perform satisfactorily, the Contractor shall repair same at his own expense.

Section VII

TEMPORARY AND PERMANENT RESTORATION

1. **TEMPORARY RESTORATION:** Any street, driveway, parking lot, sidewalk, stairs, walls, etc. disturbed by water line construction which is shown on roadway construction plans to be disturbed by roadway construction may be replaced with temporary materials. These temporary materials and their placement shall be approved by the Engineer prior to placement. The cost for temporary paving materials and their placement shall be considered incidental to the cost of water line construction.
2. **PERMANENT RESTORATION:** Any street, driveway, parking lot, sidewalk, walls, shrubs, etc. disturbed by water line construction, which is shown on roadway construction plans to remain and not be disturbed by roadway construction, shall be replaced in kind. The concrete, asphalt, and stone removed shall be replaced with the same type material, the same thickness as that removed. All pavement shall be removed and replaced to 300 mm (1') beyond the limits of excavation as detailed on drawing contained herein. These permanent materials and their placement shall be approved by the Engineer prior to placement. The Contractor shall reconstruct same to the original lines and grades and in such a manner as to leave all such items in fully as good or better condition than that which existed prior to construction. All restoration work shall conform to the requirements of KDOH Standard Specifications for Road and Bridge Construction and to the drawing for pavement restoration contained herein. The cost for this permanent restoration shall be considered incidental to the cost of the water line construction.
3. **SEEDING AND SODDING:** This work shall be performed under bid items pertaining to same for roadway construction and in accordance with KDOH Standard Specifications for Road and Bridge Construction

Section VIII

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. METHOD OF MEASUREMENT

1. **Ductile Iron Water Line**: Each type and size shall be measured by the linear foot laid in the trench, along the center line of the pipe, thru valves and fittings, to point of contact with existing lines.
2. **Service Pipe**: All sizes shall be measured by the linear foot laid in the trench, excluding meter settings, from water main or existing service line to existing service line.
3. **Water Line Undercut**: When directed by the Engineer shall be measured along the subgrade for length and width and from pipe subgrade or bottom of fill, if in a fill placed for roadway as a part of this same contract, to bottom of undercut. Water line undercut shall be measured and paid by the cubic yard.
4. **Method of Measurement For All Other Items**: Shall be by each or lump sum as specified for that particular item in "SECTION I, BID ITEM EXPLANATIONS" contained herein.

B. BASIS OF PAYMENT

1. **Excavation** for water lines from the surface to water line subgrade or to 150 mm (6") below water line subgrade in rock, for structures, for service lines, or for any other water system item will not be a bid item but shall be considered incidental to the bid item to which it pertains. No additional payment will be made for rock excavation.
2. **Water Line Undercut** when directed by the Engineer and/or BCWD, shall be paid by the cubic meter. The accepted quantities of water line undercut will be paid at the agreed unit price of \$15 per cubic yard (which shall also include acquisition and placement of acceptable refill material. Should the Contractor be directed to perform water line undercut, the item "Water Line Undercut" at the agreed unit price of \$15 per cubic yard shall be added to the contract by change order.
3. **Water Main Fittings** shall be paid EACH, couplings in tie-ins and all fittings in offsets shall be considered incidental to those items.
4. **Backfill** for all phases of water line construction shall not be paid separately but shall be considered incidental to water line construction.

5. **Temporary Restoration** of streets, roadways, sidewalks, steps, walls, trees, shrubs, etc. shall be considered incidental to water line construction when damaged by water line construction. The cost for this temporary restoration shall be considered incidental to the cost of the water line construction.
6. **Traffic Control and Maintenance of Traffic** for a water line construction shall not be paid separately but shall be considered incidental to water line construction.
7. **Basis of Payment for all Other Items** shall be by cubic yard, ton, linear foot, square yard, each, or lump sum as specified for that particular item.

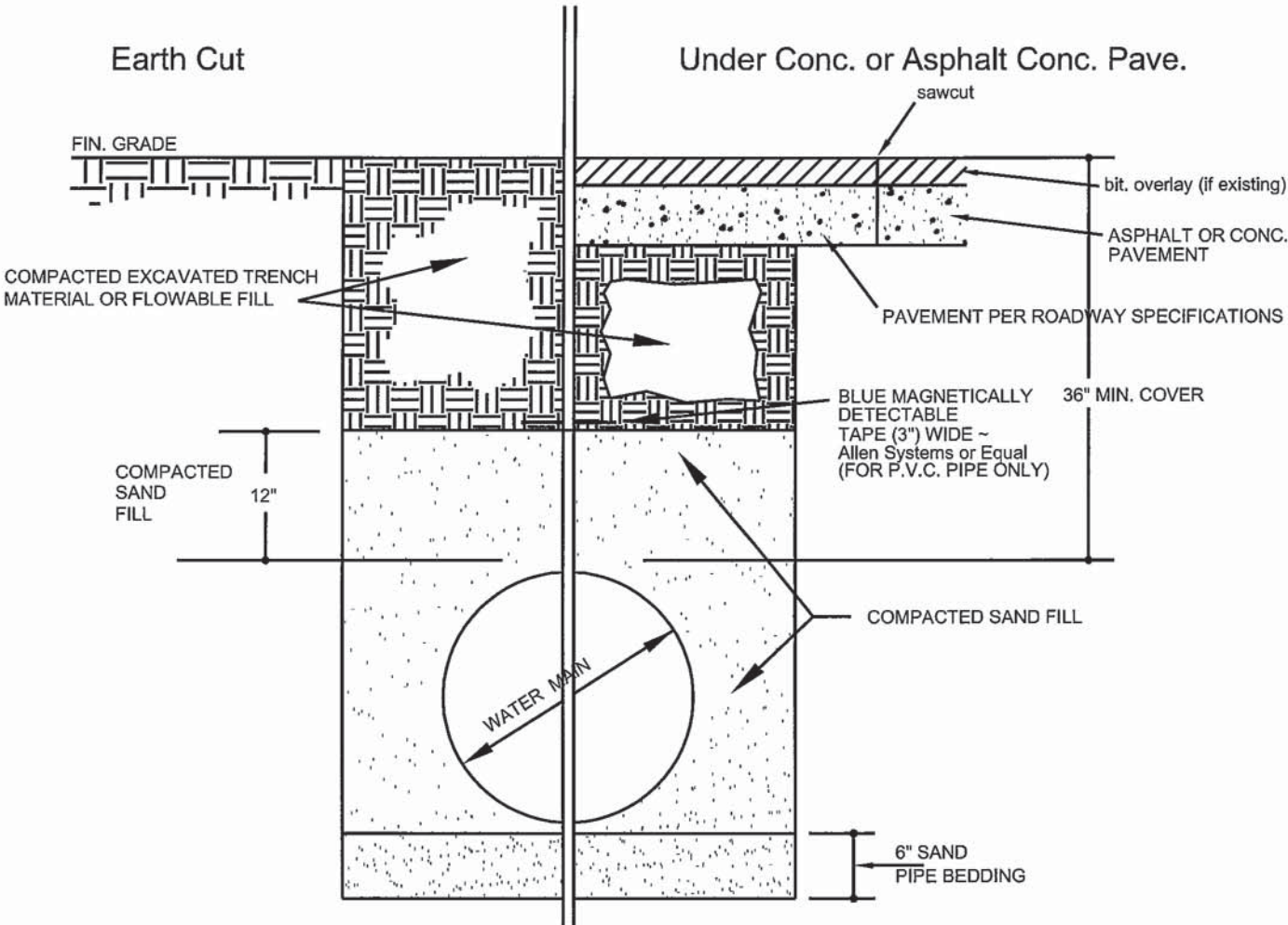
BOONE COUNTY WATER DISTRICT

WATER MAIN DETAILS

STANDARD DRAWINGS

Backfill of all trenches will be compacted by the Standard Proctor Methods, ASTM D 698

All areas will require compaction to 95% of maximum density or to the satisfaction of the Geo-Technical Engineer.



4/2/07
KYTC SPEC.

2

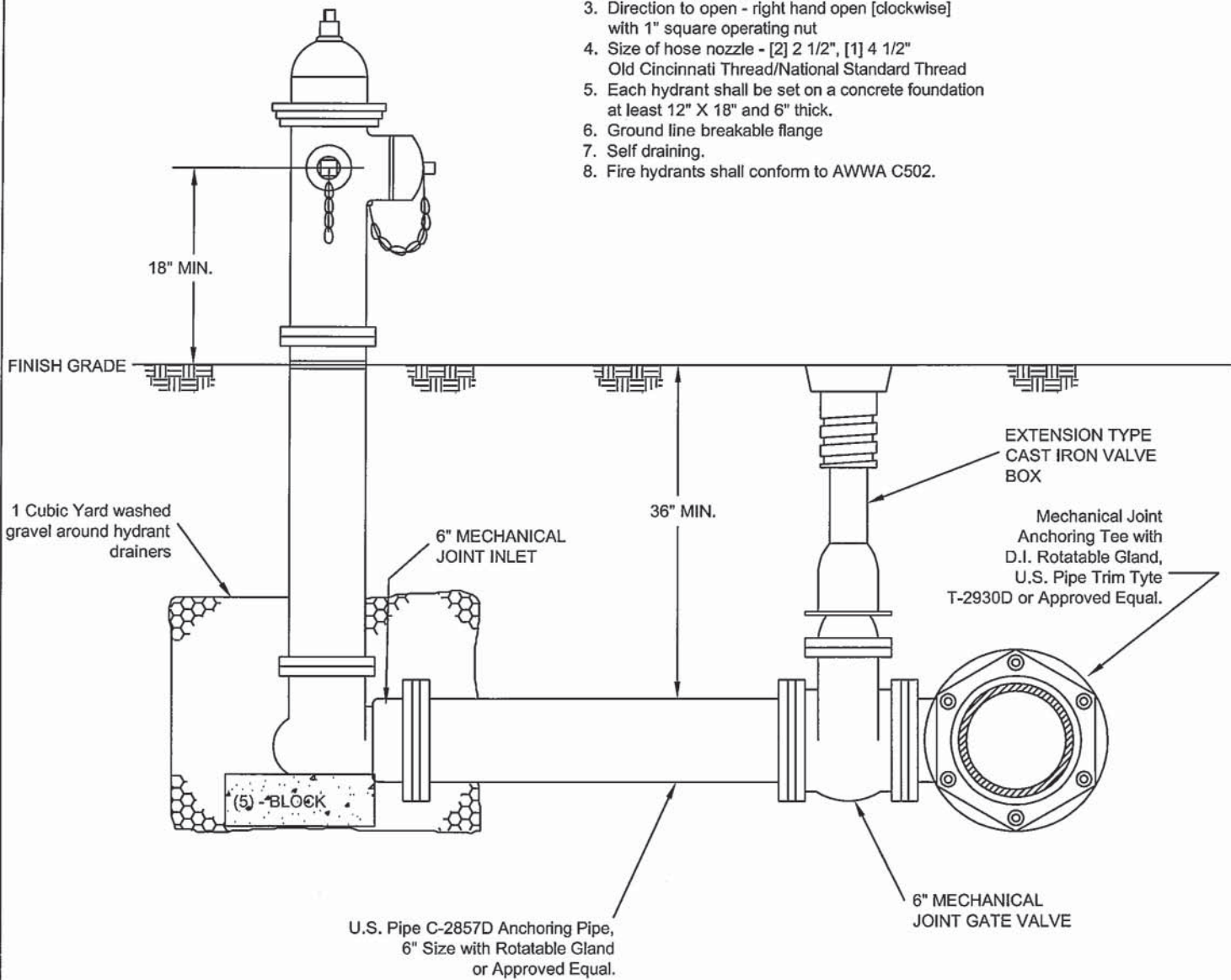
WATER MAIN TRENCH DETAIL

BCWD

SCALE: N.T.S.

HYDRANT DATA

- 1. Kennedy, Mueller, M&H, or Clow.
- 2. Size of Hydrant, minimum 6 inch
- 3. Direction to open - right hand open [clockwise] with 1" square operating nut
- 4. Size of hose nozzle - [2] 2 1/2", [1] 4 1/2" Old Cincinnati Thread/National Standard Thread
- 5. Each hydrant shall be set on a concrete foundation at least 12" X 18" and 6" thick.
- 6. Ground line breakable flange
- 7. Self draining.
- 8. Fire hydrants shall conform to AWWA C502.



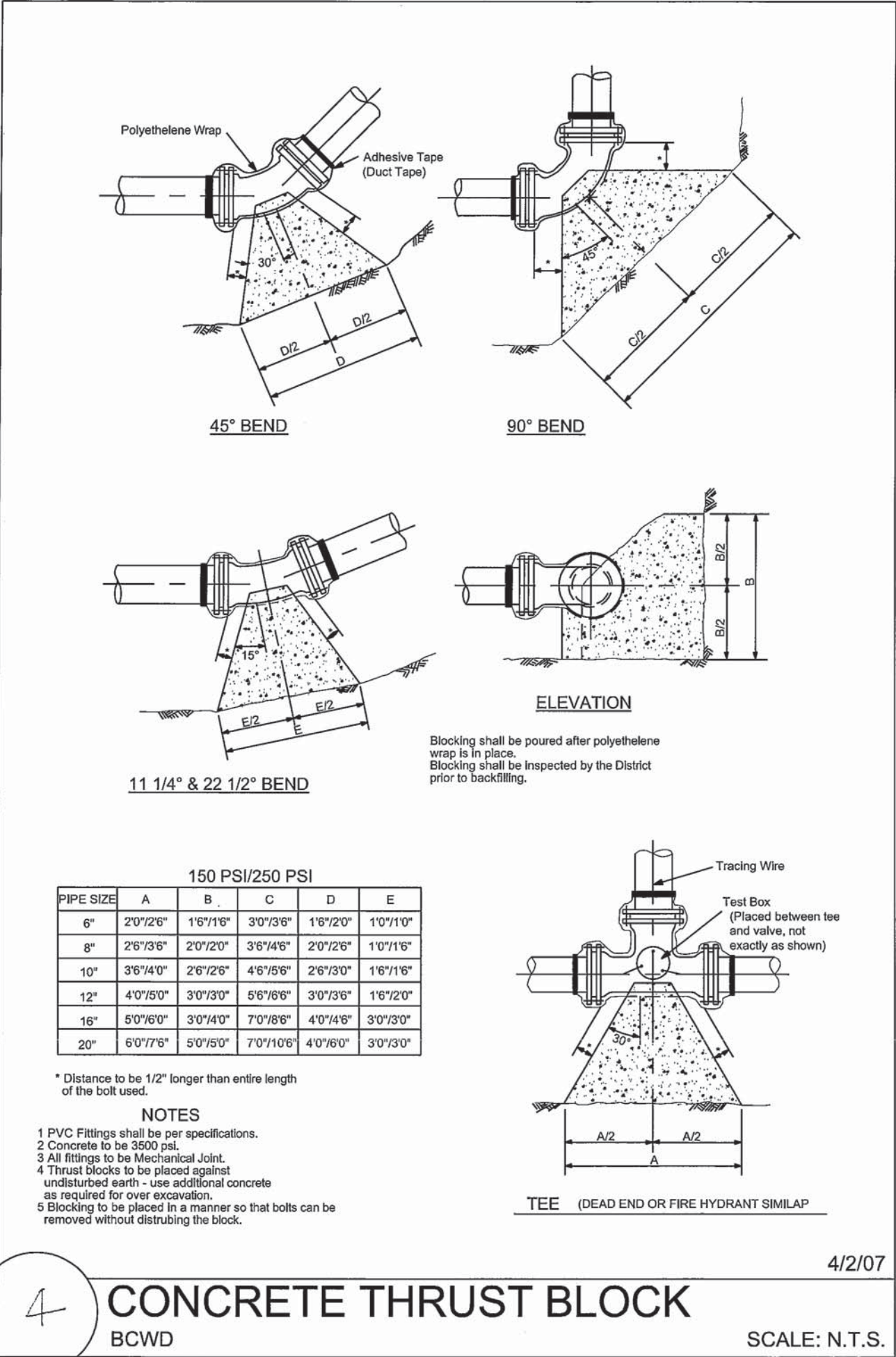
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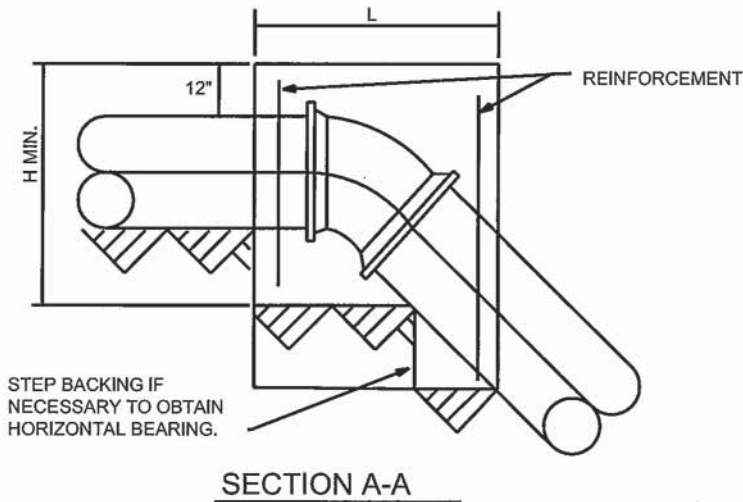
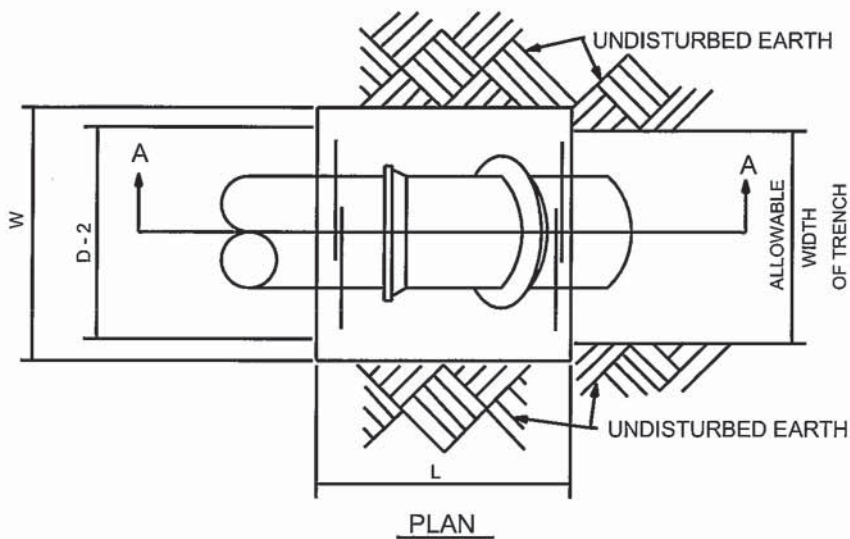
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HYDRANT ASSEMBLY

BCWD

SCALE: N.T.S.





CONCRETE BACKING
FOR VERTICAL BENDS

- 1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.
- 2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.
- 3. CENTER BACKING ON BEND.

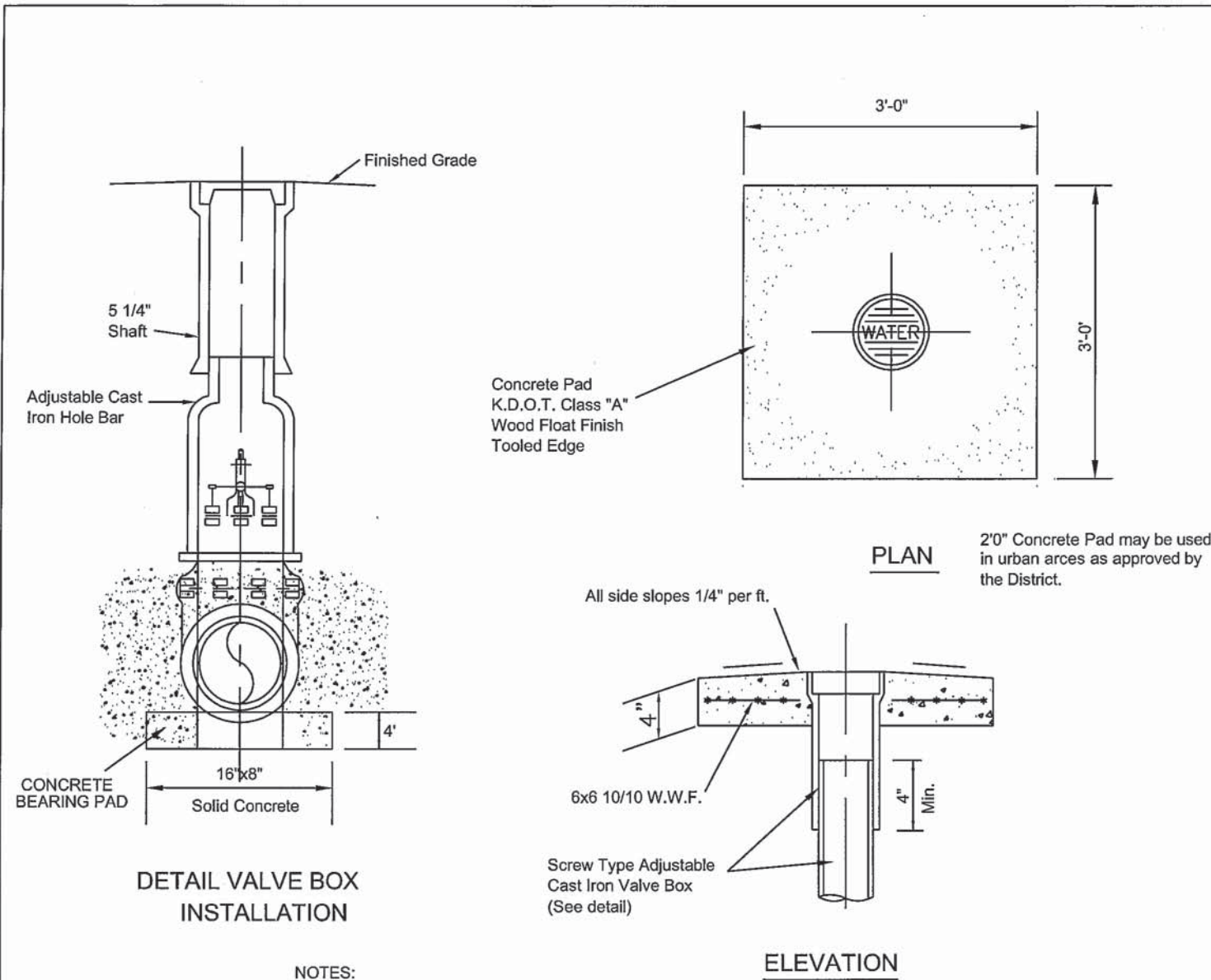
NO BLOCKING REQUIRED FOR
VERTICAL "UP" BENDS

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

NOTE: VOLUMES GIVEN IN CUBIC FEET

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

5



2'0" Concrete Pad may be used in urban arces as approved by the District.

6

VALVE BOX AND VALVE PAD

BCWD

SCALE: N.T.S.

4/2/07

Boone County Water District Self Centering Alignment Ring Specification

Each valve box shall have a two piece AFC Centering Ring that centers the valve box directly in a vertical position. The Centering Ring must have an adjustable detented slide to compensate for multiple stem diameters. The installation of the alignment ring below the operating nut should not disturb the function of the operating nut nor should the operating nut have to be removed to install the Centering Ring. Alternate centering devices other than that listed above must have the approval of the Boone County Water District.

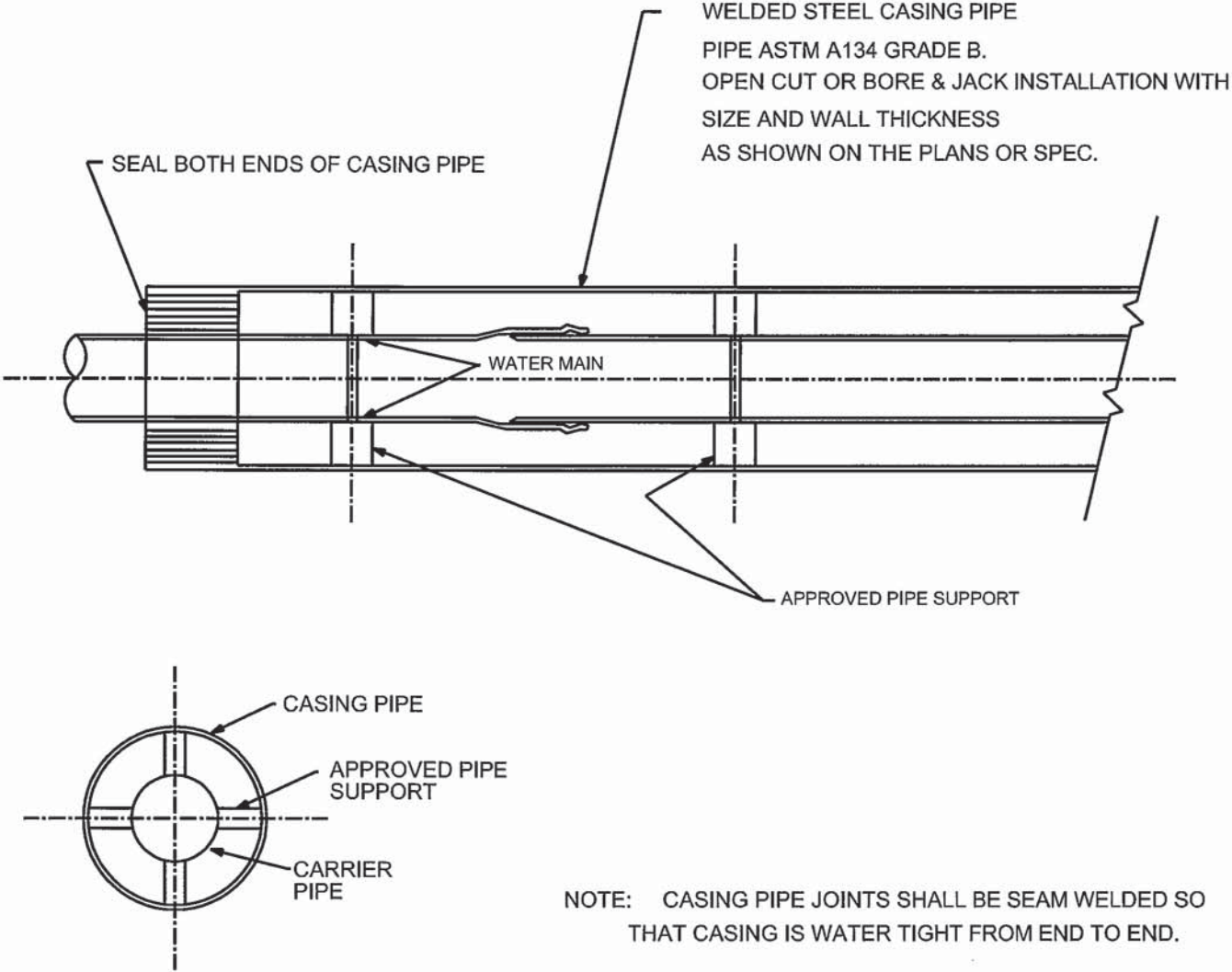
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7

CENTER RING NOTE

BCWD

SCALE: N.T.S.



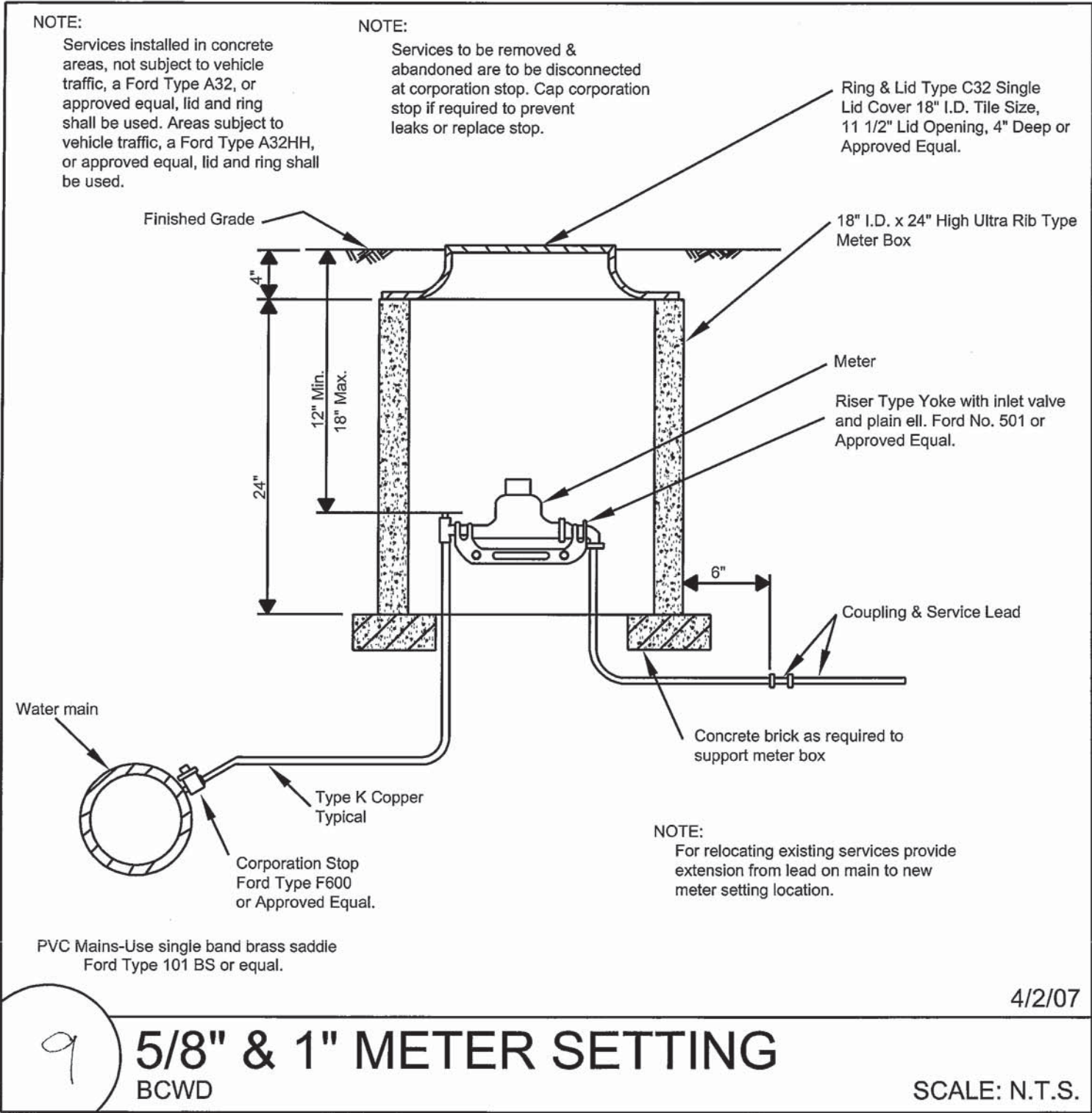
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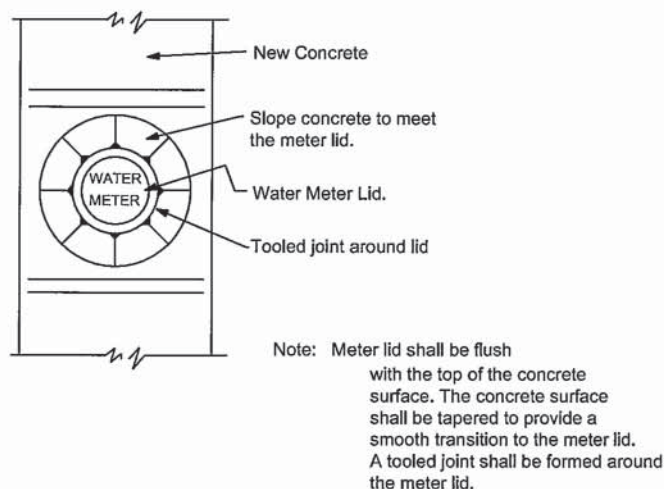
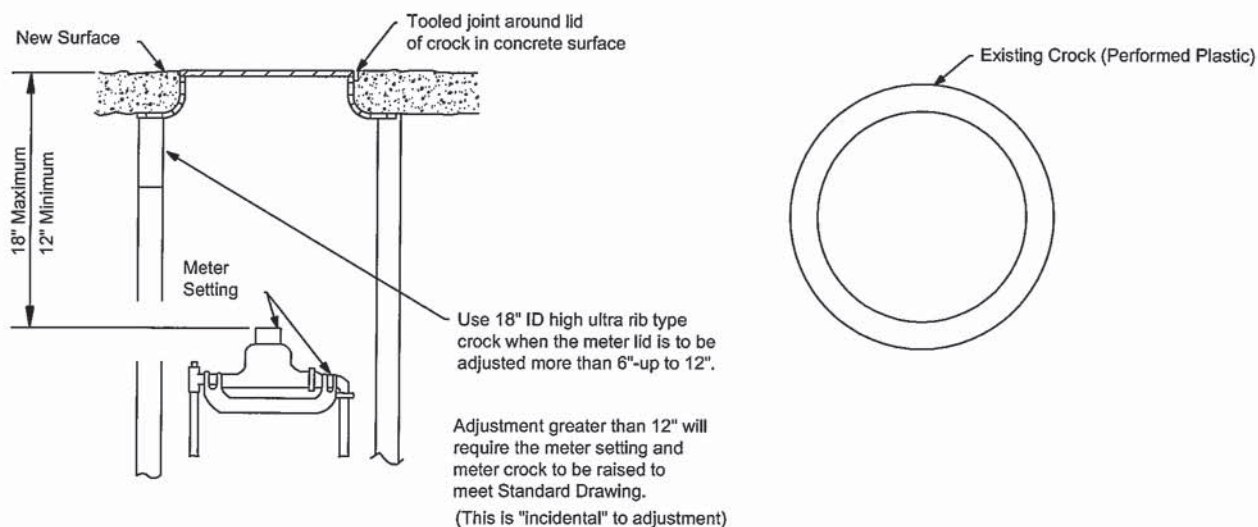
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CASING PIPE DETAIL

BCWD

SCALE: N.T.S.





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

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

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

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

If the meter box is damaged beyond repair it shall be replaced. See Meter Setting detail.

RAISING CURB STOPS OR VALVE BOXES:

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

New upper sections shall be supplied by Contractor.

10

ADJUSTING RING & LID TO GRADE

BCWD

SCALE: N.T.S.

**Contract Documents and
Specifications for**

**Boone County
FD04 008 69792 01U**

**Reconstruct & Widen KY-237/Camp Ernst
Road from Rogers Lane To KY-18**

Item Number 06-8001.25



**Sanitation District No. 1
Fort Wright, Kentucky**

Volume 1 of 1

SPECIFICATION EXPLANATION FOR FORCE MAIN SANITARY SEWER AND GRAVITY SANITARY SEWER CONSTRUCTION

The following explanation is provided with the specifications and plans for the HDR Engineering, Inc., Force Main Sanitary Sewer and the Bayer Becker, 8" and 12" Gravity Sanitary Sewer for SD1 being installed as a part of the road contract for Industrial Road (KY-1829) Widening Priority Section 2. The contents of this document and the following technical specifications shall apply only to the force main work and gravity sewer work and shall not extend to cover any other utility or roadway work. For the force main work and gravity sewer work, this explanation, specifications and drawings shall apply and shall take precedence over the requirements of the KYTC Department of Highways Standard Specification for Road and Bridge Construction.

SPECIFICATION

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Appendix A SD1 Standard Details	

1. Force Main "Complete" Defined

Force Main Work will be considered complete when Sanitation District No. 1 (SD1) has approved all materials used, all testing is completed and passed, the installation is final inspected and accepted by SD1, and the force main is considered ready for permanent and continuous use by the Cabinet and SD1.

2. SUBMITTALS AND CORRESPONDENCE

All submittals and correspondence relative to force main work and gravity sewer work being performed under the roadway contract shall be directed to the Owner (SD1) with one additional copy directed to the Engineer (KYTC). The Contractor shall allow a minimum of 21 days for processing of all material or shop drawing submittals that require review and response. See Specification Section 01340.

3. DEFINITIONS

1. Engineer

Where the word "Engineer" appears in the specifications or plans, it shall be understood the "Engineer" is the Kentucky Transportation Cabinet, Department of Highways Resident Engineer, the Utility Owner, Utility Owner Engineer or their designated representatives jointly. All decisions made during construction shall be agreeable to all parties. The Resident Engineer and Utility Owner Engineer or their designated representatives shall work cooperatively to inspect and accomplish the work. It shall be understood that the Kentucky Transportation Cabinet, through it's Resident Engineer, has ultimate authority in all decisions.

2. Owner

Owner is Sanitation District No. 1 represented by the Utility Owner Engineer or other designated representative(s).

3. Utility Owner Engineer

Utility Owner Engineer is Viox and Viox.

4. Resident Engineer

Resident Engineer is the engineer or representative designated by KYTC to supervise construction, administer, and insure compliance with the contract in the field.

5. Resident Project Representative

Resident Project Representative is the Utility Owner's Representative to supervise construction, administer, and insure compliance with the Force Main and Gravity Sewer construction documents in the field.

4. BID ITEMS

A. General

The Contractor shall furnish all necessary labor, materials and equipment to perform all work and testing as indicated on the plans and/or in the specifications at the unit prices bid complete and ready to use. All temporary restoration of paved and unpaved areas shall be considered incidental to sewer construction unless otherwise noted. Permanent restoration is the responsibility of the Roadway Contractor.

B. Bid Item and Payment Descriptions

1. Sewer Pipe, all types, sizes 200mm (8 inches) and larger

Payment will be made at the contract unit price, and shall include clearing, grubbing, all excavation including rock removal, pipe material, restraint, bedding, laying pipe, backfilling, CCTV, labor and material for the Force Main and Gravity Sewers including testing, and cleanup as required per SD1 Specification Section 02610. All materials shall be new and unused. All bedding and backfill material, including flowable fill where the sewer pipe is installed under existing and/or proposed roadway surfaces and in other areas where designated on the plans, shall be incidental to the sewer pipe contract unit prices.

Method of measurement of sanitary sewer pipe, all types and all sizes, shall be by linear meter or feet laid in the trench measured along the center-line of the pipe and shall be paid by LINEAR METER or FEET (LM or LF).

2. Bends and Fittings (All Types, All Sizes)

These items include furnishing and installing the necessary fittings, restraint and blocking as shown on the plans and specifications. Payment shall be made under these items. This item shall include all labor and material to accomplish this item of work in compliance with the specifications 02610 complete and ready for use. Paid EACH (EA) when complete.

3. 4 inch Combination Air/Vacuum Release Vault (Station 24+00)

Payment for Combination Air/Vacuum Release Vaults will be made at the contract unit price each in place complete and ready for use at depth shown on plans, which shall include 4 inch Vent-Tech Model # 04SWG10SBS or approved equal combination air/vacuum release valve, Valve Vault in accordance with the SD1 standard drawing #124. All materials used for vault construction shall be new and unused. Refer to the following specifications for all other sanitary force main requirements. Paid EACH (EA) when complete.

4. 3 inch Combination Air/Vacuum Release Vault (Station 64+50)

Payment for Combination Air/Vacuum Release Vaults will be made at the contract unit price each in place complete and ready for use at depth shown on plans, which shall include 4 inch Vent-Tech Model # 03SWG10SBS or approved equal combination air/vacuum release valve, Valve Vault in accordance with the SD1 standard drawing #124. All materials used for vault construction shall be new and unused. Refer to the following specifications for all other sanitary force main requirements. Paid EACH (EA) when complete.

5. Manholes (All Kinds, All Sizes)

Payment for Manholes will be made at the contract unit price each in place complete and ready for use at depth shown on plans, which shall include anti-flotation concrete base with minimum 8" projection, cone section, steps, casting frame and watertight lid, excavation, backfilling, testing, restoration and cleanup in accordance with the standard drawings and specification 02606. Final adjustments may be made using adjusting rings set in a bed of butyl rubber sealant and the joint shall be pointed with cement mortar to a smooth finish unless a second row of sealant is installed. The total height of adjusting rings and butyl rubber sealant may not exceed 10 inches. All materials used for manhole construction shall be new and unused. Refer to the following specifications for all other sanitary force main requirements. Paid EACH (EA) when complete.

5. BACKFILLING

A. Pipe Bedding (Refer to SD1 Specification 02220)

Pipe bedding shall meet the requirements of SD1 Specification Section 02220 and KYTC Department of Highways, Standard Specifications for Road and Bridge Construction.

B. Flowable Fill

Flowable fill shall meet the requirements of the KYTC Department of Highways, Standard Specifications for Road and Bridge Construction.

C. Surface Restoration Materials (Temporary and Permanent)

All restoration materials shall meet the requirements of the appropriate sections of KYTC Department of Highways, Standard Specifications for Road and Bridge Construction.

D. Concrete (Refer to SD1 Specification 03300)

6. RESTORATION

1. Temporary Restoration

Any temporary restoration necessary to maintain traffic and insure public safety shall be performed to the satisfaction of the Engineer. All temporary restoration materials and their placement shall be approved by the Engineer. The Contractor will be responsible for maintenance of temporary restoration until permanent restoration is accomplished. Payment for temporary restoration shall be incidental to the contract.

2. Permanent Restoration

All areas and items that are disturbed during utility construction which are outside of road construction limits shall be replaced in-kind. All permanent restoration materials and their placement shall be approved by the Engineer. All permanent restoration materials and their placement shall meet the requirements of the appropriate sections of Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction. All permanent pavement restoration shall be paid for under the Roadway Contract Bid Items.

7. TESTING (Refer to SD1 Specification 02610)

8. BASIS OF PAYMENT

1. Temporary and Permanent Restoration

No separate payment will be made for the furnishing and placement of temporary or permanent restoration materials. This work shall be considered incidental to utility construction.

2. Maintenance of Traffic

No separate payment will be made for maintaining and controlling traffic. This work shall be considered incidental to utility construction.

3. Flowable Fill

No separate payment will be made for flowable fill. Flowable fill is required to be used under existing and proposed pavement areas and in other areas designated on the plans, and shall be considered incidental. No separate payment will be made for flowable fill when the material is being used at the contractor's convenience.

Payment for flowable fill will be made separately only when the Engineer directs its use contrary to this addendum, the plans and specifications. If the Engineer directs the use of flowable fill, the Engineer will arrange payment to the contractor.

4. Bedding Material

No separate payment will be made for bedding material. The furnishing and placement of bedding material by the contractor shall be considered incidental to utility construction.

5. Excavation and Backfill

No separate payment will be made for excavation and backfill for sanitary sewer construction. All excavation and backfill shall be unclassified. No separate payment will be made for rock excavation.

End of Specification Explanation

SECTION 01340

SHOP DRAWING PROCEDURES

1.1 GENERAL

- A. Shop Drawing procedures shall conform to requirements of General Conditions and as described in this Section.
- B. Shop drawings shall be submitted for each type of equipment, piping, construction operation, facility or system specified on the drawings or in the specifications.
- C. A schedule of values, site specific safety plan, submittal schedule, construction schedule, construction photos, testing results, record documents and other items requested by the OWNER or ENGINEER during the course of the project shall also be submitted

1.2 PROCEDURE

- A. Submit Shop Drawings to: Sanitation District No. 1, 1045 Eaton Drive, Fort Wright, Kentucky 41017. Submit additional copy to the Resident Project Representative at address provided by ENGINEER.
- B. A letter of transmittal shall accompany each submittal. If data for more than one Section of the Specifications is submitted, a separate transmittal letter shall accompany the data submitted for each Section.
- C. At the beginning of each letter of transmittal provide a reference heading indicating the following:
 - 1. OWNER'S Name Sanitation District No. 1
 - 2. Project Name _____
 - 3. Contract Name/No. _____
 - 4. Transmittal No. _____
 - 5. Section No. _____
- D. If a Shop Drawing deviates from the requirements of the Contract Documents, CONTRACTOR shall specifically note each variation in his letter of transmittal.
- E. All Shop Drawings submitted for approval shall have a title block with complete identifying information satisfactory to ENGINEER.
- F. All Shop Drawings submitted shall bear the stamp of approval and signature of CONTRACTOR as evidence that they have been reviewed by CONTRACTOR. Submittals without this stamp of approval will not be reviewed by ENGINEER and will be returned to CONTRACTOR.

CONTRACTOR'S stamp shall contain the following minimum information:

Project Name: _____

CONTRACTOR'S NAME: _____

Date: _____

Item: _____

Specifications:

Section: _____

Page No.: _____

Para. No.: _____

Drawing No.: _____ of _____

Location: _____

Submittal No.: _____ Review Cycle No.: _____

Shop Drawing/Document Reference No.: _____

Company Name of Source: _____

Approved By: _____

G. Shop Drawing Submittal Numbering and Identification:

1. In order to identify and track all Shop Drawing submittals as separate and unique items, the CONTRACTOR shall utilize a two number Shop Drawing submittal identification numbering system as follows:
 - a. The first number shall be the Submittal Number. The Submittal Number shall be a separate and unique Shop Drawing. No two Shop Drawings shall be submitted with or under the same Submittal Number, regardless of whether or not they are submitted together, at the same time, under the same Section Number and/or with the same transmittal letter. A Submittal Number shall be assigned to each unique and separate submittal that needs to be tracked as a separate and unique item. The Submittal Number shall be a two part, eight character,

number assigned by CONTRACTOR in the following manner:

- 1) The first part of the Submittal Number shall consist of five characters that pertain to the applicable Section Number. For example:

<u>Section Number</u>	<u>Submittal Number, First Part</u>
2220	02220
11336	11336
13620	13620

- 2) The second part of the Submittal Number shall consist of three digits (the numbers 001 to 999) to number each separate and unique item, document, or drawing submitted under each Section Number.
- 3) A dash shall separate the two parts of the Submittal Number.
- 4) A typical Submittal Number would be as follows:
11336-003;
11336 = Section for Secondary Clarifier Collector Mechanism;
and
003 = the third submittal under this section.

- b. The second number shall be the Review Cycle. The Review Cycle shall be a three-digit number indicating the initial submission or resubmission or resubmission of the same Shop Drawing submittal. For example:
001 = Initial submission.
002 = First resubmission.
003 = Second resubmission, etc.

- c. Some examples of typical Shop Drawing submittal identification numbers are:

<u>Submittal Number</u>	<u>Review Cycle</u>
11336-003	001

11336 = Section for Secondary Clarifier Collector Mechanism;
003 = the third submittal under this section; and,
001 = the initial submission of this submittal.

<u>Submittal Number</u>	<u>Review Cycle</u>
08331-001	001

08331 = Section for Overhead Coiling Doors;
001 = the first submittal under this section; and,
001 = initial submission for this submittal.

<u>Submittal Number</u>	<u>Review Cycle</u>
08331-001	002

08331 = Section for Overhead Coiling Doors;
001 = the first submittal under this section; and,
002 – first resubmission of this submittal.

- H. CONTRACTOR shall initially submit to ENGINEER a minimum of 7 copies of all submittals. The Resident Project Representative shall receive one copy only of each submittals which will be stamped “Preliminary – Not For Construction.”
- I. After ENGINEER completes his review, Shop Drawings will be marked with one of the following notations:
 - 1. Approved.
 - 2. Approved as Corrected.
 - 3. Revise and Resubmit.
 - 4. Not approved.
- J. If a submittal is acceptable, it will be marked “Approved” or “Approved as Corrected”. Four prints or copies of the submittal will be returned to CONTRACTOR.
- K. Upon return of a submittal marked “Approved” or “Approved as Corrected”, CONTRACTOR may order, ship or fabricate the materials included on the submittal, provided it is in accordance with the corrections indicated.
- L. If a Shop Drawing marked “Approved as Corrected” has extensive corrections or corrections affecting other drawings or Work, ENGINEER may require that CONTRACTOR make the corrections indicated thereon and resubmit the Shop Drawings for record purposes. Such drawings will have the notation, “Approved as Corrected – Resubmit.”
- M. If a submittal is unacceptable, 2 copies will be returned to CONTRACTOR with one of the following notations:
 - 1. “Revise and Resubmit.”
 - 2. “Not Approved.”
- N. Upon return of a submittal marked “Revise and Resubmit”, CONTRACTOR shall make the corrections indicated and repeat the initial approval procedure. The “Not Approved” notation is used to indicate material or equipment that is not acceptable. Upon return of a submittal so marked, CONTRACTOR shall repeat the initial approval procedure utilizing acceptable material or equipment.

- O. Any related Work performed or equipment installed without an “Approved” or “Approved as Corrected” Shop Drawing will be at the sole responsibility of the CONTRACTOR.
- P. Shop Drawings shall be submitted well in advance of the need for the material or equipment for construction and with ample allowance for the time required to make delivery of material or equipment after data covering such is approved. CONTRACTOR shall assume the risk for all materials or equipment which are fabricated or delivered prior to the approval of Shop Drawings. Materials or equipment will not be included in periodic progress payments until approval thereof has been obtained in the specified manner.
- Q. ENGINEER will review and process all submittals promptly, but a first submission review period, not including mailing time, of 21 days shall be allotted by the CONTRACTOR when scheduling the Work. Shop Drawings being revised and resubmitted for review shall also have the same time allotted for ENGINEER’s review.
- R. It is CONTRACTOR’S responsibility to review submittals made by his suppliers and Subcontractors before transmitting them to ENGINEER to assure proper coordination of the Work and to determine that each submittal is in accordance with his desires and that there is sufficient information about materials and equipment for ENGINEER to determine compliance with the Contract Documents. Incomplete or inadequate submittals will be returned for revision without review.
- S. CONTRACTOR shall furnish required submittals with complete information and accuracy in order to achieve required approval of an item within three submittals. All costs to ENGINEER involved with subsequent submittals of Shop Drawings, Samples or other items requiring approval, will be backcharged to CONTRACTOR, at the rate of 3.0 times direct technical labor cost by deducting such costs from payments due CONTRACTOR for Work completed. In the event that CONTRACTOR requests a substitution for a previously approved item, all of ENGINEER’S costs in the reviewing and approval of the substitution will be backcharged to CONTRACTOR unless the need for such substitution is beyond the control of CONTRACTOR.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECTION (Not Used)

++ END OF SECTION ++

SECTION 02050

DEMOLITIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required for demolitions, removal and disposal Work.
2. Included, but not limited to, are demolition and removals of existing materials, equipment, or work necessary to install the new Work as shown and specified and to connect same with existing work in an approved manner. Demolition includes structural concrete, foundations, walls, doors, windows, structural steel, metals, roofs, masonry, attachments, appurtenances, piping, electrical and mechanical equipment, paving, curbs, walks, fencing, gates, and similar existing facilities.
3. Demolitions and removals which may be specified under other Sections shall conform to requirements of this Section.
4. OWNER reserves the right of ownership of any and all materials.

B. Related Sections:

1. Section 01010, Summary of Work.
2. Section 02220, Excavation and Backfill.

1.2 SUBMITTALS

- ###### A. Schedule:
- Submit for approval proposed methods, equipment, and operating sequences. Include coordination for shut-off, capping, temporary services, continuation of utility services, and other applicable items to ensure no interruption of OWNER'S operations.

1.3 JOB CONDITIONS

A. Protection:

1. Perform all demolition and removal Work to prevent damage or injury to structures, occupants thereof and adjacent features which might result from falling debris or other causes, and so as not to interfere with the use, and free and safe passage to and from adjacent structures.
2. Closing or obstructing of roadways, sidewalks, and passageways adjacent to the Work by the placement or storage of materials will not be permitted, and all operations shall be conducted with a minimum interference to traffic on these ways.
3. Erect and maintain barriers, lights, sidewalk sheds, and other necessary protective devices.

4. Repair damage to facilities to remain, or to any property belonging to the OWNER or occupants of the facilities.
- B. Scheduling:
 1. Carry out operations so as to avoid interference with OWNER'S operations and work in the existing facilities.
- C. Notification:
 1. At least 48 hours prior to commencement of a demolition or removal, notify ENGINEER in writing of proposed schedule therefor. OWNER will inspect the existing equipment and mark for identification those items which are to remain the property of the OWNER. Do not start removals without the permission of the ENGINEER.
- D. Explosives:
 1. Do not bring explosives on site nor use explosives for any demolition.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

- A. All materials and equipment removed from existing work shall become the property of CONTRACTOR, except for those which OWNER has identified and marked for his use. All materials and equipment as indicated in Section 01010 or on the Contract Drawings shall be carefully removed by the CONTRACTOR, so as not to be damaged, and shall be cleaned and transported to the Lakeview Pump Station, 1045 Eaton Drive, Fort Wright, Kentucky 41017 or Dry Creek Waste Water Treatment Plant, 2999 Amsterdam Road, Villa Hills, Kentucky 41017 or as directed by the OWNER.
- B. CONTRACTOR shall dispose of all demolition materials, equipment, debris, and all other items, except for equipment or materials which are to remain the property of the OWNER, off the site and in conformance with all existing applicable laws and regulations.
- C. Surfaces of walls, floors, ceilings, or other areas which are exposed by any of the removals specified herein, and which will remain as architecturally finished surfaces shall be repaired and re-finished by the CONTRACTOR with the same or matching materials as the existing adjacent surface or as may be otherwise approved by the ENGINEER.
- D. CONTRACTOR shall work closely with OWNER during completion of the Project to avoid disruptions to pump station operations.

- E. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.
 - 1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
 - 2. Clean adjacent structures, facilities, and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to conditions existing prior to the start of the Work.
- F. Building Demolition:
 - 1. Unless otherwise approved by ENGINEER, proceed with demolition from the top of the structure to the ground. Complete demolition work above each floor or tier before disturbing supporting members of lower levels.
 - 2. Demolish concrete and masonry in small sections.
 - 3. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.
 - 4. Break up and remove foundations and slabs-on-grade, unless otherwise shown to remain.
 - 5. Locate equipment used for demolition work, and remove demolished materials, so as to not impose excessive loads on supporting walls, floors or framing.

3.2 STRUCTURAL REMOVALS

- A. Remove structures to the lines and grades shown unless otherwise directed by the ENGINEER. Where no limits are shown, the limits shall be 4 inches outside the item to be installed. The removal of masonry beyond these limits shall be at the CONTRACTOR'S expense and these excess removals shall be reconstructed to the satisfaction of the ENGINEER with no additional compensation to the CONTRACTOR.
- B. All concrete, brick, tile, concrete block, roofing materials, reinforcement, structural or miscellaneous metals, plaster, wire mesh and other items contained in or upon the structure shall be removed and taken from the site, unless otherwise approved by the ENGINEER. Demolished items shall not be used in backfill adjacent to structures or in pipe line trenches.
- C. After removal of parts or all of masonry walls, slabs and like work which tie into new Work or existing work, the point of junction shall be neatly repaired so as to leave only finished edges and surface exposed.
- D. The jambs, sills and heads of any new windows, passageways, doors, or other openings cut into new Work or existing work, shall be dressed with new masonry, concrete or metal to provide a smooth, finished appearance.

- E. Where new anchoring materials including bolts, nuts, hangers, welds and reinforcing steel, are required to attach new Work to the existing work they shall be included under this Section, except where specified elsewhere.

3.3 MECHANICAL REMOVALS

- A. Mechanical removals shall consist of dismantling and removing of existing piping, pumps, motors, equipment and other appurtenances as specified, shown, or required for the completion of the Work. It shall include cutting, capping, and plugging as required, except that the cutting of existing piping for the purpose of making connections thereto will be included under Division 15.
- B. Existing process, water, chemical, gas, fuel oil and other piping not required for the new Work shall be removed where shown or where it will interfere with new Work. Piping not indicated to be removed or which does not interfere with new Work shall be removed to the nearest solid support, capped and left in place. Chemical and fuel lines and tanks shall be purged and made safe prior to removal or capping. Where piping that is to be removed passes through existing walls, it shall be cut off and properly capped on each side of the wall.
- C. When underground piping is to be altered or removed, the remaining piping shall be properly capped. Abandoned underground piping may be left in place unless it interferes with new Work or is shown or specified to be removed.
- D. Waste and vent piping shall be removed to points shown. Pipe shall be plugged with cleanouts and plugs. Where vent stacks pass through an existing roof that is to remain, they shall be removed and the hole in the roof properly patched and made watertight.
- E. Any changes to potable water piping and other plumbing and heating system work shall be made in conformance with all applicable codes and under the same requirements as other underground piping. All portions of the potable water system that have been altered or opened shall be pressure tested and disinfected in accordance with Section 15051 and local codes. Other plumbing piping and heating piping shall be pressure tested only.

3.4 ELECTRICAL REMOVALS

- A. CONTRACTOR shall be responsible for disconnecting wiring at equipment to be removed. CONTRACTOR shall be responsible for removing the disconnected conduit, disconnect switches, wiring, lighting fixtures, receptacles, and all other appurtenant electrical removals unless otherwise noted on the Drawings.
- B. Electrical removals shall consist of the removal of existing transformers, distribution switchboards, control panels, motors, conduits and wires, poles and overhead wiring,

panelboards, lighting fixtures, and miscellaneous electrical equipment all as shown, specified, or required to perform the Work.

- C. All existing electrical equipment and fixtures to be removed shall be removed with such care as may be required to prevent unnecessary damage, to keep existing systems in operation and to keep the integrity of the grounding systems.
- D. Distribution switchboards shall be removed or modified as shown. Switchboards to be removed shall be disconnected and dismantled, and all components shall be disposed of off the site. Circuit breakers and other control equipment on modified switchboards that will no longer be used shall be removed unless otherwise shown or specified. All new openings cut into the modified switchboard panels shall be cut square and dressed smooth to the dimensions required for the installation of the new equipment.
- E. Motors shall be disconnected and removed where shown or specified. Motors not designated by the OWNER to be salvaged shall be removed from the site. Motors or other electrical gear designated for reuse shall be stored in enclosed, heated storage.
- F. Conduits and wires shall be abandoned or removed where shown. All wires in abandoned conduits shall be removed, salvaged, and stored. Abandoned conduits concealed in floor or ceiling slabs, or in walls, shall be cut flush with the slab or wall at the point of entrance. The conduits shall be suitably plugged and the area repaired in a flush, smooth, approved manner. Exposed conduits and their supports shall be disassembled and removed from the site. Repair all areas of work to prevent rust spots on exposed surfaces.
- G. Where shown or otherwise required, wiring in the underground duct system shall be removed. All such wiring shall be salvaged and stored as specified. CONTRACTOR shall verify the function of all wiring before disconnecting and removing it. Ducts which are not to be reused shall be plugged where they enter buildings and made watertight.
- H. Where shown, direct-burial cable shall be abandoned. Such cable shall be disconnected at both ends of the run. Where it enters a building or structure, the cable shall be cut back to the point of entrance. All openings in buildings for entrance of abandoned direct-burial cable shall be patched and made watertight.
- I. Poles and overhead wiring shall be abandoned as shown and specified. Existing substation and poles owned by the power company will be removed by the power company. Poles not owned by the power company shall be completely removed from the site by the CONTRACTOR. The overhead wires shall be salvaged and stored as specified in Section 02050, Paragraph 3.1.A. CONTRACTOR shall perform this work after the new service has been completed and energized, and in accordance with the approved schedule. CONTRACTOR also shall make all the necessary arrangements with the power company for the removal of their

transformers and metering equipment after the new electrical system has been installed and energized.

- J. Panelboards where shown shall be removed and disposed of off the site. Where shown or specified, they shall be replaced with new panelboards at the same or adjacent locations. All cutting and patching necessary for the removal and replacement of panelboards shall be performed.
- K. Lighting fixtures shall be removed or relocated as shown. Fixtures not relocated shall be removed from the site. Relocated fixtures shall be carefully removed from their present location and rehung where shown.
- L. Wall switches, receptacles, starters and other miscellaneous electrical equipment, shall be removed and disposed of off the site as required. Care shall be taken in removing all equipment so as to minimize damage to architectural and structural members. Any damage incurred shall be repaired.

3.5 ALTERATIONS AND CLOSURES

- A. Alterations shall conform with all applicable Specifications, the Drawings, and the directions and approvals of the ENGINEER.
- B. Where alterations require cutting or drilling into existing floors, walls, and roofs, the holes shall be repaired in an approved manner. CONTRACTOR shall repair such openings with the same or matching materials as the existing floor, wall, or roof or as otherwise approved by the ENGINEER. All repairs shall be smoothly finished unless otherwise approved by the ENGINEER.
- C. Openings in existing concrete slabs, ceilings, masonry walls, floors and partitions shall be closed and sealed as shown or otherwise directed by the ENGINEER. New Work shall be keyed into the existing Work in an acceptable manner. New reinforcing steel shall be welded to the existing reinforcing. Welding shall conform to AWS D12.1, Reinforcing Steel Welding Code. In general, use the same or matching materials as the existing adjacent surface. The finished closure shall be a smooth, tight, sealed, permanent closure acceptable to the ENGINEER.

3.6 CLEAN-UP

- A. CONTRACTOR shall remove from the site all debris resulting from the demolition operations as it accumulates. Upon completion of the Work, all materials, equipment, waste, and debris of every sort shall be removed and premises shall be left, clean, neat and orderly.

++ END OF SECTION ++

SECTION 02220

EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

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

B. Related Sections:

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

1.2 QUALITY ASSURANCE

A. Tests:

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

- d. Compacted Select Fill, Drainage Fill, Subbase Material and Pipe Bedding: Compaction, ASTM D 1556 and ASTM D 698, ASTM D 2922, ASTM D4253, ASTM D4254.
- B. Permits and Regulations:
1. OWNER will obtain all necessary permits for work in roads, rights-of-way, railroads, etc.
 2. CONTRACTOR shall obtain permits as required by local, state and federal agencies for discharging water from excavations.
 3. CONTRACTOR shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- C. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.
1. ASTM A 36, Specification for Structural Steel.
 2. ASTM A 328, Specification for Steel Sheet Piling.
 3. ASTM D 422, Method for Particle-Size Analysis of Soils.
 4. ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soils Using Standard Effort (12,400 ft – lbf/cu ft) (600 KN-m/cum).
 5. ASTM D 1556, Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 6. ASTM D 2321, Practice for Underground Installation of Thermoplastic Pipe for Sewer and other Gravity – Flow Applications
 7. ASTM D 2922, In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 8. ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 9. ASTM D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 9. AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings.
 10. Kentucky Department of Highways (KDOH), Standard Specifications for Road and Bridge Construction, 2000 Edition.
 11. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.3 SUBMITTALS

- A. Excavation Plan: Prior to start of excavation operations, submit written plan to demonstrate compliance with OSHA Standard 29 CFR Part 1926.650. As a minimum, excavation plan shall include:
1. Name of competent person.
 2. Excavation method(s) or protective system(s) to be used.

3. Copies of "manufacturer's data" or other tabulated data if protective system(s) are designed on the basis of such data.
- B. Shop Drawings: Submit for approval the following:
 1. Sheet piling and bracing, or other protective system(s).
 2. Dewatering system.
 3. Cofferdams.
 4. Anticipated Protection Methods.
 5. Underpinning.Shop Drawings shall be prepared by a licensed professional engineer recognized as expert in the specialty involved. Also submit for approval, calculations and all other pertinent information. CONTRACTOR, however, will be responsible for designing, installing, operating and maintaining the system(s) as required to satisfactorily accomplish all necessary sheet piling, bracing, protection, underpinning and dewatering.
- C. Submit gradation and compaction test reports of all specified soil materials.

1.4 JOB CONDITIONS

- A. Subsurface Information: Refer to Supplementary Conditions for Data on subsurface conditions. Data is not intended as a representation or warranty of continuity of conditions between soil borings nor of groundwater levels at dates and times other than date and time when measured. OWNER will not be responsible for interpretations or conclusions drawn therefrom by CONTRACTOR. Data are solely made available for the convenience of CONTRACTOR.
 1. Additional test borings and other exploratory operations may be made by CONTRACTOR at no cost to OWNER.
- B. Existing Structures: The Drawings show certain surface and underground structures adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of CONTRACTOR. CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from damage by CONTRACTOR. If they are broken or damaged, they shall be restored immediately by CONTRACTOR at his expense.
- C. Existing Utilities: Locate existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during all operations.
 1. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult piping or utility owner and ENGINEER immediately for directions as to procedure. Cooperate with OWNER and utility owner in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. In general, service lines to individual houses and businesses are not shown; however, CONTRACTOR shall assume that a service exists for each utility to each house or business.
 3. Do not interrupt existing utilities serving facilities occupied and used by OWNER or others, except when permitted in writing by ENGINEER and then only after acceptable temporary utility services have been provided.
 4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
- D. Protection of Persons and Property: Barricade open excavations occurring as part of the Work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- E. Dust Control: Conduct all operations and maintain areas of activity, including sweeping and sprinkling of roadways, to minimize creation and dispersion of dust. Calcium chloride may be used to control serious or prolonged dust problems, subject to approval of ENGINEER.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Select Fill:
1. Place select fill where shown or specified below and around structures, pipelines, roads, tanks, walks, and other work.
 2. Use well graded sand and gravel, free from organic matter. A well-graded select fill shall have a uniformity coefficient greater than 6 for sand and greater than 4 for gravel and have a coefficient of gradation between 1 and 3 for sand and gravel. Not more than 70 percent by weight shall pass through a No. 40 sieve; not more than 10 percent by weight shall pass through a No. 200 sieve; and 100 percent shall pass through a 3-inch square sieve.
 3. Advise ENGINEER in writing of source and, if required, submit a sample of the material for approval.
- B. Subbase Material:
1. Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, or natural or crushed sand, approved by ENGINEER.
 2. Comply with the gradation conforming to Crushed Stone Base in Section 805 of the KDOH Standard Specifications for Road and Bridge Construction, 2000 Edition.

- C. Drainage Fill: Gradation shall conform to the requirements for Free Draining Bedding and Backfill in Section 805 of the KDOH Standard Specifications for Road and Bridge Construction, 2000 Edition.
- D. General Backfill and Fill Materials: Provide approved soil materials for backfill and fill, free of rock thicker than 6 inches or larger than 24 inches maximum in any dimension, debris, waste, frozen materials, vegetable and other organic matter and other deleterious materials. Previously excavated materials meeting these requirements may be used for backfill. All rock shall be excluded from fill within 24 inches of the pipe.
- E. Riprap: Provide rock, broken concrete, or stone of sizes such that at least 85% of the total material by weight is larger than a 6-inch but less than an 18-inch square opening. At least 50% of the total material by weight shall be larger than a 12-inch square opening. The material smaller than a 6-inch square opening shall consist predominantly of rock and shall be free of soil.
- F. Pipe Bedding Material:
 - 1. Place around pipe and compact for pipe bedding material.
 - 2. Fill shall be clean natural or washed sand and gravel, crushed gravel or crushed stone, free from cementitious substances and flat or flaky particles in an amount to cause caking, packing, yielding or uneven support for the pipe. Lime sand shall not be acceptable. All material shall be of such sizes that one-hundred percent (100%) passes the one and one half (1 ½) inch screen, 40% or less passes the No. 40 sieve, and ten (10) percent or less passes the No. 200 sieve.
 - 3. Fill shall not consist of any organic soil or stone larger than 1½-inch in any dimension.
- G. Control Density Fill:
 - 1. Use for trench backfill where shown on the Drawings.
 - 2. Description:
 - a. Flowable fill shall consist of a mixture of cement, sand, fly ash, water and other materials approved by SD1.
 - 3. Materials and Mixing Proportioning:
 - a. Cement: 30 lbs.
 - b. Fly Ash, Class F: 300 lbs. Do not allow the loss or ignition for Class F fly ash to exceed twelve (12) percent.
 - c. Natural Sand (S.S.D): 3,000 lbs.
 - d. Water (Maximum): 550 lbs. Water used for the mixture shall be potable and free of oil, salts, acid and other impurities that would have an adverse effect on the quality of the backfill material.
 - 4. Properties:
 - a. Average Compressive Strength:
 - 1) 28 days: 50 to 100 psi

- b. For applications that require early opening to traffic or placement of pavement as soon as possible, provide a mixture with the following properties:
 - 1) Mixture bleeds freely within 10 minutes
 - 2) Mixture shall support a 150-pound person within three (3) hours.

H. Flash Fill:

- 1. Use for trench backfill where shown on the Drawings.
- 2. Description:
 - a. Be readily flowable to form around pipes, cables and other embedments in trenches.
 - b. Achieve a quick initial set to permit paving within 4 hours of placement.
 - c. Achieve an initial strength capable of bearing traffic within 4 hours of placement.
 - d. Achieve an ultimate strength of no more than 100 psi so that material can be re-excavated if necessary.
- 3. Materials:
 - a. Cement: None.
 - b. Fly ash shall meet ASTM C-618, Class C or Class F, except that requirement for moisture and pozzolanic activity are waived for Class F fly ash.
 - c. Sand shall be natural, recycled, or manufactured. Other filler materials may be used as a substitute with approval.
 - d. Water used for the mixture shall be potable and free of oil, salts, acid and other impurities that would have an adverse effect on the quality of the backfill material.
- 4. Properties:
 - a. Resistance to Penetration (avg. at 4 hours): 400 psi.
 - b. Coefficient of Permeability: 2.6×10^{-5} cm/sec.
 - c. Unconfined Compressive Strength:
 - 1) 3 Hours: 20 psi (1.44 tsf).
 - 2) 28 Days: 70 psi (5.0 tsf).
 - 3) 91 Days: 100 psi (7.2 tsf).
 - d. Atterberg Limits: Non plastic.
 - e. pH (at one month): 11.16.
 - f. Thermal Resistivity: 45 C-cm/w.
 - g. Color: Tan.
- 5. Mixing Proportioning:
 - a. ASTM C-618 Fly Ash: 400 lbs.
 - b. Sand: 2930 lbs.
 - c. Water: 430 lbs.
 - d. Unit Weight (Fresh Weight): 135 lbs/cu. ft.
- 6. Product Name:
 - a. Flashfill by Roth Ready Mix Concrete Co.
 - b. Or equal.

PART 3 - EXECUTION

3.1 INSPECTION

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

3.2 SITE PREPARATION

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

3.3 TEST PITS

- A. Where shown or ordered by ENGINEER, excavate and backfill, in advance of construction, test pits to determine conditions or location of existing facilities. Perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, backfilling and replacing pavement for the test pits.
- B. Payment for test pits ordered by ENGINEER will be paid for under a change order per Article 10 of the General Conditions.
- C. No separate payment will be made for test pits made by CONTRACTOR for his own use.

3.4 EXCAVATION

- A. Perform all excavation required to complete the Work as shown, specified and required. Excavations shall include earth, sand, clay, gravel, hardpan, boulders, bedrock, pavements, rubbish and all other materials within the excavation limits.
- B. Refer to Section 02222 for Rock Removal.

- C. Excavations for structures and pipelines shall be open excavations. Provide excavation protection system(s) required by ordinances, codes, law and regulations to prevent injury to workmen and to prevent damage to new and existing structures or pipelines. Unless shown or specified otherwise, protection system(s) shall be utilized under the following conditions.
 - 1. Excavation Less Than 5 Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
 - 2. Excavations More Than 5 Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded or shored and braced.
 - 3. Excavation protection system(s) shall be installed and maintained in accordance with drawings submitted under Article 1.3 above.
- D. Where the structure or pipeline is to be placed below the ground water table, well points, cofferdams or other acceptable methods shall be used to permit construction of said structure or pipeline under dry conditions. Dry conditions shall prevail until concrete has reached sufficient strength to withstand earth and hydrostatic loads and until the pipelines are properly jointed, tested and backfilled. In addition, protect excavation from flooding until all walls and floor framing up to and including grade level floors are in place and backfilling has begun. Water level shall be maintained below top of backfill at all times.
- E. Pumping of water from excavations shall be done in such a manner to prevent the carrying away of unsolidified concrete materials, and to prevent damage to the existing subgrade. See also additional requirements in section 15051 BURIED PIPING INSTALLATION.
- F. The elevation of the bottom of footings shown shall be considered as approximate only and ENGINEER may order such changes in dimensions and elevations as may be required to secure a satisfactory footing. All structure excavations shall be hand-trimmed to permit the placing of full widths, and lengths of footings on horizontal beds. Rounded and undercut edges will not be permitted.
- G. When excavations are made below the required grades, without the written order of ENGINEER, they shall be backfilled with compacted gravel or concrete, as directed by ENGINEER, at the expense of CONTRACTOR.
- H. Excavations shall be extended sufficiently on each side of structures, footings, etc., to permit setting of forms, installation of shoring or bracing or the safe sloping of banks.
- I. Subgrades:

1. General Requirements: The backfill shall be maintained at $\pm 3\%$ from optimum moisture content. The compacted fill shall remain firm and intact under all construction operations. Mud, muck, and other soft or unsuitable materials shall be removed.
2. Subgrade Requirements for Roadways: Compact to the degree specified in Section 207 of the KDOH Standard Specifications for Road and Bridge Construction, 2000 Edition.
3. Subgrade Requirements for Pipeline Trench Bottoms, Floor Slabs and Concrete Pads: Compact to at least 95% of the maximum Standard Proctor dry unit weight as determined by ASTM D 698.
4. Subgrade Requirements for Footing Foundations: Compact to at least 98% of the maximum Standard Proctor dry unit weight as determined by ASTM D 698.
5. Soft Subgrades: For subgrades which are otherwise solid, but which become soft or unsuitable on top due to construction operations, remove the soft and unsuitable material and replace with suitable backfill and recompact to the specified density.
6. Finished Elevation of Stabilized Subgrades: Do not place above subgrade elevations shown.

J. Stability of Excavations:

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

K. Pipe Trench Preparation: Trench construction shall be per SD1 pipe bedding and trench condition details as follows

1. No more than 200 feet of trench may be opened in advance of pipe laying.
2. Trench width shall be minimized to greatest extent practical but shall conform to SD1's standard trench details and the following:
 - a. Flexible Pipe: Sufficient to provide room for installing, jointing and inspecting piping, but a minimum of pipe barrel OD plus two feet for 36" and less diameter pipe. For pipe that is greater than 36" in diameter, the trench width shall be the OD of the pipe plus four feet.
 - b. Rigid Pipe: Sufficient to provide room for installing, jointing and inspecting piping, but a minimum of pipe barrel OD plus two feet for 36" and less diameter pipe. For pipe that is greater than 36" in diameter, the trench width shall be: $OD + 2 \cdot (OD/6)$.
 - c. Enlargements at pipe joints may be made if required and approved by ENGINEER.

- d. Sufficient for shoring and bracing, or shielding and dewatering.
 - e. Sufficient to allow thorough compaction of bedding material adjacent to bottom half of pipe.
 - f. Do not use excavating or compaction equipment, which requires the trench to be excavated to excessive width.
- 3. Depth of trench shall be as shown. If required and approved by ENGINEER, depths may be revised.
- 4. Bedding material shall be carefully placed over the full trench width before the pipe is laid to a depth of at least 6-inches and compacted in maximum of 6-inch lifts over the full trench width. Where pipe is laid in rock excavation, depth of pipe bedding below the pipe shall be at least 6-inches for pipe 24-in. and smaller and 9-inches for pipe 30-in. and larger. After laying pipe, the balance of the bedding material and backfill shall be placed as described herein.
- L. Material Storage: Stockpile satisfactory excavated materials in approved areas, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
 - 1. Locate and retain soil materials away from edge of excavations.
 - 2. Dispose of excess soil material and waste materials as specified hereinafter.
- M. Where ENGINEER considers the existing material beneath the bedding material unsuitable, CONTRACTOR shall remove same and replace it with compacted select fill or compacted pipe bedding material.

3.5 UNAUTHORIZED EXCAVATION

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

3.6 AUTHORIZED UNDERCUTS

- A. Subgrades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workers.
- B. If in the course of excavation as determined by the ENGINEER, unstable soil is encountered at the point of the bottom of the required excavation, the CONTRACTOR shall be authorized to undercut sufficiently to remove all the unstable soil to the limits specified by the ENGINEER.
- C. The CONTRACTOR shall refill the undercuts with select backfill or pipe bedding material and compact same to the requirements set forth in paragraph 3.4.I, unless other means of refill are specified or ordered by the ENGINEER.

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

3.7 DRAINAGE AND DEWATERING

- A. General:
 - 1. Prevent surface and subsurface water from flowing into excavations and from flooding adjacent areas.
 - 2. Remove water from excavation as fast as it collects.
 - 3. Maintain the ground water level below the bottom of the excavation to provide a stable surface for construction operations, a stable subgrade for the permanent work, and to prevent damage to the Work during all stages of construction.
 - 4. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.
 - 5. Obtain ENGINEER'S approval before shutting down dewatering system for any reason.
- B. Standby Requirements for Dewatering: Provide standby equipment to ensure continuity of dewatering operations.
- C. Disposal of Water Removed by Dewatering System:
 - 1. All dewatering flows are to be settled in siltation basins or directed through filtering devices before discharge to stabilized sites, such as streams or sewers; not onto exposed soils, stream banks, or any other site where the flow could cause erosion.
 - 2. Silt from construction operations shall not be permitted to enter the storm sewer system. When construction occurs near storm sewer inlets, erosion control measures such as inlet filters and hay bales shall be used to prevent silt from entering storm sewers.
 - 3. Dispose of all water removed from the excavation in such a manner as not to endanger public health, property, or any portion of the Work under construction or completed.
 - 4. Dispose of water in such a manner as to cause no inconvenience to OWNER, ENGINEER, or others involved in work about the site.
 - 5. Convey water from the construction site in a closed conduit. Do not use trench excavations as temporary drainage ditches.
 - 6. CONTRACTOR shall be responsible for complying with all regulatory agency rules pertaining to dewatering and obtaining permits, if required.
 - 7. See also additional requirements in section 15051 BURIED PIPING INSTALLATION.

3.8 SHEETING, SHORING AND BRACING

A. General:

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

B. Sheeting Left in Place:

1. Steel sheet piling shown to be left in place shall consist of rolled sections of the continuous interlocking type unless otherwise approved. The type and design of the sheeting and bracing shall conform to the above specifications for all steel work for sheeting and bracing. Steel sheeting designated to be left in place shall be new.
2. Steel sheet piling to be left in place shall be driven straight to the lines and grades as shown or directed. The CONTRACTOR shall determine the grade to which the sheet piling shall be driven. The piles shall penetrate into firm materials with secure interlocking throughout the entire length of the pile.

Damaged piling having faulty alignment shall be pulled and replaced by new piling.

3. The type of guide structure used and method of driving for steel sheet piling to be left in place shall be subject to the approval of ENGINEER. Jetting will not be permitted.
4. Cut off piling left in place to the grades shown or ordered by ENGINEER and remove the cut offs from the site.
5. Clean wales, braces and all other items to be embedded in the permanent structure, and ensure that the concrete surrounding the embedded element is sound and free from air pockets or harmful inclusions. Provisions shall include the cutting of holes in the webs and flanges of wale and bracing members, and the welding of steel diaphragm waterstops perpendicular to the centerline of brace ends which are to be embedded.
6. Subsequent to removal of the inside face forms, and when removal of bracing is permitted, cut back steel at least 2 inches inside the wall face and patch opening with cement mortar. Concrete shall be thoroughly worked beneath wales and braces, around stiffeners and in any other place where voids may be formed.
7. Portions of sheeting or soldier piles and breast boards which are in contact with the foundation concrete shall be left in place, together with wales and bracing members which are cast into foundation or superstructure concrete.

C. Removal of Sheeting and Bracing:

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

3.9 TRENCH SHIELDS

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

- C. When using a shield for the installation of structures, the bottom of the shield shall not extend below the top of the bedding for the structures.
- D. When a shield is removed or moved ahead, extreme care shall be taken to prevent the movement of pipe or structures or the disturbance of the compacted bedding for pipe or structures. Pipe or structures that are disturbed shall be removed and reinstalled as specified.

3.10 GENERAL REQUIREMENTS FOR BEDDING, BACKFILL, FILL AND COMPACTION

- A. Furnish, place and compact all fill and backfill required for structures and trenches and to provide the finished grades shown and specified, including but not limited to restoration of access roads, construction benches, etc. Unless otherwise specified, backfill and fill may be obtained from on-site sources. Additional materials, if required, shall be furnished from off-site sources at no additional cost to OWNER.
- B. Backfill excavations as promptly as Work permits, but not until completion of the following:
 - 1. Acceptance by ENGINEER of construction below finish grade including dampproofing, waterproofing, perimeter insulation, trench construction, and pipe and bedding installation.
 - 2. Inspection, testing, approval, and recording of locations of underground utilities.
 - 3. Removal of concrete formwork.
 - 4. Removal of shoring and bracing.
 - 5. Removal of trash and debris.
 - 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
 - 7. Placement of settlement plates.
- C. Keep excavations dry during backfilling operations. Bring backfill around structures and piping up evenly on all sides.
- D. Do not allow levels of backfill against concrete walls to differ by more than 2 feet on either side of walls unless walls are adequately braced or all floor framing is in place up to and including grade level slabs.
- E. Place select backfill material above pipe encasements and as bedding material for pipelines that pass under structures, concrete pavements, or other pipelines. General backfill material may be used above pipe bedding material in other areas. Method of bedding pipe shall be as specified in Section 02610 and as shown on the Drawings.

- F. Place all bedding in pipe trenches in horizontal layers not exceeding 6 inches in depth up to a point 12-inches or more above the top of the pipe and thoroughly compact each layer along the full trench width before the next layer is placed.
- G. Prior to the installation of pipes which are to be installed in fill sections, place the fill as described herein, until a minimum height of 2 feet above the pipe is reached, unless otherwise required in other Sections. The fill for the trench width shall then be excavated and the pipe installed, bedded, and backfilled. The remainder of the fill shall then be placed.
- H. Control the water content of backfill and fill material during placement within the range necessary to obtain the compaction specified. In general, the moisture content of the fill shall be within 3 percent of the optimum moisture content for compaction as determined by laboratory tests. Perform all necessary work to adjust the water content of the material to within the range necessary to permit the compaction specified. Do not place backfill or fill material when free water is standing on the surface of the area where the backfill or fill is to be placed. No compaction of backfill or fill will be permitted with free water on any portion of the material to be compacted.
- I. Do not place or compact backfill or fill in a frozen condition or on top of frozen material. Remove backfill or fill containing organic materials or other unacceptable material and replace with approved backfill material.
- J. Perform Compaction of bedding, backfill and fill with equipment suitable for the type of material placed and which is capable of providing the densities required. CONTRACTOR shall select compaction equipment and submit it and his proposed procedure to ENGINEER for approval.
- K. Compacted bedding, backfill, and fill shall be compacted by at least two coverages of all portions of the surface of each lift by compaction equipment. One coverage is defined as the condition obtained when all portions of the surface of the material have been subjected to the direct contact of the compactor.
- L. Test the effectiveness of the equipment selected by CONTRACTOR at the commencement of compaction by construction of a small section of trench, backfill or fill within the area where material is to be placed. If tests on this section show that the specified compaction is not obtained, CONTRACTOR shall increase the number of coverages, decrease the lift thicknesses or obtain a different type of compactor. No additional cost to OWNER shall be incurred.
- M. Perform backfill around structures using the specified procedures, except that within 10 feet of foundations and underground structures, light compaction equipment shall be used, with the gross weight of the equipment not exceeding 7,000 pounds.

Provide equipment that is capable of the required compaction within restricted areas next to structures and around piping.

3.11 PIPE BEDDING

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

3.11.1 Normal Backfill

- A. After the pipe sections have been embedded up to a point 12-inches or more above

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

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

3.11.2 Rock Backfill

- A. Where the trench is located in areas from which rock had to be excavated in a quantity other than isolated stones, the excavated rock may be used as part of the backfill above a point 2 feet or more above the top of the pipe, or above a point 1 foot above pipe encasement, but shall not be used under pavement areas, unless specifically authorized by the ENGINEER.
- B. The rock fragments used in the backfill shall not exceed rock thicker than 6 inches or larger than 24 inches maximum in any dimension, shall not be dropped into the trench directly over the pipe centerline and shall be used with sufficient smaller dimensioned material so that voids between larger fragments shall be filled. Compaction shall meet the requirements specified under 3.11 Compaction Specifications up to existing ground level or finished grade level if same has been established.
- C. Rock shall not be used in the top 12-inches of the backfill, except across creeks, gullies, ravines or areas designated by the ENGINEER, where the rock may be used to the existing ground level as specified on the drawings.

3.12 COMPACTION SPECIFICATIONS

- A. Requirements based on material types are as follows:
 - 1. Select Fill, Drainage Fill and Pipe Bedding: For fill and bedding beneath structures and foundations, compact granular materials that exhibit a well-defined moisture density curve to at least 98 percent of the standard proctor maximum dry density (ASTM D698). For all other fill and bedding, compact granular materials that exhibit a well-defined moisture-density curve to at least 95 percent (ASTM D698). Moisture-condition fill materials to within a range of two (2) percent below to three (3) percent above optimum moisture content

(ASTM D698). Compact granular materials that do not exhibit a well-defined moisture-density curve to at least 85 percent relative density (ASTM D4253 and D4254) beneath structures and foundations, and to at least 75 percent relative density (ASTM D4253 and D4254) for all other areas.

2. Subbase Material: Compact granular materials that exhibit a well-defined moisture-density curve to at least 100 percent (ASTM D698). Moisture-condition subbase material to within one (1) percent of optimum moisture contents (ASTM D698). Compact granular materials that do not exhibit a well-defined moisture density curve to at least 85 percent relative density (ASTM D4253 and D4254).
 3. General Fill and Backfill: Compact materials that exhibit a well-defined moisture density curve to at least 98 percent of the standard proctor maximum dry density (ASTM D698) beneath structures, foundations and the top one (1) foot below pavements, and at least 95 percent (ASTM D698) in all other areas. Moisture-condition fill materials to within a range of two (2) percent below to three(3) percent above optimum moisture content (ASTM D698). Compact granular or rock materials that do not exhibit a well-defined moisture-density curve to at least 85 percent relative density (ASTM D4253 and D4254) beneath structures and foundations, and to at least 75 percent relative density (ASTM D4253 and D4254) for all other areas.
- B. If the specified densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly functioning compaction equipment, or because of soil moisture content, the CONTRACTOR shall perform whatever work is required to provide the required densities. This work shall include complete removal of unacceptable bedding, backfill or fill areas, and replacement and recompaction until acceptable densities are provided.
- C. CONTRACTOR shall repair, at his own expense, any Settlement that occurs within the construction area. He shall make all repairs and replacements necessary within 30 days after notice from ENGINEER or OWNER.

3.13 EMBANKMENTS

- A. To the maximum extent available, use excess earth obtained from structure bench and trench excavations for construction of embankments. Obtain additional material from borrow pits as necessary. After preparation of the embankment area, level and roll the subgrade so that surface materials of the subgrade will be compact and well bonded with the first layer of the embankment. All material deposited in embankments shall be free from rocks or stones, more than 6 inches thick or larger than 24 inches in maximum dimension, brush, stumps, logs, roots, debris, and organic or other objectionable materials. Construct embankments in horizontal layers not exceeding 8 inches in uncompacted thickness. Spread and level material

deposited by excavating and hauling equipment prior to compaction. Thoroughly compact each layer by rolling or other method acceptable to the ENGINEER to at least 98 percent of the maximum density within two (2) to three (3) percent of optimum moisture content as determined by ASTM D 698 beneath structures and foundations, and 95 percent (ASTM D698) in all other areas. If the material fails to meet the density specified, compaction methods shall be altered. Wherever a trench passes through a fill or embankment, the fill or embankment material shall be placed and compacted to an elevation 24 inches above the top of the pipe before the trench is excavated.

3.14 STRUCTURE FILL

- A. Provide structure fill in the following locations:
 - 1. Support for structure foundations where CONTRACTOR excavates below design subgrade shall be provided at CONTRACTOR'S expense.
 - 2. Support below and around piping and foundations as directed by ENGINEER.
 - 4. Subgrade for roads and pavements.
 - 5. Restoration of construction benches and access roads.
 - 6. Where shown or directed by ENGINEER.
- B. Subgrade surface shall be level, dry, firm and subject to ENGINEER'S approval. Do not place fill if any water is on the surface of area to receive fill. Do not place or compact fill in a frozen condition or on top of frozen material.
- C. Place fill in horizontal loose lifts of 8 inches maximum thickness. It shall be mixed and spread in a manner to assure uniform lift thickness after placing.
- D. Compact each layer of fill before placement of the next lift.
- E. Do not use fill containing topsoil, rubble, debris, wood or other organic matter. Fill containing unacceptable material shall be removed and disposed of.
- F. The water content of the fill being compacted shall be within the range of two (2) percent below to three (3) percent above the optimum moisture content of the material. CONTRACTOR shall wet or dry the fill materials during placement to achieve water contents needed for effective compaction.
- G. Perform compaction of fill with equipment suitable for the type of fill material being placed. Select equipment, which is capable of providing the densities, required and submit selection of the equipment to ENGINEER for approval.
- H. Compact each layer of fill material by at least two complete coverages of all portions of the surface of each lift using approved compaction equipment. One coverage is defined as the condition reached when all portions of the fill lift have been subjected to the direct contact of the compacting surface of the compactor.

- I. The minimum density to be obtained in compacting the structural fill shall be 98 percent of the standard Proctor maximum dry density (ASTM D698) beneath structures and foundations, and 95 percent (ASTM D698) in all other areas. If the field and laboratory tests indicate unsatisfactory compaction, CONTRACTOR shall provide the additional compaction necessary to obtain the specified degree of compaction. All additional compaction work shall be performed by CONTRACTOR at no additional cost to OWNER until the specified compaction is obtained.
- J. Structure fill necessary to replace subgrade materials disturbed and softened as a result of CONTRACTOR'S operations or to backfill unauthorized excavation shall be provided, placed and compacted at CONTRACTOR'S expense.

3.15 GRADING

- A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth subgrade surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
 - 1. Turfed Areas or Areas Covered with Gravel, Stone, Wood Chips, or Other Special Cover: Finish areas to receive topsoil or special cover to within not more than 1 inch above or below the required subgrade elevations.
 - 2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 1 inch above or below the required subgrade elevation.
 - 3. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2 inch above or below the required subgrade elevation.
- C. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 10 foot straightedge.
- D. Compaction:
 - 1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.16 PAVEMENT SUBBASE COURSE

- A. General: Place subbase material, in layers of specified thickness, over ground surface to support pavement base course.
 - 1. See other Sections of Division 2 for paving specifications.
- B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
- C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12 inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.
- D. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
 - 1. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.17 DISPOSAL OF EXCAVATED MATERIALS

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

3.18 RESTORING AND RESURFACING EXISTING ROADWAYS AND FACILITIES

- A. Place 1-1/2 inches of temporary bituminous pavement immediately after backfilling trenches in paved roadways, which are to be retained for permanent use. Maintain the surface of the paved area over the trench in good and safe condition during progress of the entire Work, and promptly fill all depressions over and adjacent to the trench caused by settlement of backfilling. The permanent replacement pavement shall be equal to that of the existing roadways unless otherwise specified.
- B. Pavement, gutters, curbs, sidewalks or roadways disturbed or damaged by the CONTRACTOR'S operations shall be restored by him at his own expense to as good condition as they were previous to the commencement of the Work and in accordance with applicable local and state highway specifications.

3.19 TEMPORARY FENCING

- A. Furnish and install a temporary fence surrounding excavations and work area. Fence shall have openings only at vehicular, equipment and worker access points.
- B. The fence shall be a snowfence type enclosure, 48 inches high. Fence shall be constructed of vertical hardwood slats measuring 1-1/2 by 1/4-inch interwoven with strands of horizontal wire, or shall be of equivalent plastic construction. Posts shall be of steel, either U, Y, T or channel section, and shall have corrugations, knobs, notches or studs placed and constructed to engage a substantial number of fence line wire in the proper position. Posts shall have tapered anchors weighing 0.67 pounds or more, each firmly attached by means of welding, riveting or clamping. Posts shall have a nominal weight of 1/3 pound per linear foot exclusive of the anchor. Each post shall be furnished with a sufficient number of galvanized wire fasteners or clamps, of not less than 0.120-inch in diameter for attaching fence wire to the post.

3.20 ENVIRONMENTAL PROTECTION AND RESTORATION

- A. CONTRACTOR shall be responsible for complying with all regulatory requirements pertaining to environmental protection and restoration. CONTRACTOR shall follow all erosion control design provisions shown in the Erosion Prevention and Sediment Control Plan, drawings, and specifications. CONTRACTOR shall provide, install, and maintain additional erosion and sediment control measures as necessary to retain disturbed sediments on-site.
- B. All disturbed areas of the site shall be stabilized. Stabilization shall begin within 7 days on areas of the site where construction activities have permanently or temporarily (for 30 days or more) ceased. When snow cover causes delays, stabilization shall begin as soon as possible. Stabilization practices include seeding, mulching, placing sod, planting trees or shrubs, and using geotextile fabrics and other appropriate measures.

3.21 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: The OWNER's testing service must inspect and approve subgrades and fill layers before construction work is performed thereon. Tests of subgrades and fill layers shall be taken as follows:
 - 1. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to ENGINEER.
 - 2. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2000 square feet of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test

for every 2000 square feet of overlaying building slab or paved area, but in no case less than 3 tests.

3. Compacted bedding material beneath and around pipe in trenches: Make at least one field density test of compacted bedding at the start of the project to ensure CONTRACTOR's method of compacting the bedding is meeting the compaction requirements. OWNER shall periodically call for tests of bedding compaction as the Work progresses and if the CONTRACTOR's pipe placement operations differ from proper procedures.
- B. If testing service reports or inspections show subgrade, fills, or bedding compaction are below specified density, CONTRACTOR shall remove any unacceptable materials as necessary and replace with specified materials and provide additional compaction at the CONTRACTOR's sole expense until subgrades, bedding, and backfill are acceptable as specified herein. The costs for the retesting of these subgrade, fills, or bedding materials that did not originally meet the specified density shall be paid by the CONTRACTOR.

++ END OF SECTION ++

SECTION 02222

ROCK REMOVAL

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. The CONTRACTOR shall excavate rock, if encountered, as required to perform the required work, and shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.
- B. CONTRACTOR shall utilize blasting if required and specified otherwise rock shall be removed by a suitable mechanical method.
- C. In general, rock in pipe trenches shall be excavated so as to be not more than 6 inches below the invert of the pipe after it has been laid.
- D. No additional payment will be made for rock excavation.

1.02 References

- A. NFPA 495 – Explosive Materials Code
- B. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

1.03 REGULATORY REQUIREMENTS

- A. Comply with Federal, State, and Local Regulations and National Codes on the purchase, transportation, storage, and use of explosive material. Federal Regulations and National Codes include but are not limited to the following:
 - 1. Storage, security, and accountability: Bureau of Alcohol, Tobacco, and Firearms (BATF): 27 CFR Part 181.
 - 2. Shipment: DOT, 49 CFR Parts 171-179, 390-397.
 - 3. Safety and Health: OSHA 29 CFR Part 1926, Subpart U.
 - 4. Transportation and Storage: NFPA 495, Chapters 3 through 6.
 - 5. Kentucky Department of Mines and Minerals code for explosive disintegration of rock.
- B. Obtain permits from local authorities having jurisdiction before explosives are brought to site or drilling is started.

1.04 DEFINITIONS

- A. Rock: A naturally occurring hard inorganic material that is in-situ. Rock may be either of sedimentary, igneous, or metamorphic origin, and is solid, bedded, jointed or fractured, and cannot be removed without ram hammering or systematic drilling and blasting; and boulders, masonry or concrete, except pavement, exceeding 1 cubic yard volume.
- B. Blaster in Charge (BIC): One competent, experienced person shall be specifically designated as Blaster-in-Charge (BIC); the BIC shall be in charge of explosives and blasting operations.
- C. Explosives and Initiating Devices: Explosives and initiating devices include, but are not limited to, dynamite and other explosives, slurries, water gels, emulsions, blasting agents, initiating explosives, detonators, and detonating cord.
- D. Shot: Explosive charge designed to fracture rock when detonated.

1.05 QUALITY ASSURANCE

- A. Prepare blasting plan in accordance with applicable regulatory requirements. Obtain written approval before bringing any explosives and initiating devices to the jobsite and beginning blasting. The blasting plan is for quality control and record keeping purposes. The review of the blasting plan does not relieve the Contractor of the responsibility for using existing drilling and blasting technology and for obtaining the required results in a safe manner. The blasting plan shall include, but not be limited to the following minimum requirements:
 - 1. Part 1: Include a complete summary of proposed transportation, handling, storage, safety precautions, and use of explosives and initiating devices, and include the name of the Blaster in Charge (BIC), who will supervise and be responsible for blasting operations, written evidence of past experience and competency, and a minimum of three references for that person.
 - 2. Part 2: Shall contain the general concept for the blasting, including the following minimum requirements:
 - a. Typical plan and section view of the drill pattern for controlled blast holes, and production blast holes as necessary. Indicate stations or coordinates for the areas to be shot and number of holes. Show the free face, burden, hole diameters, depths, spacings, inclinations, and depth of subdrilling if any.

- b. Individual blast hole loading pattern diagram for each type of shot anticipated showing:
 - (1) Location of each hole.
 - (2) Maximum dimensions for width, length, depth of shot.
 - (3) Amount of each type of explosive in each hole including primer and initiators.
 - (4) Location, type, and depth of stemming.
 - c. Initiation and delay methods, delay times and overall power factor.
 - d. Manufacturer's data sheets for all explosives and initiating devices.
 - e. Controls of noise, dust, fly rock, airblast and vibrations.
 - f. Data necessary to support the adequacy of the Contractor's proposed efforts regarding the safety of structures and slopes.
 - g. Information on test blasts (planned by the Contractor or) required by the regulatory authorities.
- B Videotape preblast conditions with audible descriptions of observed conditions. Provide and install vibration monitors and sensors at designated locations in accordance with blasting plan.
- C. Blasting and liability insurance in accordance with Kentucky Department of Highway (KDOH) and Sanitation District No. 1 (Owner) requirements.
- D. Comply with local and state safety codes in effect at the time of the work, observe the recommendations set forth in Employers Mutual, Factory Mutual or Associated General Contractors safety manuals and shall be completely responsible for all blasting operations.
- E. Blasting shall only be done by a Kentucky certified blaster and will be referred to herein as the BIC. The BIC shall maintain documentation of current license at the site for review by regulatory authorities and OWNER.
- F. Explosives and caps shall be kept in separate locked metal boxes, painted a bright color and stenciled with approved warning signs. When not in use, explosives and caps shall be stored in separate magazines. Whenever a blast is made, signals warning persons of danger shall be given in ample time. Suitable timber or steel blasting mats shall be used over blast area to confine all material lifted by blasting.

- G. Excessive blasting or overshooting will not be permitted. Any material outside the authorized excavation limits which is shattered or loosened by blasting shall be removed at the CONTRACTOR'S expense. The OWNER shall have the authority, with notice, to order blasting stopped if the method or amount is causing overshooting or is dangerous to life or destructive to property.
- H. Preparation: Provide security, notification of adjacent owners, warning signs, guards, clearances, and other protective measures and procedures necessary to this project.
- I. Protection: Protect existing features and facilities from damage, movement or gas-induced pressures. Make proper use of blasting mats and other protective devices, adopting additional precautions necessary to prevent damage to trees, shrubs, and other landscape features, buildings, utilities, monuments, and other structures. Should damage occur, make restoration as required by the OWNER at no additional cost to the OWNER.

1.06 SCHEDULING

Requirements: Schedule blasting between the hours of () and (), and only on () days.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- B. Delay devices: Type recommended by explosives firm and conforming to state regulations.
- C. Blasting mat materials: Type recommended by explosives firm and conforming to state regulations.

PART 3 – EXECUTION

3.01 PREBLAST STRUCTURE SURVEY

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

3.02 BLAST DESIGN

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

- C. Whenever air blast exceeds limits, change design of subsequent blasts or provide controls necessary to reduce air blast to within specified limits.

3.03 VIBRATION LIMITS

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

3.04 AIR-BLAST LIMITS

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

3.05 FLY ROCK CONTAINMENT

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

3.06 VIBRATION AND AIR-BLAST MONITORING

- A. Monitor and record blast-induced vibrations and air blast using suitable sensors and recording equipment for each blast.
- B. Seismograph Requirements:
 - 1. Designed for monitoring blast-induced vibrations and air blast.
 - 2. Capable of recording particle velocity in three mutually perpendicular directions in range from 0 to 6 inches per second.
 - 3. Flat vibration frequency response between 4- and 200-Hz.
 - 4. Capable of recording air-blast overpressure up to 140 decibels.
 - 5. Flat air-blast frequency response between 2- and 500-Hz.
- C. Monitor on, or at, structures or other facilities that are closest to point of blasting. Monitoring more distant facilities that are expected to be sensitive to blast-induced vibrations and air blast.
- D. BIC shall supervise establishment of monitoring programs and initial operation of equipment; review interpretation of records and recommend revisions of blast designs.

- E. Include following information in blasting plan.
 - 1. Vibration and air-blast limits as recommended by BIC.
 - 2. Name of qualified BIC who will be responsible for monitoring program and interpretation of records.
 - 3. Types and models of equipment proposed for monitoring.
 - 4. Numbers and locations of proposed monitoring stations.
 - 5. Procedures to be used for coordinating recording of each blast.
 - 6. Steps to be taken if blasting vibrations or air blast exceed limits.

3.07 EXPLOSIVES

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

3.08 BLASTING PRECAUTIONS

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

3.09 BLASTING RECORDS

- A. For each blast, document the following:

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

3.10 SUSPENSION OF BLASTING

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

3.11 ROCK REMOVAL – MECHANICAL METHOD

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

3.12 PAYMENT

Rock excavation shall be bid incidental to the Work and will not be paid for separately.

++ END SECTION ++

SECTION 02400

TUNNELING, JACKING, BORING AND OPEN-CUT CASING PIPE (TUNNELING – NOT USED)

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Scope: CONTRACTOR shall provide all labor, materials, equipment, supervision and incidentals required to furnish and install casing pipe and carrier pipe as shown on the Plans or specified herein.
 - 3. The CONTRACTOR'S attention is directed to the methods described herein and shown on the drawings for installing the casing pipe below existing facilities. They are jacking and boring method.
 - 4. Horizontal and vertical tolerance for the crossings shall be limited to the requirements herein. Should the tolerances be exceeded, it shall be at the option of the OWNER to: accept the installation; abandon the installation at the CONTRACTOR'S expense and require a new installation; or require a combination of hand-mined tunnel and casing pipe at the CONTRACTOR'S expense.
- B. Coordination: CONTRACTOR shall carefully coordinate work at crossings to avoid existing utilities.
- C. Related Work Specified Elsewhere:
 - 1. Section 02220, Excavation and Backfill.
 - 2. Section 02610, Pipe and Fittings
 - 3. Section 03300, Cast-In-Place Concrete.

1.2 QUALITY ASSURANCE

- A. Installer's Qualifications and Experience:
 - 1. Installer shall be a specialist in the construction of casing pipes by jacking, and boring and shall have at least 5 years experience in this specialty. Installer shall have satisfactorily constructed completely in his own name, during the past 5 years not less than ten similar installations which are comparable in diameter and length to that shown and specified herein.
 - 2. The CONTRACTOR chosen to perform this work shall present evidence to prove to the satisfaction of the OWNER and ENGINEER that his company and the superintendent he will employ for this Project have experience in boring and jacking through ground similar to that found on the Project. The CONTRACTOR shall keep such a superintendent continuously employed until the boring and jacking work is completed.

3. Use only personnel thoroughly trained and experienced in the skills required. The field supervisor of boring operations and the boring machine operator shall have not less than 12 months experience in the operations of the equipment being used.
4. Welds shall be made only by experienced welders, tackers and welding operators who shall have at least 10 years experience in this specialty. Welders previously qualified by tests as prescribed in the American Welding Society, AWS D.1.1 to perform the type of work required are adequate but a certified welder is not required. See additional requirements in Section 15051.
 - a. Casing Welding Requirements
 - (1) Conform to AWS D1.1, AWWA C206, approved welding procedures, and referenced welding codes.
 - (2) Rejectable weld defects shall be repaired or redone, and retested until sound weld metal has been deposited in accordance with appropriate welding codes.
 - b. Field Welding:
 - (1) Butt Joint Welded: Plain ends beveled as required by AWWA C200 and Contractor's welding procedure.
 - (2) OWNER shall contract with a third party testing agency to visually inspect the welds and the welders procedures and processes. CONTRACTOR shall notify OWNER and ENGINEER at least 48 hours in advance of when welding will begin.
 - (3) OWNER reserves the right to inspect 100 percent of all butt welds with full circumference radiographic inspection performed by approved NDT Quality Control personnel at the CONTRACTOR's sole expense if welds do not appear sound or filled in the field upon OWNER's inspection.
 - c. Defective Welds: Remove in manner that permits proper and complete repair by welding.
 - d. Retest unsatisfactory welds. Submit test results to OWNER.
5. Perform topographical surveys prior to the beginning of any excavation in the area and upon completion of the carrier pipe installation and backfilling. CONTRACTOR shall restore all existing surface and sub-surface facilities damaged due to measurable settlement at no additional cost to the OWNER.
6. CONTRACTOR shall submit a plan to monitor vibration, movement, and cracks at nearby structures during the jacking and boring operation. A pre-construction plan to examine existing cracks and install vibration monitors on nearby structures prior to the start of the Work shall also be submitted. Vibration monitors shall record movement continuously and be checked frequently by the CONTRACTOR during the boring and jacking operation. If

vibration, movement, or cracking is noticed to a degree that could or is suspected to cause damage, the jacking and boring operation shall be immediately terminated and the CONTRACTOR's operations adjusted to prevent damage to nearby structures.

7. The CONTRACTOR shall be completely responsible and liable for protecting the work and adjacent property from vibration, movement, cracking, and other damage and for all costs associated with any damages and repair of damages that result due to the installation operation.

B. Permits:

1. Where permits are required, the OWNER shall be responsible to obtain and pay for all permits, insurance and bonds required completing the work.
2. The CONTRACTOR shall obtain copy of the permits and be familiar with all necessary requirements of the agencies having jurisdiction prior to starting any boring or jacking operations. Adequate means shall be provided and dewatering shall be performed prior to excavation to keep the work free from water.

- C. Requirements of Regulatory Agencies: Comply with the OSHA Standards, Underwriter Laboratories, Kentucky Transportation Cabinet and all other authorities having jurisdiction. Requirements set forth in any license, permit or similar agreement issued by the railroad company, highway, or other agency beneath whose facility the casing pipe is to be installed, shall be fully complied with. In the event of a conflict with information given in these specifications or shown on the plans, the requirements stipulated in the license or permit agreement shall govern.

D. Tolerances:

1. The casing pipes shall be installed on the lines and grades shown on the Plans and within tolerances required to allow the sewer pipe to be installed in accordance with the lines and grades shown on the plans.
2. The maximum allowable tolerances are as follows:
 - a. Allowable Horizontal Tolerance (ft): 1.0'
 - b. Allowable Vertical Tolerance (ft): 1.0'
3. Refer to paragraph 3.1, herein.

E. Reference Standards:

1. ANSI B36.10, Welded and Seamless Wrought Steel Pipe.
2. ASTM A 53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A 106, Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service.
4. ASTM A 139, Electric-Fusion (ARC Welded) Steel Pipe.
5. ASTM A 153, Zinc-Coating (Hot Dip) on Iron and Steel Hardware.

6. ASTM A 252, Welded and Seamless Steel Pipe Piles.
7. ASTM A 307, Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
8. ASTM A 569, Carbon Steel, Hot-Rolled Sheet and Strip, Commercial Quality.
9. AREA Chapter 1, Part 4, "Jacking Culvert Pipe through Fills".
10. AREA Chapter 1, Part 5, "Specification for Pipelines Conveying Non-Flammable Substances".
11. AWS D1.1, Structural Welding Code.
12. OSHA.

1.3 SUBMITTALS

- A. Installation Methods: Before starting work, the CONTRACTOR shall submit drawings and descriptions showing methods and equipment for the excavation of the jacking pits and installation of the casing pipes and the carrier pipe for approval by the OWNER. The CONTRACTOR shall prepare a report of anticipated construction method information, dewatering methods, jacking pit elevations and profile of proposed bore. The report shall be submitted to the OWNER.
- B. Technical data, test reports, work schedules and any other information required by the authority having jurisdiction.
- C. Certificates: Certificate of Conformance in accordance with paragraph 21.1. of ASTM A139.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 1. Exercise special care during delivery not to damage the casing pipe and carrier pipe.
 2. Damaged materials will be rejected by the OWNER'S Project Representative and replaced by the CONTRACTOR at his expense.
 3. Deliver materials to such locations so as to avoid excessive handling.
 4. The OWNER is not responsible for accepting shipments of any kind.
- B. Storage:
 1. Store casing pipe and carrier pipe on approved blocking for protection from corrosion until incorporation into the Work in accordance with manufacturer's recommendation.
 2. Store in areas shown on the Plans or as approved by the OWNER'S Project Representative.
 3. The OWNER shall be permitted access to inspect the materials in storage areas.

- C. Handling:
 - 1. Handle materials in a manner so as to avoid damage.
 - 2. Materials damaged during handling shall be repaired or replaced as ordered by the OWNER'S Project Representative.

1.5 JOB CONDITIONS

- A. Subsurface Information:
 - 1. CONTRACTOR shall refer to the Supplementary Conditions for requirements on subsurface information.
 - 2. Data on subsurface conditions is not intended as a representation or warranty of continuity of such conditions between soil borings. ENGINEER will not be responsible for interpretation or conclusions drawn therefrom by CONTRACTOR.
 - 3. Additional test borings and other exploratory operations may be made by CONTRACTOR at no cost to OWNER.
- B. Existing Structures: The Drawings show certain existing facilities and surface and underground structures located on or adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of CONTRACTOR. CONTRACTOR shall explore ahead of the required Work to determine the exact location of all structures. They shall be supported and protected from damage by CONTRACTOR. If they are broken or damaged, they shall be restored immediately by CONTRACTOR at his expense.
- C. Existing Utilities: Locate existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during all operations.
 - 1. Should uncharted or incorrectly charted piping or utilities be encountered during Work, consult ENGINEER immediately for directions as to procedure. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 - 2. Do not interrupt existing utilities serving facilities occupied and used by OWNER or others, except when permitted in writing by ENGINEER and then only after acceptable temporary utility services have been provided.
 - 3. Coordinate with utility companies for shut-off of services, if required and the lines are active.
 - 4. See additional requirements specified on the Contract Drawings.
- D. Protection of Persons and Property: Barricade open excavations occurring as part of this Work. Obtain approval of OWNER prior to use of warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required, per approval of OWNER.

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

- E. Topographic mapping shown on plan/profile drawings was derived using photogrammetric survey methods. The mapping should be regarded as accurate within normal tolerance for 2-foot contour interval photogrammetric mapping as of the date of photography.
- F. The ground profiles and vertical alignments shown on plan/profile drawings are derived from the topographic mapping and therefore are approximate.
- G. Use of Explosives: Do not bring explosives onto site or use in the Work. Use of explosive materials is specifically prohibited.
- H. Dust Control: CONTRACTOR shall conduct all operations and maintain the area of activities, including sweeping and sprinkling of roadways, so as to minimize creation and dispersion of dust. Calcium chloride shall be used to control serious or prolonged dust problems, subject to approval of ENGINEER.
- I. All excavations shall be sheeted, shored and braced as required to prevent subsurface subsidence. Refer to Section 02220 for additional requirements.
- J. All jacking and receiving pits shall be kept dewatered, and pumps shall be attended on a 24-hour basis, if conditions so require. Close observation shall be maintained to detect any settlement or displacement of facilities during dewatering operations. Dewater into a sediment trap and comply with applicable environmental protection criteria specified elsewhere in these Contract Documents.
- K. Maintain the air in the pipe, when hand excavating, in a condition suitable for the health of workmen at all times.

1.6 GUARANTEE

- A. Guarantee of Work completed by the CONTRACTOR shall be as specified in the General Conditions of these specifications, except that longer periods may be required where noted in the permits or specified by applicable authorities.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Steel Casing Pipe:

1. Casing pipe shall be steel pipe meeting the requirements as specified below:
 - a. Unless otherwise called for, casing pipe shall be smooth-wall steel pipe of welded steel construction conforming to ASTM A-139, Grade B, with butt welded joints when more than one length is used. The steel casing pipe shall be of new material with a minimum yield point of 36,000 psi.
 - b. Sections of the casing pipe shall be welded together to form a continuous conduit capable of resisting all stresses, including jacking stresses. Welding of the steel casing pipe shall be solidly butt-welded with a smooth non-obstructive joint inside. Casing pipe shall be designed for earth cover shown on the Drawings and live load including impact equal to HS-20 wheel loading for roadway crossings.
2. Minimum wall thickness shall be as shown on drawings. Inside diameter shall be 4-inches minimum greater than outside diameter of force main at joints or couplings. If the casing pipe is furnished in sections and requires field welding, then it shall be furnished with plain ends, mill beveled for field butt welding. Field welded joints shall be performed by experienced welders as specified in paragraph 1.2.A.4 above and be full penetration single-vee groove, butt type welds around the entire circumference of the pipe. All welding shall receive testing as specified in paragraph 1.2.A. Copies of test reports shall be submitted to the OWNER.
 - a. Coatings: No exterior and interior coatings of the casing pipe are required.
3. CONTRACTOR may use a mechanical joint type pipe in lieu of welded joints. The pipe joint shall be flush with the inside and outside diameter. The joints shall be manufactured by Permalok Corporation or ENGINEER approved equal.

B. Carrier Pipe: Refer to Specification Section 02610 for carrier pipe requirements. Inside tunneling or casing pipe, all carrier pipe shall be harnessed or restrained with casing spacers (top, bottom, and sides).

C. Casing Spacers and End Seals

1. As specified herein.

PART 3 – EXECUTION

3.1 GENERAL

- A. Installation of the crossings shall be by jacking and boring and shall conform in all respects to the requirements contained herein and other applicable standards.
- B. Lines and Grades: The CONTRACTOR is responsible for establishing and maintaining proper line and grade at each crossing.
 - 1. The CONTRACTOR shall periodically check his line and grade to assure conformance with line and grade shown on the Plans and within the tolerances indicated in this Section.
 - 2. Extra work required because of the CONTRACTOR'S failure to maintain the proper line and grade, as shown on the Plans, shall be performed, by the CONTRACTOR, at no additional cost to the OWNER.
 - 3. The casing pipe and carrier pipe in its final position shall be straight and true in alignment and grade, as indicated on the drawings. Sufficient deviation from line or grade, in the opinion of the OWNER or ENGINEER, shall be justification for disapproving the installation. No space shall be left unfilled between the earth and the outside of the casing.

3.2 INSPECTION

- A. As required by the OWNER, Sanitation District No. 1 of Northern Kentucky Representative; or other regulatory authority.

3.3 PREPARATION

- A. Work pits at each end of the crossings shall be sufficiently large to permit satisfactory installation of the casing pipe or tunnel liner plates. All excavation, backfill, sheeting, shoring, bracing, and dewatering shall comply with the applicable requirements of Section 02220 of these Specifications and the requirements of the applicable authorities.
- B. All pits and their locations necessary in the performance of this work shall be acceptable to the OWNER, ENGINEER, and the agency having jurisdiction prior to starting work. All pits shall be adequately sheeted to protect the work, all persons, and adjacent property. The CONTRACTOR shall provide all additional shields, headers, or stabilization of the pit faces, as required by the OWNER or ENGINEER, to prevent settlement or damage to the areas above the casing. The CONTRACTOR shall be completely responsible and liable for protecting the work and adjacent property and for any damages that may result due to insufficient stabilization.

- C. The CONTRACTOR shall dispose of excess excavated material or drilling mud/cuttings in an approved upland disposal site.

3.4 INSTALLATION

- A. Installation of Steel Casing Pipe by Jacking:
1. Install in accordance with current American Railroad Engineering Association Specifications requirements.
 2. Design bracing and backstops and use jacks of sufficient rating such that jacking can be accomplished in a continuous manner until the leading edge of the pipe reaches the final positions shown on the Plans.
 3. If voids develop around the casing pipe as it is jacked, pump cement grout to fill all such voids, or fill by other means acceptable to the OWNER'S Project Representative.
 4. Fill all voids as specified hereafter as soon as possible after completion of jacking operation.
- B. Installation of Steel Casing Pipe by Boring:
1. The boring method shall consist of pushing the pipe into the fill with a boring auger rotating inside the pipe to remove the soil.
 2. Provide the front of the casing pipe with suitable mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe.
 3. The equipment and mechanical arrangements or devices used to bore and remove the earth shall be removable from within the casing pipe in the event an obstruction is encountered.
 4. The face of the cutting edge shall be arranged to provide reasonable obstruction to the free flow of soft or poor soil.
 5. Do not use water or other liquids to facilitate casing emplacement or spoil removal.
 6. If voids develop around the casing pipe as it is bored, pump cement grout to fill all such voids, or fill by others means acceptable to the OWNER'S Project Representative.
 7. Fill all voids as specified hereinafter as soon as possible after completion of boring operation.
- C. Obstructions: If an obstruction is encountered during installation to stop the forward action of the casing pipe, and it becomes evident that it is impossible to advance the pipe, the CONTRACTOR shall continue the casing pipe by hand tunneling and installation of tunnel liner plates. The continuation by the tunneling method shall be at the CONTRACTOR'S expense and at no additional cost to the OWNER.
- D. Installation of Casing Pipe by Open Trenching:
1. See Section 02610, Pipe and Fittings.

- E. Installation of the Force Main Sewer:
1. After completion of the tunnel or steel casing pipe, the Force Main Sewer pipe shall be installed and pressure tested by an approved method.
 2. Care shall be taken to prevent undue disturbances of the joints.
 3. The sewer pipe shall be laid on the line and grade shown on the Plans.
 4. The sewer pipe shall be blocked in place, using stainless steel casing spacers as specified below:
 - a. Centered/Restrained Casing spacers shall be installed to position the carrier pipe within the center of the casing pipe or at a slope as required to meet the specified slope of the carrier pipe as shown on the Drawings, except that for PVC carrier pipe, a minimum of 3 spacers shall be installed on each length of pipe with a maximum 6 feet spacing between spacers. The required spacing and installation shall be per the manufacturer's recommendation and shall be 304 or 316 stainless steel as manufactured by Cascade Waterworks MFG Co., Advance Products and Systems (APS) or other approved equal. Casing spacers shall be provided with height field-adjustment capability for installation of gravity sewer on a constant slope.
 5. The sewer pipe shall be installed with casing spacers in a centered/restrained position.
 6. The CONTRACTOR shall repair, replace or take whatever action is deemed necessary by the OWNER to correct all disturbed joints at no additional cost to the OWNER.
- F. End Seals:
2. After the sewer pipe is installed in the steel casing, and successfully pressure tested, construct end seals as shown on the Plans and as specified below:
 - a. Casing pipe end seals shall be installed at each end of the casing pipe and shall consist of a proper sized rubber seal and attached to the carrier and casing pipe with stainless steel bands per the manufacturers recommendation. Casing pipe end seals shall be manufactured by Cascade Waterworks MGG Co., Advanced Products and Systems (APS) or other approved equal.
 3. Prior to the installation of end seals, the sewer pipe shall be properly and sufficiently secured against flotation and against all movement, which would disturb joints.
 - a. The CONTRACTOR shall be responsible for all joints.
 - b. The CONTRACTOR shall repair, replace, or take whatever action is deemed necessary by the OWNER'S Project Representative to correct all disturbed joints at no additional expense to OWNER.

- G. Dewatering:
 - 1. Dewatering shall be performed in accordance with the criteria specified in Section 02220.

++ END OF SECTION ++

SECTION 02606

MANHOLES & AIR/VACUUM RELEASE VALVE VAULTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown on the Design Drawings, specified herein and required to furnish and install all precast and cast-in-place manholes, air release manholes and bypass pumping vaults.
- B. General:
 - 1. Manholes shall conform in shape, size, dimensions, material, and other respects to the details shown or as ordered by ENGINEER.
 - 2. Cast-iron frames, grates and covers shall be as shown on the drawings.
 - 3. Concrete for cast-in-place manholes and for inverts in precast manholes shall conform to the requirements of Section 03300.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. ASTM C 33, Standard Specification for Concrete Aggregate.
 - 2. ASTM C 76, Class III Reinforced Concrete Pipes.
 - 3. ASTM C 443, Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
 - 4. ASTM C 478, Specification for Precast Reinforced Concrete Manhole Sections.
 - 5. ASTM C 579, Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes.
 - 6. ASTM C 857, Standard Practice for Minimum Structural Design Loading for underground Precast Concrete Utility Structures.
 - 7. ASTM C 923, Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
 - 8. ASTM D 695, Standard Test Method for Compressive Properties of Rigid Plastics.
 - 9. ASTM D 790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 10. ASTM C 990, Standard Specification for Joints for Concrete Pipe, Manholes, Precast Box Sections Using Preformed Flexible Joint Sealants.

11. ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
12. ASTM D 4161, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
13. ASTM D 6783, Standard Specification for Polymer Concrete Pipe.
14. ASTM F 477, Specification for Elastomeric Seals (gaskets) for Joining Plastic Pipe.
15. AWWA C 110, Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.
16. AWWA C 111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. AWWA C 115, Flanged Ductile-Iron Pipe with Threaded Flanges.
17. AWWA C 151, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
18. AWWA C 302, Reinforced Concrete Pressure Pipe, Noncylinder Type, for Water and Other Liquids.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 1. Design Drawings showing design and construction details of all precast concrete and cast-in-place manholes including details of joints between the manhole bases and riser sections and stubs or openings for the connection of sewers. Design Drawings shall also show invert elevations of all pipe connections entering and leaving the manhole along with flowline slope across the base.
 2. Manufacturer's name for all precast structures.
- B. Submit a laying schedule of each manhole showing elevations and manhole components to be used from base to casting.
- C. For manhole interior linings, if required, submit calculations for the round manhole lining that demonstrate hoop strength under maximum hydrostatic conditions. The calculation shall assume zero liner adhesion to the existing structure, but assume lateral support from the existing wall. The calculated hoop stress shall be less than 11% of the compressive strength as determined by appropriate ASTM test method.

PART 2 - PRODUCTS

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

A. General:

1. Precast manholes shall conform to the details shown on the Standard Details.
2. Concrete shall be minimum 4000 psi compressive strength.
3. Except where otherwise specified precast manhole components shall consist of reinforced concrete pipe sections especially designed for manhole construction and manufactured in accordance with ASTM C 478 except as modified herein.
 - a. Standard Manholes shall be six (6) feet or more in depth, measured from the base of the cover frame to the invert of the outlet and shall be concentric cone-type, top construction as shown on the Design Drawings.
 - b. Shallow Manholes shall be less than six (6) feet in depth, measured from the base of the cover frame to the invert of the outlet and shall be of flat-top construction as shown on the Design Drawings.
4. Precast, reinforced concrete manhole bases, riser sections, flat slabs and other components shall be manufactured by wet cast methods only, using forms which will provide smooth surfaces free from irregularities, honeycombing or other imperfections.
5. All precast manhole components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, an H-20 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact.
6. Precast concrete manhole sections (including eccentric and concentric cones, risers and grade rings) shall conform to ASTM C 478 except sections deeper than 12 feet shall have reinforcing equal to that of ASTM C76 Class III reinforced concrete pipes, unless otherwise noted on the Design Drawings.
7. Lifting holes, if used in manhole components, shall be tapered, and no more than two shall be cast in each section. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by plugs driven from the outside face of the section only.
8. Mark date of manufacture, manhole number as shown on the Design Drawings, and name or trademark of manufacturer on inside of barrel.

B. Manhole Bases Sections:

1. Precast concrete manhole base sections shall be "monolithic", consisting of base slab and base riser (barrel) section.
 - a. Precast base sections shall be furnished with an integral anti-

flotation footing, thickness as specified hereinafter, extending trench bank-to-bank as shown in the Standard Details (minimum 8" projection).

- b. Precast concrete manhole base slab thickness shall comply with the following schedule:

0.0' – 15.0'	Vertical Height	- 8" Slab
15.1' – 20.0'	Vertical Height	- 10" Slab
20.1' – 25.0'	Vertical Height	- 12" Slab
25.1' – 30.0'	Vertical Height	- 14" Slab
 - d. Manholes over 30 feet shall be designed by a Professional Engineer registered in the State of Kentucky. Submittals shall be provided to the District for review & approval.
 - c. Manhole bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall not be less than 5 inches.
 - d. There should be a minimum of twelve (12") inches between the outside diameters of all pipe penetrations in the base section.
 - e. Base riser shall extend a minimum twelve (12) inches above the top of the highest pipe in the base.
2. Flow channel (invert) and apron (bench) shall be poured separately at the point of manufacture to the dimensions shown on the Design Drawings.
- b. The flow channel through manholes should be made to conform in shape and slope to that of the sewers.
 - c. Invert shall be smooth and semi-circular in cross-section of the same diameter of the pipe leaving the manhole.
 - d. Changes of direction of flow or sewer centerline within the manhole shall be made by forming the flow channel along a smooth curve with as long radius as the inside of the manhole will allow.
 - e. Bench shall slope toward invert at not less than one (1) inch per foot.
3. All precast base sections with pipe openings shall be furnished with ASTM C 923 pipe-to-manhole connector gaskets as specified hereinafter.

C. Manhole Barrel Sections:

- 1. Manhole barrel sections shall have reinforcing steel in their walls, Wall thickness shall not be less than 5 inches.
- 2. The barrel of the manhole shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the manholes for sewers or drop connections will not be permitted closer than one foot from the nearest joint. Special manhole base or riser sections shall be furnished as necessary to meet this requirement.
- 3. The barrel sections shall be of the height required, but not less than

- one (1) foot in height. No opening shall be cut into a barrel section, the maximum dimension of which exceeds one-half (1/2) the section height.
4. Joints between manhole components shall be the tongue and groove. The circumferential and longitudinal steel reinforcement shall extend into the tongue and groove ends of the joint without breaking the continuity of the steel. Joints between the base sections, riser sections and top slabs of manholes 72 inches in diameter and less shall be rubber and concrete joints. Joints for manhole components greater than 72 inches in diameter shall be provided with steel bell and spigot rings.
 5. Precast manhole section joints shall be joined with one of the following products:
 - a. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
 - b. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
 - c. Hamilton-Kent "Kent-Seal No. 2"
 - d. K.T. Snyder Co. "Rub'r-Nek"
 - e. Press Seal Gasket "E-Z Stik"
 6. All precast barrel sections with pipe openings shall be furnished with ASTM C 923 pipe-to-manhole connector gaskets as specified hereinafter.
- D. Cone Sections and Top Slab:
1. A precast concentric cone or precast top slab shall be provided at the top of the manhole barrel to receive the cast iron frame and cover or floor access hatch cover as shown on the Design Drawings. Eccentric cones will be evaluated on a case by case basis.
 2. Cone sections and top slabs shall be designed for an H-20 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact.
 3. Cone sections for standard manholes shall have a minimum 8" thick upper walls and shall not exceed 3'-0" in height.
 4. Concrete top slabs shall not be less than 8 inches thick.
- E. Drop Manhole:
1. Drop Manholes shall conform to all provisions specified herein, with the additional requirements for the drop pipe as shown on the Design Drawings.
 2. The drop pipe shall be of the same material and diameter as the inlet sewer pipe used.
 3. Drop pipe shall be totally enclosed in concrete, formed, with a minimum covering dimension of six (6) inches.
 4. No drop pipes shall be allowed inside of the manholes, unless otherwise approved by the Owner.
 5. Base shall be cast to support drop connection.

6. If the slope of the influent sewer is greater than or equal to five (5) percent, a detailed drop connection drawing needs to be submitted. All other influent sewer slopes and drop connections will be evaluated on a case by case basis.
 7. If the total height of the drop is greater than sixteen (16) feet, a Vortex Assembly must be used. See section 2.8
- F. Acceptable Manufacturers
1. Aerocrete
 2. Sherman Dixie
 3. KOI
 4. Hanson
 5. or equal

2.2 MISCELLANEOUS METALS

- A. Metal frames, covers, floor access hatch covers, steps, toe pockets and similar required items shall be provided as shown on the Design Drawings.

2.3 FLEXIBLE PIPE JOINT SEAL

- A. A flexible pipe joint seal shall be provided in the connection of pipe to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material.
- B. All connecting elements of the seal shall be Type 304 stainless steel.
- C. Flexible pipe joint seal shall allow for pipe alignment of up to fifteen (15) degrees deflection.
- D. Pipes entering manholes that do not have existing flows and have slopes greater than twenty-six (26) percent shall have fittings (22.5 or 11.25 degree bends) installed immediately outside the manhole.
- E. If a flexible pipe joint seal is provided at each manhole wall penetration and the pipe is not rigidly locked into the manhole wall through grouting or other methods, then the 12" maximum pipe stub shown in the SD1 Standard Drawing No. 113 is not required.
- F. Acceptable Products:
1. Kor-N-Seal by NPC, Inc.
 2. A-Lok by A-LOK Products, Inc.
 3. Dura-Seal III by Dura-Tech
 4. Or equal.

2.4 MANHOLE STEPS

- A. Plastic manhole steps shall be PS1-PF (Press Fit polypropylene plastic) as manufactured by MA Industries, or equal. Steps shall be driven into specially sized holes cast into the manhole section. Holes shall be formed in the manhole section using an insert plug that is removed upon curing.
- B. Steps shall be aligned vertically above the downstream pipe, in line with the direction of flow. Step spacing shall be 12" as shown the Standard Detail Drawing.

2.5 MANHOLE RISERS

- A. Manhole risers (adjusting rings) 6" to 10" height shall be concrete.
- B. Manhole risers 2" to 4" height shall be high density polyethylene as manufactured by Ladtech, Inc.

2.6 EXTERNAL SLEEVE FOR STRUCTURE

- A. Provide external sleeve around all manhole joints and the chimney as designated on the plans. Any manholes located within fifty (50) feet or less of a creek/ stream or within a floodplain shall have an external sleeve. External sleeve shall be a wraparound heat shrinkable sleeve that creates a barrier to water infiltration and protects support of the structure and frame from ground moisture prevents corrosion and freeze-thaw damage. The system shall be compatible with and bond to concrete, metal, and fiberglass using an adhesive type primer. The sleeve shall have the following physical properties:

Softening Point	212 degrees Fahrenheit	ASTM E-28
Lap Shear Strength	12 PSI	DIN 30 672
Tensile Strength	2900 PSI	ASTM D-638
Elongation	600%	ASTM D-638
Hardness	46 Shore D	ASTMD-2240
Abrasion Resistance	45 mg	ASTMD-1044
Peel Strength	9PLI	ASTMD-1000
Water Absorption	0.05%	ASTM D-570
Low Temperature	-40 degrees Fahrenheit	ASTMD-2671D
Minimum Width	12 inches	

- B. System shall accommodate ground movement and resists soil stress.
- C. Acceptable Products:
 - 1. WrapidSeal – Manhole Encapsulation System by Canusa –CPS.
 - 2. Link- Seal Riser- Wrap Heat Shrink System.
 - 3. Or Equal.

PART 3 - EXECUTION

3.1 MANHOLE BASES

A. General

1. Manholes shall be constructed at the locations shown on the Design Drawings.
2. The dimensions shall be as shown on the detail sheets and the depths shall be as indicated by either finished top elevation given or depth dimension given on the plans.
3. Perform Sitework as per the requirements of Specifications Sections 02220 and 02222.
4. Excavation for manholes and other underground structures shall be of sufficient size to adequately accommodate installation and proper centering.
5. The bases shall be placed directly on an 8-inch to 12-inch deep pad (compacted thickness) of pipe bedding material as specified in section 02220, placed to proper elevation and leveled, unless a deeper excavation is required to remove any loose sandy soils or soft to medium stiff, clayey soils down to a soil stratum suitable for support of the manhole and base.
 - a. The excavated soils shall be replaced with an appropriate Structural Backfill material or with controlled, low-strength material (CLSM), lean concrete, or an extra thickness of manhole base concrete.
6. The excavation shall be kept free of water while the manhole is being constructed and manhole shall not be backfilled until inspected by the ENGINEER.
7. CONTRACTOR will be required to compact bedding material around the entire circumference of the manhole and manhole excavation area to at least 12-inches above the highest incoming or outgoing pipe.
8. Compacted backfill as specified on the Design Drawings or section 02220 shall then be placed above the compacted bedding material up to finished grade.

B. Pre-Cast Bases

1. The Engineer reserves the right to inspect precast manhole base sections at the construction site and to reject the use of such sections if the Engineer determines the products unsuitable for the OWNER'S installation.

C. Cast-in-Place Bases

1. Cast-in-Place Bases shall be used when installing a doghouse manhole over an existing sewer or as approved by the ENGINEER.
 - b. Cast-in-place bases shall be placed on suitable foundations after the pipes are laid as specified in 3.1.A.5.

2. The base shall be cast monolithically to an elevation at least 12 inches above the top of the highest pipe entering the manhole, except where a drop connection is to be installed.
 - b. Base thickness shall be as per 2.1.B.1.
 - c. Base, walls and bottom shall be at least of the thickness shown and reinforced to withstand the loads to be expected.
 - d. Connections for sewer pipes shall conform to the details shown.
 - e. The base of the bell or groove end at joints between components shall be buttered with 1:2 cement-sand mortar to provide a uniform bearing between components.
 - f. All joints shall be sealed with cement mortar inside and out and troweled smooth to the contour of the wall surface.
 - g. Raised or rough joint finishes will not be accepted.

3.2 PRECAST MANHOLE SECTIONS

- A. Set sections vertical with steps and sections in true alignment.
- B. Install sections, joints and gaskets in accordance with manufacturer's recommendations.
- C. Lifting holes shall be sealed tight with a solid rubber plug driven into the hole from the outside of the barrel and the remaining void filled with 1 to 2 cement-sand mortar.

3.3 MANHOLE CHANNELS (NOT USED)

3.4 GRADING RINGS

- A. Grading rings shall be used for all precast and masonry manholes to adjust height of manhole frame casting where required.
 1. Grade rings shall be a maximum of 10 inches in height, constructed on the roof slab or cone section on which the manhole frame and cover shall be placed.
 2. The height of the grade ring shall be such as is necessary to bring the manhole frame to the proper grade.
 3. One piece precast concrete rings shall be used for grade adjustment greater than six (6) inches and up to ten (10) inches in height. Rings shall be set concentrically on top of the cone section or top slab if used.
 4. High density polyethylene risers shall be used for grade adjustment from two (2) inches to a maximum of six (6) inches in height. Rings shall be set concentrically on top of the cone section or top slab if used.
 5. The rings shall be set in a bed of butyl rubber sealant and this joint

- shall be pointed with cement mortar to a smooth finish unless a second row of sealant is installed.
6. Polyethylene grade rings shall be sealed using two rows of butyl rubber sealant.
- B. The casting frame shall be installed on the riser as previously described with four (4) five-eighths (5/8) inch diameter stainless steel bolts extending through the riser and into the cone section or top slab.
1. The riser and cone may also be drilled with four (4) equally spaced five-eighths (5/8) inch diameter holes and four (4) No. 5 steel reinforcement bars installed and left flush with the riser top to prevent lateral movement and the casting frame bolted to the riser as previously described.
- C. High Density Polyethylene Manhole Adjusting Rings shall be used to adjust up to a maximum of six (6) inches. Casting must be bolted through the adjusting rings to the cone section with four (4) equally spaced five-eighths (5/8) inch diameter threaded stainless steel rods with cinch anchors.

3.5 CONNECTIONS TO EXISTING MANHOLES (NOT USED)

3.6 STUBS FOR FUTURE CONNECTIONS (NOT USED)

3.7 GRADING AT MANHOLES

- A. Manholes shall be installed to conform to the following convention unless otherwise called for on the plans. The ground surface shall be graded to drain away from the manhole. Final dimensions shall be determined after grading has taken place.
1. Manholes in roads, parking lots, paved areas and lawns shall be installed flush with the surrounding area.
2. Manholes in wooded or other inaccessible areas shall be installed twelve (12) inches above the final grade.
3. Manholes in cultivated fields, hay fields and pastures shall be installed with the cone section flush with the final grade. After installation of the casting, a slope fill 1:5 (1 vertical to 5 horizontal) shall be installed to provide surface drainage away from the manhole.
- B. Manholes in paved areas shall be constructed to meet the final surface grade. In paved areas on State Highways, all manholes shall be 1/2 inch below final wearing surfaces. Manholes shall not project above finished roadway pavements to prevent damage from snowplows.

- C. CONTRACTOR shall be solely responsible for the proper height of all manholes necessary to reach the final grade at all locations. CONTRACTOR is cautioned that ENGINEER'S review of Shop drawings for manhole components will be general in nature and CONTRACTOR shall provide an adequate supply of random length precast manhole riser sections to adjust any manhole to meet field conditions for final grading.

3.8 MANHOLE WATERTIGHTNESS

- A. All manholes shall be free of visible leakage. Each manhole shall be tested for leaks and inspected. If the manhole fails testing, the District will consider the manhole defective and the Contractor shall replace the manhole and make any necessary reconnections to the new or existing pipelines at no additional cost to the Owner. No leak repairs shall be performed without the ENGINEER'S approval.
- B. Vacuum test manholes to ASTM C 1244. Testing to be witnessed by OWNER. Manholes not subject to vacuum testing must be in writing from OWNER. This specification shall govern the negative air pressure (vacuum) testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the OWNER, in accepting maintenance of a sanitary sewer manhole or structure on behalf of the public. Other forms of testing of some manholes may be required, as deemed necessary by the Owner.
- C. Manholes shall be tested after installation with all connections in place along with the following completed prior to testing:
 - 1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.
 - 2. Drop connections shall be installed prior to testing.
 - 3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.
 - 4. The manholes shall be backfilled and finished to design grade prior to test.
 - 5. Test pressure requirements of ASTM C-923 shall be met.
- D. Test Procedure:
 - 1. Temporarily plug, with the plugs being braced to prevent the plugs or pipes from being drawn into the manhole, all pipes entering the manhole at least eight inches into the sewer pipe(s). The plug must be inflated at a location past the manhole/pipe gasket.
 - 2. The test head shall be placed inside the frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
 - 3. A vacuum of 10" of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line.

4. The pressure gauge shall be liquid filled, having a 3.5 inch diameter face with a reading from zero to thirty inches of mercury.
5. The manhole shall be considered to pass the vacuum test if it holds at least 9 inches of mercury for the following time durations:

<u>Manhole Depth</u>	<u>Time (Minutes)</u>		
	<u>4' Diameter</u>	<u>5' Diameter</u>	<u>6' Diameter</u>
20 Feet or Less	1	2	3
20.1 to 30 Feet	2	3	4

Note: Consult SD1 on manhole diameters larger then six (6) foot

6. If a manhole fails the vacuum test, The District will consider the manhole defective and the CONTRACTOR shall replace the manhole and/ or defective components and make any necessary reconnections to the new or existing pipelines at no additional cost to the Owner. No repairs shall be made to the manhole unless approved by the ENGINEER.
7. All temporary plugs and braces shall be removed after each test.
8. Manholes will be accepted as having passed the vacuum test requirements if they meet the criteria stated above.

+ + END OF SECTION + +

SECTION 02610

PIPE AND FITTINGS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. CONTRACTOR shall provide all labor, materials, equipment, incidentals, and services as shown, specified, and required for furnishing, installing, and testing all buried piping, fittings, and specials specified herein. Piping herein specified includes force main & gravity sewer. Refer to the pipe material schedule shown below to determine which pipe materials are acceptable for each application. Remove and replace all existing piping that interferes with installation of new pipe or structures or that is damaged by new installations in a manner approved by the ENGINEER.

Type	Size	Depth	Acceptable Materials
Gravity	15	Less than 20'	PVC SDR 35; Fiberglass Polymer Mortar Pipe SN 46
Gravity	15	20.1' to 30'	PVC SDR 26; Fiberglass Polymer Mortar Pipe SN 72
Gravity	18	0 to 30' 30' and greater Ductile Iron Class 350 with Protecto 401 lining only	PVC C905 DR 14; ASTM F649 PS115, Fiberglass Polymer Mortar Pipe SN 42 and 72, or Ductile Iron Class 350 with Protecto 401 lining
Gravity	16	0 to 30'	Ductile Iron Class 350 with Protecto 401 lining
Force Main	24"	Any	Ductile Iron, Restrained Joint Class 350 with Protecto 401 Lining

Note: Pipe selected shall be designed for the cover and loading requirements to each project. Design calculations for pipe wall thickness and structural design shall be provided by the ENGINEER, as requested by SD1. Restrained joint calculations for force mains shall be provided for all projects.

Depth is based on maximum cover between structures or manhole runs. Pipe shall be the same thickness between structures or manholes.

- B. The Work includes, but is not limited to, the following:
1. Piping beneath structures.
 2. Supports and restraints,.
 3. Pipe encasements.
 4. Work on or affecting existing piping.
 5. Testing.
 6. Cleaning and disinfecting.
 7. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other Work required to complete the buried piping installation.
 8. Incorporation of valves, meters and special items shown or specified into the piping systems as required and as specified in the Section 15100.
 9. Unless otherwise specifically shown, specified, or included under other Sections, all buried piping work required, beginning at the outside face of structures or structure foundations and extending away from structure.
- C. Review installation procedures under other Sections and other contracts and coordinate with the work that is related to this Section.

1.2 RELATED WORK

1. Section 02606 - Manholes.
2. Section 02220, Excavation and Backfill.
3. Section 02710, Drainage Structures.
4. Section 03300, Cast-In-Place Concrete.
5. Section 09900, Painting.
6. Division 15, Sections on Piping, Valves and Appurtenances.
7. Section 15052, Exposed Piping Installation.
8. Section 15100, Valves and Appurtenances.
9. Section 15121, Wall Pipes, Floor Pipes and Pipe Sleeves.
10. Section 15122, Piping Specialties.
11. Section 15140, Pipe Hangers and Supports.

1.3 LIMITATIONS

All existing piping as shown on the Design Drawings is based on the best information available, but SD1 and ENGINEER makes no guarantees as to the accuracy of the locations or type of piping depicted. All new piping which ties into existing lines must be made compatible with that piping. So that piping conflicts may be avoided, CONTRACTOR shall open up his trench well ahead of the pipe laying operation to confirm exact locations and sizes of existing piping before installing any new piping. CONTRACTOR shall provide all fittings and adapters necessary to complete all connections to existing piping as approved by

SD1. All costs associated with alignment adjustments on new piping to tie into existing piping shall be borne by CONTRACTOR. No additional costs will be paid by SD1.

1.4 QUALITY ASSURANCE

Requirements of Regulatory Agencies:

- A. Comply with requirements of UL, FM and other jurisdictional authorities, where applicable.
- B. Refer to the General and Supplementary Conditions regarding permit requirements for this Project.

1.5 REFERENCES

Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

- A. AWWA C104, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- B. AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
- C. AWWA C110, Standard for Ductile-Iron and Gray-Iron Fittings, 3 In.-48 In. (76 mm-1,219 mm), for Water.
- D. AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- E. AWWA C115, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- F. AWWA C150, Standard for Thickness Design of Ductile-Iron Pipe.
- G. AWWA C151, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- H. AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
- I. AWWA C606, Grooved and Shouldered Joints.
- J. AWWA C800, Underground Service Line Valves and Fittings.

- K. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In.-12 In. (100 mm-300 mm), for Water Dist.
- L. AWWA M23, PVC—Design and Installation
- M. ASTM A 27, Standard Specification for Steel Castings, Carbon, for General Application.
- N. ASTM A 82, Standard Specification for Steel Wire, Plain for Concrete Reinforcement.
- O. ASTM A 185, Welded Steel Wire Fabric for Concrete Reinforcement.
- P. ASTM A 496, Deformed Steel Wire for Concrete Reinforcement.
- Q. ASTM A 497, Steel Welded Wire Fabric, Deformed for Concrete Reinforcement.
- R. ASTM A 1011, Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- S. ASTM A 615, Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- T. ASTM C 14, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
- U. ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- V. ASTM C 118, Concrete Pipe for Irrigation or Drainage.
- W. ASTM C 150, Standard Specification for Portland Cement
- X. ASTM C 361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
- Y. ASTM C 443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- Z. ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
- AA. ASTM D 1238, Measuring Flow Rates of Thermoplastics by Extrusion Plastometer.

- BB. ASTM D 1598, Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
- CC. ASTM D 1599, Short Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
- DD. ASTM D 1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- EE. ASTM D 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- FF. ASTM D 2122, Determining Dimensions of Thermoplastic Pipe and Fittings
- GG. ASTM D 2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- HH. ASTM D 2464, Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- II. ASTM D 2467, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- JJ. ASTM D 2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- KK. ASTM D 2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
- LL. ASTM D 3034, Bell and Spigot-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- MM. ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- NN. ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- OO. ASTM D 3262, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- PP. ASTM D 3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

- QQ. ASTM D 3754, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
- RR. ASTM D 4161 Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
- SS. ASTM D 5685, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Pressure Pipe Fittings.
- TT. ASTM F 437, Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- UU. ASTM F 439, Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- VV. ASTM F 441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- WW. ASTM F 493, Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- XX. ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- YY. ASCE MOP No. 37, Design and Construction of Sanitary and Storm Sewers

1.6 SUBMITTALS

- A. In addition to the requirements of Section 01300, provide the following:
 - 1. Size, class and other details of pipe to be used.
 - 2. Full details of piping, specials, joints, harnessing, and connections to existing piping, structures, equipment and appurtenances.
 - 3. Laying schedules and detailed drawings in plan and profile for piping.
 - 4. Jacking and boring operation details, including size of jacking and receiving pits, method of shoring and dewatering, jacking machine information, casing pipe, spacers and end seals.
 - 5. Method to monitor vibration, movement, settlement, cracking of nearby structures from jacking and boring operation.
- B. Tests: Submit description of proposed testing methods, procedures and apparatus. Prepare and submit report for each test.
- C. Certificates: Submit certificates of compliance with referenced standards.

- D. As requested by SD1, all pipe manufacturers that supply pipe for the project shall provide a detailed structural design taking in account the depth of burial, highway loads, bedding and backfill requirements, water elevation, soil conditions and installation procedures. All designs submitted shall have a Professional ENGINEER's stamp from Kentucky. Such design shall be received, reviewed, and approved prior to manufacture.
- E. As requested by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures. As requested by SD1, pipe manufacturer's representative shall visit job site to monitor progress of pipe installation and shall notify in writing the CONTRACTOR and SD1 of any discrepancy, changes, or incorrect procedures that would prevent the pipe from performing as designed.
- F. Record Drawings: Submit record drawings in accordance with Section 01720 and Section 01721.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Refer to applicable Sections for material specifications.
- B. General:
 - 1. Marking Piping:
 - a. Clearly mark each piece of pipe or fitting with a designation conforming to those shown on the laying schedule.
 - b. Cast or paint material, type and pressure designation on each piece of pipe or fitting 4 inches in diameter and larger.
 - c. Pipe and fittings smaller than 4 inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

2.2 DUCTILE IRON PIPE AND FITTINGS

- A. Piping furnished hereunder shall be complete with all joint gaskets, bolts, and nuts required for installation of valves and equipment furnished by others for installation under this contract.
- B. Pipe Manufacturer's Experience and Field Services.
 - 1. All ductile iron pipe, fittings, and specials shall be fabricated, lined and coated by the pipe manufacturer. Minimum required experience shall include manufacture of a similar pipeline in length to this contract, of equal or larger

- diameter than the pipe to be provided with joints, lining, and coating suitable for the same or greater pressure rating specified herein, which has performed satisfactorily for the past 5 years.
2. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience installing ductile iron pipe with joints, lining, and coating of the pipe to be provided.
 3. All ductile iron pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
 4. Each joint, including all restrained joints, shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the joint and the restraints are installed properly.
 5. The pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
 6. All costs for these services shall be included in the Contract Price.

C. Materials

1. Where ductile iron pipe is required, it shall conform to ANSI/AWWA C151/A21.51, Table 1 or Table 3. Pressure class 350 shall be used for all piping, unless otherwise shown on the drawings or specified. Fittings shall conform to ANSI/AWWA C110/A21.10, or ANSI/AWWA C153/A21.53, with a minimum working pressure rating of 350 psi. All fittings shall be suitable for a test pressure as specified herein without leakage or damage.
2. All buried pressure piping shall be push-on joint or mechanical joint. Restrained joint pipe shall be installed at the station locations shown on the Contract Drawings. All above ground piping or piping in vaults shall be flanged.
3. All gravity sewer piping shall be push-on joint or mechanical joint.

4. Push-on joints and mechanical joints shall be in accordance with ANSI/AWWA C111/A21.11.
5. Restrained joint pipe shall be fabricated to the lengths required as determined by the laying schedule to be submitted as specified herein. If deviations from the approved laying schedule are required in the field as approved by SD1 and ENGINEER and field-cuts are required, CONTRACTOR shall provide restraint on the field-cut piping using, EBAA Iron "Megalog" restrained joints as specified below.
6. Field cuts shall be minimized and will be limited to only locations approved by SD1 and ENGINEER, when no other alternative to using factory provided joint restraint exists. Use of field-lock, fast-grip, field flex-ring, TR-flex gripper ring, etc. gaskets for field-cut pipe shall not be allowed.

D. Joints

1. Certification of joint design shall be provided in accordance with ANSI/AWWA C111/A21.11-90, Section 4.5, Performance Requirements, as modified herein.
2. The joint test pressure for each type of joint used on this project shall be not less than 2 times the working pressure or 1-1/2 times the test pressure of the pipeline, whichever is higher. The same certification and testing shall also be provided for restrained joints. For restrained joints, the piping shall not be blocked to prevent separation and the joint shall not leak or show evidence of failure.
3. It is not necessary that such tests be made on pipe manufactured specifically for this project. Certified reports covering tests made on other pipe of the same size and design as specified herein and on the drawings and manufactured from materials of equivalent type and quality may be accepted as adequate proof of design.
4. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in two layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.

E. Material Schedule

Push-on Joints and Mechanical Joints	ANSI/AWWA C111/A21.11
Restrained Push-on Joints Positive locking segments and/or rings (4 inch through 64 inch)	American "Flex-Ring", or "Lok-Ring"; U.S. Pipe "TR Flex"; Clow Corp., "Super-Lock", without exception

Restrained Push-on Joints,
(field-cut spigot)
locking wedge type

EBAA Iron "Megalug" Series 1700,
without exception. Shall only be
used in locations approved by the
ENGINEER.

Restrained Mechanical Joints
(Factory prepared spigot)
(4 inch through 48 inch)

American "MJ coupled Joints"

Restrained Mechanical Joints
(field cut spigot)

EBAA Iron "Megalug" Series 1100,
without exception. Shall only be
used in locations approved by the
ENGINEER.

Fittings

ANSI/AWWA C110/A21.1, or
ANSI/AWWA C153/A21.53, all
with minimum working pressure of
350 psi, and suitable for the test
pressure based on the project design
without leakage or damage.

Flanged Joints & Fittings

Ductile Iron, ANSI/AWWA
C115/A21.5 suitable for the test
pressure based on the project design
without leakage or damage. Faced
and drilled, ANSI B16.1 125-pound
flat face. Threaded conforming to
AWWA C115/A21.15.

Bolting

125-pound flat-faced flange: ASTM
A 307, Grade A carbon steel hex
head bolts and ASTM A563 Grade A
carbon steel hex head nuts

Gaskets

Restrained Push-on and Mechanical
Joints: Synthetic rubber conforming
to AWWA C111/A21.11. Natural
rubber is not acceptable.

Flanged: 1/8 inch thick, red rubber
(SBR), hardness 80 (Shore A), rated
to 200 degrees F., conforming to

ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Full face for 125-pound flat-faced flanges, or specially designed gaskets with required properties per ANSI/AWWA C111/A21.11 to meet the test pressure rating. Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange.

Gasket pressure rating to equal or exceed the system hydrostatic test pressure.

Joint Lubricant

Manufacturer's standard

Tapping Sleeves

316 SS, with 316 SS body and bolting, and rubber sealing gasket, suitable for the test pressure specified herein. JCM Industries, Model JCM 452 or approved equal.

Polyethylene Encasement

Seamless, ANSI/AWWA C105/A21.5; LLD-8 mil or HDCL-4 mil

F. Lining and Coating Ductile Iron Pipe and Fittings

1. All buried ductile iron pipe and fittings shall have manufacturers outside standard asphaltic coating and ceramic epoxy lining inside, factory applied. Ceramic epoxy lining shall be Protecto 401 as manufactured by Vulcan Painters, Inc. of Birmingham, AL, or NovoCoat SP-2000W as manufactured by NovoCoat Protective Coatings, of Addison, Texas and as specified herein. Flange faces shall be coated externally with a suitable manufacturer's standard rust-preventative compound.
2. Application of Lining
The interior of the pipe exposed to liquids and gases shall be blasted and cleaned to remove all loose oxides and rust. After cleaning, the lining material shall be applied to yield 40 mils for the complete system using a centrifugal lance applicator. No lining shall take place over grease, oil, etc., that would be detrimental to the adhesion of the compound to the substrate. The compound shall not be applied when the substrate temperature is below

40 degrees F., or in adverse atmospheric conditions which will cause detrimental blistering, pinholing or porosity of the film.

3. Lining material

The material shall be a two component epoxy with the following minimum Requirements:

- a. A permeability rating of 0.0 perms when measured by ASTM E96-66, Procedure A. Duration of test - 6 weeks.
- b. A direct impact resistance of 125 inches-pounds with no cracking when measured by ASTM-D-2794.
- c. The ability to build at least 50 mils dry in one coat.
- d. The material shall be recoatable with itself for at least seven days with no additional surface preparation when exposed to direct summer sun and a temperature of 90 degrees F.
- e. The material shall contain at least 20% by volume of ceramic quartz pigment.
- f. A test and service history demonstrating the ability of the material to withstand the service expected.

4. Inspection

- a. All pipe shall be checked for thickness using a magnetic film thickness gauge.
- b. All pipe shall be pinhole detected with a non-destructive 2,500 volt test.
- c. Each pipe joint shall be marked with the date application of the lining system and with its numerical sequence of application of that date.
- d. Each requirement of 3. above must be certified by the material supplier.

5. Field Cuts

- a. All manufacturer's procedures and recommendations shall be followed when making field cuts. Note proper field preparations and curing time of the coating.

G. All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. If requested, three (3) copies of such instructions shall be delivered to the ENGINEER at start of construction.

H. Encasement

1. Polyethylene encasement shall be provided for all buried ductile iron pipe, including all straight pipe, bends, tees, wyes, adapters, closure pieces, field restraint devices, valves and other fittings or specials, in accordance with

ANSI/AWWA C105/A21.5, Method A. Preparation of the pipe shall include, but not be limited to: removing lumps of clay, mud, cinders, etc., prior to installation.

2. Where ductile iron pipe is also embedded or encased in concrete or within a casing pipe, the polyethylene encasement shall be installed over the ductile iron pipe prior to concrete placement and in conjunction with installation in the casing pipe.
3. The pipe shall be wrapped with 8-mil thickness polyethylene tube wrap, using the recommended minimum flat tube widths for the specified pipe sizes. The polyethylene tube wrap shall be of virgin polyethylene as produced from DuPont Alathan resin or equal.
4. The polyethylene tube seams and overlaps shall be wrapped and held in place by means of 2-inch wide plastic backed adhesive tape. The tape shall be Polyken Number 900, Scotchrap Number 50, or equal. The tape shall be such that the adhesive shall bond securely to both metal surfaces and polyethylene film.
5. The polyethylene film supplied shall be clearly marked at a minimum of 2-ft along its length, containing the following information:
 - a. Manufacturer's name or trademark
 - b. Year of Manufacture
 - c. ANSI/AWWA C105/A21.5
 - d. Minimum film thickness and material type (LLDPE or HDCLPE)
 - e. Applicable range of nominal pipe diameter size(s)
 - f. Warning--Corrosion Protection--Repair any Damage

2.3 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS (GRAVITY LINES)

A. Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Piping – Schedule Rated Pipe:

1. Pipe and Fitting Material:
 - a. Standard: ASTM D 1784.
 - b. Type: Type I, Grade 1, rigid (12454-B).
2. Pipe:
 - a. PVC:
 - 1) Standard: ASTM D 1785.
 - 2) Designation: PVC 1120.
 - b. CPVC:
 - 1) Standard: ASTM F 441.
3. Joints:
 - a. General: Connect pipe by solvent cementing except where flanged or threaded fittings are required at expansion joints, valves, flow meters, equipment connections or otherwise shown or directed.
 - b. Flanged Joints:
 - 1) Use flanges joined to pipe by solvent cementing.
 - 2) Flange Drilling and Dimensions: Comply with ANSI B16.1.

- 3) Flange Gaskets: Viton full face.
 - 4) Bolts, Nuts and Washers: Type 316 stainless steel.
 - 5) Provide washers on each face of the bolted connection.
 - c. Threaded Joints:
 - 1) Taper Pipe Threads: ANSI B2.1.
 - 2) Joint Preparation: Teflon tape.
 - 3) Use PVC dies for taper pipe threads.
 - d. Primer and Solvent Cement:
 - 1) Standard:
 - a) PVC: ASTM D 2564.
 - b) CPVC: ASTM F 493.
4. Fittings:
- a. Socket-Type:
 - 1) PVC:
 - a) Standard: ASTM D 2467.
 - b) Designation: PVC I.
 - 2) CPVC:
 - a) Standard: ASTM F 439.
 - b. Threaded Type:
 - 1) PVC:
 - a) Standard: ASTM D 2464.
 - b) Designation: PVC I.
 - 2) CPVC:
 - a) Standard: ASTM F 437.

B. Polyvinyl Chloride (PVC) Piping – Gravity Sewer Pipe and Fittings:

- 1. Pipe and Fitting Material:
 - a. Standard: ASTM D 1784.
- 2. Pipe and Fittings:
 - a. Standard:
 - 1) 4-inch through 15-inch diameter: ASTM D 3034.
 - 2) 18-inch through 27-inch diameter: ASTM F 679.
 - b. Thickness Class: As shown in item 1.1 this section.
- 3. Joints:
 - a. Push On Joints: Connect pipe with integral wall bell and spigot joints. The bell shall consist of an integral wall section with a solid cross section rubber gasket, factory assembled, securely locked in place to prevent displacement during assembly. Joints shall be assembled in accordance with the pipe manufacturer's recommendations and ASTM D 3212.
 - b. Gaskets: Rubber gaskets shall be in compliance with ASTM F 477 and shall be suitable for the service specified.

2.4 POLYVINYL CHLORIDE (PVC) PIPE – C900 Piping (FORCE MAINS)

1. This pipe shall meet the requirements of AWWA C900-75 for Polyvinyl Chloride (PVC) Pressure Pipe. The pipe shall be PVC 1120 pipe with cast iron pipe equivalent ODs. See Table 1 below for pipe material depth and pressure limitations.
2. Provisions must be made for expansion and contraction at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring which meets the laboratory performance of ASTM D3139. The bell section shall be designed to be at least as strong as the pipe wall.
3. Standard laying lengths shall be 20 feet \pm for all sizes. At least 85 percent of the total footage of pipe of any class and size shall be furnished in standard lengths, the remaining 15% in random lengths. Random lengths shall not be less than 10 feet long. Each standard and random length of pipe shall be tested to four times the class pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.
4. Fittings for all lines 4 inches in diameter or larger shall be restrained ductile iron and in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 or ANSI A21.53 for compact fittings.
5. Fittings for all lines less than 4 inches in diameter shall be PVC gasketed push on type or socket glue-type manufactured specifically for the pipe class being utilized. All socket-glue type connections shall be joined with PVC solvent cement conforming to ASTM D2564. Product and viscosity shall be as recommended by the pipe and fitting manufacturer to assure compatibility. Solvent cement joints shall be made up in accordance with the requirements of ASTM D2855.
6. Appropriate restraint shall be provided for all fittings. Fittings shall be restrained with EBAA Iron Mega-Lugs, without exception. Pipe joints on either side of the fittings shall also be restrained to the distance required by the restrained joint calculations with the appropriate EBAA Iron Mega- Lug. The appropriate restraints are listed below:
 - Series 2000SV: MEGALUG Restraint for existing C900 PVC Pipe at DIP fitting
 - Series 2500: MEGALUG Restraint for C900 at PVC fitting
 - Series 2800: MEGALUG Restraint Harness for C900

- Series 2200: MEGALUG Restraint for C900 at DIP Mechanical Joint fitting

TABLE -1 Pipe Material Depth and Pressure Limitations

Pipe Material	Minimum Depth of Bury ^{1, 2}	Maximum Depth of Bury ^{1, 2}	Pressure Class / Rating	Maximum Surge Pressure Capacity
Pressure Class 350 – DIP	3 ft.	30 ft.	350 psi	450 psi
DR 25 – C900 PVC	3 ft.	10 ft.	165 psi. ³	264 psi ⁵
DR 18 – C900 PVC	3 ft.	20 ft.	235 psi. ³	376 psi ⁵
DR 14 – C900 PVC	3 ft.	30 ft.	305 psi. ³	488 psi ⁵

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.
2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA *Design of Ductile Iron Pipe* brochure, *Uni-Bell Handbook of PVC Pipe Design and Construction*, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.
3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
5. For C900 PVC pipe, maximum working pressure plus occasional or “emergency” surges shall not be greater than the Maximum Surge Pressure Capacity (1.6 times the Pressure Class of the pipe) as defined by AWWA C900(2007).
6. For C906 HDPE pipe, maximum working pressure plus occasional or “emergency” surges shall not be greater than the Maximum Surge Pressure Capacity (2.0 times the Pressure Class of the pipe) as defined by AWWA C906(2007).

2.5 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. Quality Assurance

1. Qualification of Manufacturers: Qualified manufacturers shall be firms regularly engaged in the manufacture of HDPE pipe and pipe fittings of the same size, type, and joint configuration specified, and whose products have been in satisfactory use for not less than five (5) years.
2. Heat Fusion Training/Certification: The CONTRACTOR shall ensure and certify that persons making heat fusion joints have received training in the

manufacturer's recommended procedure not more than 12 months prior to commencing construction.

- a. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience in making heat fusion joints and installing HDPE pipe.
 - b. All HDPE pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The fusion pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
 - c. Each joint shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the pipe is properly fused.
 - d. The pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling, fusion, and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
 - e. All costs for these services shall be included in the Contract Price.
3. Interchangeability of Pipe and Fittings: Within Contract limits, pipe and fittings from different approved manufacturers shall not be interchanged.
 4. HDPE shall be manufactured in accordance with ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, percent carbon, (from pipe) dimensions and ring tensile strength.
 5. Materials used for the manufacture of HDPE pipe and fittings shall be PE3408 HDPE, meeting cell classification 345434C or 345434E per ASTM D 3350 and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D 1248; and shall be listed in the name of the pipe and fitting manufacturer in Plastics Pipe Institute (PPI) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1,600 psi at 73° F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet those requirements.

6. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe. Directional fittings 16-inch IPS and larger such as elbows, tee, etc., shall have a plain end inlet for butt fusion and flanged directional outlets.
7. Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the test required under ASTM D 3261.
8. Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small V-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out.
9. Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.
10. Joints between HDPE pipes and between HDPE fittings and pipes shall be fusion bonded as described in Section 3.5.
11. The exterior of the HDPE pipe shall be color coded and striped in a way to identify the difference in pipe service, size and application.
12. HDPE pipe shall be black.
13. All piping used for horizontal directional drilling shall be permanently striped.
14. Internal 316 stainless steel stiffeners as manufactured by JCM Industries, Inc., or approved equal shall be used at all locations where external connectors or restraint clamps are installed. MJ adapters as manufactured by Central Plastics Company or equal, with creation of positive restraint to the pipe from heat fusion of the adapter to the pipe, and creation of positive restraint at the connection through bolting of the backup ring to the MJ valve or fitting, can be used in lieu of the JCM internal stainless steel stiffeners and external restraint clamps.
15. Except as noted in item 14 above, all mechanical connections shall be stiffened and restrained. Restraints shall be as manufactured by JCM Industries, Inc., or approved equal.
16. External restraint clamps utilized for transition from ductile iron pipe to polyethylene pipe shall be as manufactured by JCM Industries, Inc., or approved equal. Restraints must be compatible with stiffeners and pipe. JCM restraints shall not be used with HDPE pipe in locations where test pressures will exceed 150 psi. In locations where HDPE pipe will have test pressures exceeding 150 psi, provide an MJ adapter as described in item 14 above.
17. The Dimension Ratios (DR's) are shown on the table below:

Pipe Material Depth and Pressure Limitations

Pipe Material	Minimum Depth of Bury ^{1, 2}	Maximum Depth of Bury ^{1, 2}	Pressure Class / Rating	Maximum Surge Pressure Capacity
DR 17 - HDPE	3 ft.	10 ft.	100 psi ⁴	200 psi ⁶
DR 13.5 - HDPE	3 ft.	15 ft.	128 psi ⁴	256 psi ⁶
DR 11 - HDPE	3 ft.	20 ft.	160 psi ⁴	320 psi ⁶
DR 9 - HDPE	3 ft.	25 ft.	200 psi ⁴	400 psi ⁶
DR 7.3 - HDPE	3 ft.	25 ft.	254 psi ⁴	508 psi ⁶

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.
2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA *Design of Ductile Iron Pipe* brochure, *Uni-Bell Handbook of PVC Pipe Design and Construction*, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.
3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4°F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4°F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
5. For C900 PVC pipe, maximum working pressure plus occasional or "emergency" surges shall not be greater than the Maximum Surge Pressure Capacity (1.6 times the Pressure Class of the pipe) as defined by AWWA C900(2007).
6. For C906 HDPE pipe, maximum working pressure plus occasional or "emergency" surges shall not be greater than the Maximum Surge Pressure Capacity (2.0 times the Pressure Class of the pipe) as defined by AWWA C906(2007).

The DR's shall be verified by the Design ENGINEER and the manufacturer for the laying and pressure conditions shown on the drawings, including full consideration of vacuum, with calculations submitted to SD1 for review. NOTE: Manufacturers who do not comply with this requirement will not be considered an equal. The CONTRACTOR shall be liable if the pipe fails or pulls apart. The minimum DR shown above shall be used unless a thicker wall DR is recommended by the manufacturer during his verification. For horizontal directional drilling (HDD), pipe installed at depths from 0'-15' deep shall have a minimum DR 9 rating or

manufacturer's minimum recommended DR, whichever is more conservative. HDD pipe installed at depths greater than 15' shall also have a minimum DR 9 rating or manufacturer's minimum recommended DR, whichever is more conservative. **CONTRACTOR shall note that depending on the wall thickness of the pipe to be furnished, an increase in pipe size may be required to provide comparable internal diameter to ductile iron pipe.**

18. Mechanical joint ductile iron fittings for DIP sized HDPE pipe meeting all requirements of ANSI A211.11 (AWWA C111) may be used in lieu of HDPE pipe fittings. Restraints shall be Sur-Grip as manufactured by JCM Industries, Inc., or approved equal.
19. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in two layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.
20. HDPE pipe shall have OD of ductile iron pipe.
21. HDPE pipe shall be as manufactured by CP Performance Pipe, or equal.

2.6 FIBERGLASS REINFORCED POLYMER MORTAR (FIBERGLASS) PIPE AND FITTINGS (GRAVITY LINES)

- A. Fiberglass reinforced polymer mortar (fiberglass) pipe and fittings for gravity sewers shall conform to the requirements of ASTM D-3262, current approval, "Standard Specification for 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe."
- B. Materials
 1. Resin Systems: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
 2. Glass Reinforcements: Chopped glass reinforcement fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins. Continuous circumferential glass reinforcement fibers, where utilized, shall be of grade ECR-glass with binder and sizing compatible with impregnating resins.
 3. Silica Sand: Sand shall be a minimum of 98% silica with a maximum moisture content of 0.2%.
 4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally affect the performance of the product.
 5. Elastomeric Gaskets: Gaskets shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

C. Manufacture and Construction

1. Pipes: Manufacture pipe by a process that will result in a dense, non-porous, corrosion-resistant, consistent composite structure.
2. Joints: Unless otherwise specified, the pipe shall be field connected with fiberglass couplings that utilize elastomeric EPDM or REKA sealing gaskets as the sole means to maintain joint watertightness. The joints shall meet the performance requirements of ASTM D4161. Additionally, the joints shall be rated to a pressure of 80% of -14.7 psi as installed. Joints at tie-ins, when needed may utilize fiberglass, gasket-sealed closure couplings.
3. Fittings: Flanges, elbows, reducers, tees, wyes, laterals and other fittings shall be capable of withstanding all operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays. All fittings and couplings shall be pressure rated for a minimum of 50 psi.
4. End Coating: Protective spigot end resin coating shall be applied at the time of manufacture. CONTRACTOR shall similarly coat the ends of all field cut pipes if the wall of the pipe is completely de-aerated during the production process and glass and sand are not impregnated with 100% pure resin to form a wall that cannot be penetrated by water.
5. Fiberglass pipe shall be as manufactured by: Hobas Pipe USA, Inc., or approved equal.
6. For bury depths greater than 20 feet, CONTRACTOR shall comply with special trench construction requirements recommended by the manufacturer.

D. Dimensions

1. Diameters: The actual outside diameter of the pipe barrel shall be in accordance with ASTM D3262. The internal diameters of all pipes shall be as specified on the Contract Drawings for each pipe diameter.
2. Lengths: Pipe shall be supplied in nominal lengths of 20 feet. Actual laying length shall be nominal +1, -4 inches. At least 90% of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in nominal length sections.
3. Wall Thickness: The minimum wall thickness shall be the required design thickness for the laying conditions. Manufacturer shall provide information in writing to SD1 per the submittal requirements.
4. End Squareness: Pipe ends shall be square to the pipe axis with a maximum tolerance of 1/4".

E. Testing

1. Pipes: Pipes shall be manufactured and tested in accordance with ASTM D3262.
2. Joints: Joints shall meet the requirements of ASTM D4161.
3. Stiffness: As tested in accordance with ASTM D2412. Any fiberglass pipe run that exceeds 20 feet, but less than 30 feet, in depth to invert anywhere along the run length from one manhole or structure to a second manhole or structure shall be a minimum stiffness of 72 psi for the entire run.

- F. Customer Inspection
 - 1. SD1 or other designated representative shall be entitled to inspect pipes at the factory or witness the pipe manufacturing.
 - 2. Manufacturers Notification to Customer: Should SD1 request to see specific pipes during any phase of the manufacturing process, the manufacture must provide SD1 with adequate advance notice of when and where the production of those pipes will take place.
- G. Packaging, Handling, and Shipping shall be done in accordance with the manufacturer's instructions.

2.7 TRACER WIRE

- A. All pressure pipe shall have marking tape 6" wide. Marking tape for the force main shall be green with the words "Sanitary Sewer" installed approximately twelve (12) inches above the pipe and shall continue for the length of the pipe installation.
- B. All pipe for sanitary force mains shall be installed with a twelve (12) gauge solid copper (PVC coated) tracing wire taped to the top of the pipe every five (5) feet. No tracing wire length shall exceed fifteen hundred (1500) feet between air release valves and/or discharge manhole, where system becomes gravity, without terminating in a curb stop box marked with "Sewer". Tracing wire must run continuously through air release valves and made accessible from ground level. Sanitary force mains that end in a discharge manhole, at which point system becomes gravity, shall terminate tracing wire in a curb stop box next to the discharge manhole. Curb stop boxes shall not be located in pavement areas. Splices in the tracing wire shall be kept to a minimum and approved by SD1. If splices are required, they shall be made with copper split bolt (IlSCO #1K-8 or approved equal) and taped with electrical tape. Tracer wire shall be tested to confirm it is functioning properly after installation.

2.8 PIPE COUPLINGS

The pipe couplings shall be of a gasketed, sleeve-type with diameter to properly fit the pipe. Each coupling shall consist of one (1) stainless steel middle ring, of thickness and length specified, two (2) stainless steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets. The couplings shall be assembled on the job in a manner to insure permanently tight joints under all reasonable conditions of expansion, contraction, shifting and settlement, unavoidable variations in trench gradient, etc. The coupling shall be Dresser, Style 38, as manufactured by Dresser Manufacturing Division, Bradford, PA, or equal.

2.9 WYE BRANCH FITTINGS AND LATERALS FOR NEW CONSTRUCTION

- A. Tee or wye branch fittings shall be used for household or service connection lines to the sewer collector line. The fittings shall meet the requirements of the mainline pipe materials as specified herein. The wyes and tees shall be located as shown on the Contract Drawings or as directed by the ENGINEER. The wyes and tees shall be positioned as to require the least number of fittings per lateral connection. Regular wye connections shall be in accordance with Standard Drawing No. 120. Stack wye connections shall include vertical piping, elbows, wye, and concrete encasement in accordance with Standard Drawing No. 108. If a single sweep tee connection is used, the sweep must be in the direction of sanitary sewer main
- B. Inserta Tee pipe fittings are permitted as an alternate lateral tap connection in lieu of wye fittings on a case by case basis for new construction. Inserta Tee type shall be compatible for the pipe type be tapped. Contractor shall be responsible for supplying the proper Tee. Install Inserta Tees using procedures and equipment as referenced in the manufacturer's written installation instructions and in accordance with standard drawing 102.
- C. Tapping saddles shall only be used with the explicit approval of SD1 on a case by case basis.
- D. Lateral extensions shall be installed from the end of the regular or stack wye connection to the limit of easement or public right-of-way in accordance with Standard Drawing No. 120.

2.10 CONNECTIONS TO EXISTING SEWERS

- A. Connections to existing public sewers shall be made at the nearest wye or tee available on the public sewer. Connections to existing sewers where wyes or tees are not available shall be made by one of the following methods:
 - 1. Install a wye or tee branch fitting per the manufacturer's recommendations or an approved method by SD1.
 - 2. Inserta Tee Pipe Fittings: Install Inserta Tees using procedures and equipment as referenced in the manufacturer's written installation instructions and in accordance with standard drawings 102.
 - 3. Tapping Saddles: Tapping saddles shall only be used with the explicit approval of SD1 on a case by case basis.

2.11 JOINT RESTRAINERS AND APPURTENANCES

- A. General: Where new pipe is connected to the existing piping, consult SD1 for appropriate pipe connections.

PART 3 - EXECUTION

3.1 GENERAL

- A. After being delivered alongside the trench, the pipe, fittings, and specials shall be carefully examined for cracks, soundness, or damage, or other defects while suspended above the trench before installation. No piece of pipe or fitting which is known to be defective shall be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. Before each piece of pipe is lowered into the trench, it shall be thoroughly cleaned out. Each piece of pipe shall be lowered safely and separately in the trench. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe.
- B. The bell and spigot of the joint shall be thoroughly wire brushed and cleaned of dirt and foreign matter immediately prior to jointing. The contact surfaces shall be coated with the lubricant, primer or adhesive recommended by the manufacturer, and then the pipe shall be pushed together until the joint snaps distinctly in place. The pushing together of the pipe may be done by hand or by the use of a bar.
- C. Place pipe to the grades and alignment indicated, with a tolerance of one in 100 vertical and one in 500 horizontal, unless otherwise directed by the ENGINEER. Remove and relay pipes that are not laid correctly. Slope piping uniformly between elevations shown.
- D. Trenches shall be kept dry during pipe laying. Before pipe laying is started, all water that may have collected in the trench shall be removed. Ensure that ground water level in trench is at least 12 inches below bottom of pipe before laying piping. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete and protect and keep clean water pipe interiors, fittings and valves.
- E. All pipe shall be laid starting at the lowest point and proceed towards the higher elevations, unless otherwise approved by ENGINEER. Place bell and spigot pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.
- F. When laying of the pipe is stopped, the end of the pipe shall be securely plugged or capped. Plugging shall prevent the entry of animals, liquids, or persons into the pipe or the entrance or insertion of deleterious material.
 - 1. Install standard plugs into all bells at dead ends, tees or crosses. Cap all spigot ends.
 - 2. Fully secure and block all plugs and caps installed for pressure testing to withstand the specified test pressure.
 - 3. Where plugging is required for phasing of the Work or for subsequent connection of piping, install watertight, permanent type plugs.

- G. Pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures prior to the start of the Work.
- H. Install piping as shown, specified and as recommended by the manufacturer. If there is a conflict between manufacturer's recommendations and the Drawings or Specifications, request instructions from SD1 before proceeding.
- I. Deflections at joints shall not exceed 75 percent of the amount allowed by the pipe manufacturer.
- J. Field cut pipe, where required, with a machine specially designed for cutting piping. Make cuts carefully, without damage to pipe or lining, and with a smooth end at right angles to the axis of pipe. Cut ends on push-on joint shall be tapered and sharp edges filed off smooth. Flame cutting will not be allowed.
- K. Touch up protective coatings in a satisfactory manner prior to backfilling. See pipe material section for specific requirements.
- L. Place concrete pipe containing elliptical reinforcement with the minor axis of the reinforcement in a vertical position.
- M. Laying Pipe and Service Laterals
 - 1. Conform to manufacturer's instructions and requirements of the standards listed below, where applicable:
 - a. Ductile Iron Pipe: AWWA C600, AWWA C105.
 - b. Concrete Pipe: AWWA M9, Concrete Pipe Handbook.
 - c. Thermoplastic Pipe: ASTM D 2774.
 - d. ASCE Manual of Practice No. 37.

3.2 PIPING INSTALLATION- GENERAL

- A. Excavation for Pipeline Trenches: Refer to Section 02220. Trenches in which pipes are to be laid shall be excavated to the depths shown on the Drawings or as specified by the ENGINEER. Minimum cover for all pipelines shall be 36 inches under non-traffic areas and 60 inches under traffic areas unless otherwise shown on the Drawings or approved by the ENGINEER. All trench excavations shall be inspected by ENGINEER prior to laying pipe. Notify ENGINEER in advance of excavating, bedding and pipe laying operations.
- B. Jointing: The types of joints described herein shall be made in accordance with the manufacturer's recommendations.
- C. Separation of Sewers and Potable Water Pipe Lines:

1. Horizontal and Vertical Separation:
 - a. Wherever possible, existing and proposed potable water mains and service lines, and sanitary and storm sewers and service lines shall be separated horizontally by a clear distance of not less than 10 feet.
 - b. If local conditions preclude a clear horizontal separation of not less than 10 feet, the installation will be permitted provided the potable water main is in a separate trench or on an undistributed earth shelf located on one side of the sewer and at an elevation so the bottom of the potable water main is at least 18 inches above the top of the sewer.
 - c. Exception:
 - 1) Where it is not possible to provide the minimum horizontal and vertical separation described above, the potable water main must be constructed of cement lined ductile iron slip-on or mechanical joint pipe complying with the public water supply design standards of the governing agency. Sewer must be constructed of epoxy lined ductile iron slip-on or mechanical joint pipe complying with SD1's requirements. Both pipes shall be pressure tested in accordance with the requirements of the buried piping schedule, but in no case less than 150 psi, to assure watertightness before backfilling.
 2. Crossings:
 - a. Provide a minimum vertical distance of 18 inches between the outsides of pipes.
 - b. Center one full length section of potable water main over the sewer so that the sewer joints will be equidistant from the potable water main joints.
 - c. Provide adequate structural support where a potable water main crosses under a sewer to maintain line and grade.
 - d. Exceptions:
 - 1) See requirements in paragraph 3.2.C.1.c.(1) above.
 - 2) Encase either potable water main or sewer in a watertight carrier pipe that extends 10 feet on both sides of the crossing, measured perpendicular to the potable water main.
- D. Piping in close proximity to cathodic protection:
1. Where new metal piping is in close proximity to or crosses existing steel or Ductile Iron pipe confirmation if the existing piping has cathodic protection shall be performed. If existing piping is catholically protected, SD1 shall be consulted for direction.
- E. On steep slopes, take measures acceptable to ENGINEER to prevent movement of the pipe during installation. Permanent slope anchors shall be installed on all pipe with slopes over twenty (20) percent. See the SD1's standard detail for Concrete Anchor Block. Consult with SD1 on spacing of the anchors.

- F. Where force mains parallel gravity sewers, fittings shall be provided to maintain 12-inches of separation between all pipes and manholes.
- G. Reaction Anchorage (Pressure Pipe Only):
 - 1. All tees, Y-branches, bends deflecting 11-1/4 degrees or more, and plugs which are installed in buried piping shall be provided with proprietary restrained joint systems for preventing movement of the pipe and joints caused by the internal test pressure.
- H. Thrust Restraint
 - 1. Provide thrust restraint on pressure piping systems where shown and specified.
 - 2. Thrust restraint for DIP shall be accomplished by means of restrained pipe joints.
 - 3. Thrust restraints shall be designed for the axial thrust exerted by the system design pressures as specified by the Design ENGINEER.
- I Dewatering and Ground Water
 - 1. Discharging of sediment laden groundwater or rainwater from excavations directly to watercourses or storm sewers is prohibited. Failure of the CONTRACTOR to comply with the requirements of this specification may result in SD1 issuing a stop work order or non-approval of pay estimates until the CONTRACTOR puts measures in place to comply with this specification. All costs associated with the stop work or non-approval of pay estimates shall be at the CONTRACTOR's sole expense.
 - 2. Pipe trenches and excavations for appurtenances shall be kept free from water during trench bottom preparation, pipe laying and jointing, pipe embedment and building of appurtenances in an adequate and acceptable manner.
 - 3. Where the trench or excavation bottom is mucky or otherwise unstable because of ground water, or where the ground water elevation is above the bottom of the trench or excavation, the ground water shall be lowered by means acceptable to the ENGINEER to the extent necessary to keep the trench or excavation free from water while the trench or excavation is in progress. The discharge of ground water from the trench or excavation area shall be by the methods specified below to natural drainage channels, gutters, drains, or storm sewers which will conduct the water away from the trench or excavation area. Means of diverting any surface water away from the trench or excavation area shall be taken and surface water prevented from entering the trench or excavation area.
 - 4. Dewatering equipment shall be provided to remove and dispose of all surface water and groundwater entering excavations, trenches, or other

parts of the work. Each excavation shall be kept dry during sub grade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

5. All excavations for concrete structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations a minimum of 6 inches or more below the bottom of the excavation.
6. Surface water shall be diverted or otherwise prevented from entering excavations or trenches to the greatest extent possible without causing damage to adjacent property.
7. Groundwater and rainwater removed during dewatering shall be discharged onto undisturbed ground where vegetative cover exists or through sediment and erosion controls and allowed to flow overland to filter out any sediments before discharging to any drain, storm sewer, or watercourse specified above. No such flows are permitted onto exposed soils, stream banks, or other areas subject to erosion.
8. Where overland flow on existing undisturbed ground is not sufficient to adequately remove all sediment from dewatering operations prior to discharge to any drain, storm sewer, or watercourse, straw bale check dams, sediment capturing bags, or other means acceptable to SD1 or ENGINEER shall be used to remove the sediment from the water prior to discharge. The method of discharging ground water or rain water from the trench or excavation area shall be such as to not create any erosion of existing ground.
9. All discharge locations shall be approved prior to construction by the ENGINEER and OWNER.
10. CONTRACTOR shall take measures to prevent damage to properties, structures, sewers, and other utility installations and other work.
11. CONTRACTOR shall repair all damage, disruption, or interference resulting directly or indirectly from groundwater control system operations at no additional cost to SD1.
12. The CONTRACTOR shall maintain the components of the dewatering system and surface water erosion and sediment controls within the project site. Deficiencies identified during visual inspection by SD1, SD1 's representatives, or the governing regulatory authority shall be remedied by the CONTRACTOR at no additional cost to SD1.

13. Dewatering system components shall be located where they will not interfere with construction activities adjacent to the work area.
14. The CONTRACTOR shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

J GROUND WATER BARRIERS

Where specified, continuity of bedding material shall be interrupted by low permeability groundwater barriers to impede passage of water through the bedding. Groundwater barriers for all pipelines shall be soil plugs of 3 feet in thickness, extending the full depth and width of the pipe bedding material in the trench, and spaced not more than 400 feet apart. The soil plugs shall be constructed from soil meeting ASTM D2487 classification GC, SC, CL, or ML, and compacted to 95 percent of maximum density at or near the optimum moisture content (ASTM D698).

K PIPE ENCASEMENTS

1. Concrete Encasement
 - a. Wherever pipe encasement is called for on the plans or ordered in by SD1, the CONTRACTOR shall construct the encasement as shown on the drawings or in accordance with SD1's standard drawings.
 - b. Support the pipe sections on oak blocks or other compressible blocks, being sure to keep the pipe sections on line and grade and then pour concrete, completely under each section, along each side and up to a point at least twelve (12) inches above the top of each section, making sure that all voids are filled. In lieu of blocks, the CONTRACTOR may use a bed of concrete, to initially support the pipe sections.
 - c. The minimum dimension of concrete under the pipe sections shall be six (6) inches and on each side of the sections shall be twelve (12) inches. This encasement shall be reinforced around the top and sides of the pipe as shown on the Contract Drawings for creek crossings and other locations. If the trench walls are nearly vertical from the bottom of the trench up to a point to which the encasement is to be poured, forms for forming the encasement may be omitted and the concrete poured to and against the trench walls. Where trench walls are not nearly vertical, proper forms shall be set for forming the encasement, unless otherwise called for by SD1. The space between the trench walls and any formed encasement shall be filled and compacted with approved pipe bedding or backfilling material.
 - d. Care shall be taken to assure that the pipe sections remain on line and grade during the placing of concrete and that the joints are not disturbed. Backfill shall not be placed for a minimum of six (6) hours after encasement is completed, unless otherwise approved by SD1.

- e. Exercise care to avoid flotation when installing pipe in cast-in-place concrete.
- 2. Casing Pipe
 - a. Whenever casing pipe is called for on the plans, the CONTRACTOR shall install a casing pipe of the size and of the material called for on the plans by means of jacking, boring, or trenching.
 - b. When the casing pipe is to be installed under a highway or railroad, and at other locations specifically designated on the Drawings, the method of installation shall be jacking or boring as specified in Section 02400, unless trenching is specifically allowed.
 - 1. For force mains inside casing pipe all pipe joints shall be restrained joint connections. Casing spacers or wood blocking shall be used to center the pipe in the casing. The annular space between the force main and casing pipe shall be completely filled with 500 psi or higher compressive strength grout.
 - 2. For gravity pipe inside casing pipe, casing spacers shall be used to center the pipe within the casing. The annular space does not have to be filled.
 - c. Casing Spacers- Include in casing pipe. Centered/Restrained Casing spacers shall be installed to position the carrier pipe within the center of the casing pipe. The required spacing and installation shall be per the manufacturer's recommendation, except that for PVC carrier pipe, a minimum of 3 spacers shall be installed on each length of pipe with a maximum 6 feet spacing between spacers. All spacers shall be 316 stainless steel as manufactured by Cascade Waterworks MFG Co., Advance Products and Systems (APS) or other approved equal. Casing spacers shall also be provided with height field-adjustment capability for installation of gravity sewer on a constant slope.
 - d. Casing pipe end seals shall be installed at each end of the casing pipe and shall consist of a proper sized rubber seal and attached to the carrier and casing pipe with stainless steel bands per the manufacturers recommendation. Casing pipe end seals shall be manufactured by Cascade Waterworks MFG Co., Advanced Products and Systems (APS) or other approved equal.

L Work Affecting Existing Piping

- 1. Location of Existing Piping:
 - a. Locations of existing piping shown should be considered approximate.
 - b. CONTRACTOR shall determine the true location of existing piping to which connections are to be made, and location of other facilities

- which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work in any way.
- c. Conform to applicable requirements of Division 1 pertaining to cutting and patching, and connections to existing facilities.
- 2. Taking Existing Pipelines Out of Service:
 - a. Do not take pipelines out of service unless specifically noted on the Drawings, or approved by SD1.
 - 3. Work on Existing Pipelines:
 - a. Cut or tap pipes as shown or required with machines specifically designed for this work.
 - b. Install temporary plugs to prevent entry of mud, dirt, water and debris.
 - c. Provide all necessary adapters, fittings, pipe and appurtenances required to complete the Work.
- M. Install service laterals per SD1's standard details and per the requirements specified in this specification,.
- N. Bedding and backfilling of pipeline trenches shall be in accordance with the requirements set forth in Section 02220 and as shown on SD1's trench compaction detail.
- O. Before final acceptance, the CONTRACTOR will be required to level all trenches or to bring the trench up to grade. The CONTRACTOR shall also remove from roadways, rights-of-way and/or private property all excess earth or other materials resulting from construction.

3.3 DUCTILE IRON PIPE INSTALLATION REQUIREMENTS

- A. Jointing Pipe:
 - 1. Ductile Iron Mechanical Joint Pipe:
 - a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.
 - b. Lubricate the plain ends and gasket with soapy water or an approved pipe lubricant, in accordance with AWWA C111, just prior to slipping the gasket onto the plain end of the joint assembly.
 - c. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
 - d. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
 - e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
 - f. Insert bolts and hand tighten nuts.

- g. Make deflection after joint assembly, if required, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. The bolt torque shall be as follows:

Pipe Size (inches)	Bolt Size (inches)	Range of Torque (ft-lbs)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1-1/4	120-150

2. Ductile Iron Push-On Joint Pipe:

- a. Prior to assembling the joints, the last 8 inches of the exterior surface of the spigot and the interior surface of the bell shall be thoroughly cleaned and all mud, debris, etc. removed and joint recesses wiped clean.
- b. Rubber gaskets shall be wiped clean and flexed until resilient. Refer to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
- c. Insert gasket into joint recess and smooth out the entire circumference of the gasket to remove bulges and to prevent interference with the proper entry of the spigot of the entering pipe.
- d. Immediately prior to joint assembly, apply a thin film of approved lubricant to the surface of the gasket which will come in contact with the entering spigot end of pipe. CONTRACTOR may, at his option, apply a thin film of lubricant to the outside of the spigot of the entering pipe.
- e. For assembly, center spigot in the pipe bell and push pipe forward until it just makes contact with the rubber gasket. After gasket is compressed and before pipe is pushed or pulled all the way home, carefully check the gasket for proper position around the full circumference of the joint. Final assembly shall be made by forcing the spigot end of the entering pipe past the rubber gasket until it makes contact with the base of the bell. When more than a reasonable amount of force is required to assemble the joint, the spigot end of the pipe shall be removed to verify the proper positioning of the rubber gasket. Gaskets which have been scoured or otherwise damaged shall not be used.
- f. Maintain an adequate supply of gaskets and joint lubricant at the site at all times when pipe jointing operations are in progress.

3. Proprietary Joints:

- a. Pipe which utilizes proprietary joints such as Fastite, by American Cast Iron Pipe Company, Tyton by U.S. Pipe Incorporated, restrained joints, or other such joints shall be installed in strict accordance with the manufacturer's instructions.

B. Polyethylene Tube Wrap Installation

The polyethylene tube wrap shall be installed on ductile iron pipe in accordance with AWWA C105 and the following:

1. Pick up the pipe by a crane at the side of the trench using either a sling or pipe tongs, and raise the pipe about three feet off the ground. Slip a section of the polyethylene tubing over the spigot end of the pipe and bunch up, accordion fashion, between the end of the pipe and the sling. The tubing should be cut to a length approximately 4 feet longer than the length of the pipe.
2. Lower the pipe into the trench, seat the spigot end in the bell of the adjacent installed pipe and then lower the pipe to the trench bottom. A shallow bell hole shall be provided in the trench bottom to facilitate the wrapping of the joint.
3. Make up the pipe joint in the normal fashion.
4. Remove the sling from the center of the pipe and hook into the bell cavity and raise the bell end 3 or 4 inches to permit the polyethylene tubing to be slipped along the full length of the barrel. Enough of the tubing should be left bunched up, accordion fashion, at each end of the pipe to overlap the adjoining pipe approximately 2 feet.
5. To make the overlap joint, pull the tubing over the bell of the pipe, fold around the adjacent spigot and wrap with approximately three (3) circumferential turns of the 2-inch wide plastic adhesive tape to seal the tubing to the pipe.
6. The tubing on the adjacent pipe shall then be pulled over the first wrap on the pipe bell and sealed in place behind the bell using approximately three circumferential turns of the 2-inch plastic adhesive tape.
7. The resulting wrap on the barrel of the pipe will be loose, and it should be pulled snugly around the barrel of the pipe and the excess material folded over at the top, and held in place by means of 6-inch strips of the 2-inch wide plastic adhesive tape at intervals of approximately 3 feet along the pipe barrel.
8. Fittings, valves, hydrants, etc., shall be hand wrapped, using polyethylene film that is held in place with the plastic adhesive tape.
 - a. Bends, reducers, and offsets can be wrapped with the polyethylene tubing in the same manner as pipe.
 - b. Valves can be wrapped by bringing the tube wrap on the adjacent pipe over the bells or flanges of the valve and sealing with a flat sheet of the polyethylene passed under the valve bottom and brought up around the body to the stem and fastened in place with the adhesive tape.
 - c. Hydrants can be wrapped with polyethylene tubing slipped over the hydrant to encase the hydrant from the lead-in valve to the ground level of the hydrant. To provide drainage of the hydrant, it is necessary to cut a small hole in the film and insert a short pipe nipple to drain the water to the soil outside the film wrap.
 - d. All fittings that require concrete backing should be completely wrapped prior to pouring the concrete backing block.

3.4 HDPE INSTALLATION REQUIREMENTS

A. Pipe Joining

1. Joints between plain end pipes and fittings shall be made by butt fusion, and joints between the main and saddle branch fittings shall be made using saddle fusion using only procedures that are recommended by the pipe and fittings manufacturer.
2. Butt fusion shall be performed between pipe ends, or pipe ends and fitting outlets, of like outside diameter and wall thickness (SDR or DR). Butt fusion jointing between like diameters, but unlike wall thickness, shall not be permitted. Transitions between unlike wall thicknesses shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means.
3. Heat-joining of HDPE pipe shall conform to applicable portions of AWWA C-906.
4. HDPE pipe and fittings shall be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or mechanical couplings designed for joining HDPE pipe or for joining HDPE pipe to another material. Mechanical couplings shall be fully pressure-rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall be used in lieu of fully restrained mechanical couplings.

B. Installation

1. On every day that butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion straps shall be cut out. The test strap shall be 12-inch (minimum) or 30 times the wall thickness in length with the fusion in the center, and 1-inch (minimum) or 1.5 times the wall thickness in width. Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
2. Installation shall be in accordance with ASTM D 2321, manufacturer's recommendations, and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with all applicable safety codes and standards.
3. Mechanical joints and flange connections shall be installed in accordance with the manufacturer's recommended procedure. Flange faces shall be centered and aligned to each other before assembling and tightening bolts. In no case shall the flanged bolts be used to draw the flanges into alignment. Bolt threads shall be lubricated and flat washers shall be fitted under the

flange nuts. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the manufacturer. At least one (1) hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the manufacturer. The final tightening torque shall be 100 ft.-lbs. or as recommended by the manufacturer.

4. Pipe shall be laid on grade and on a stable foundation in accordance with Section 02220.
5. When lifting with slings, only wide fabric choker slings shall be used to lift, move, or lower pipe and fittings. Wire rope or chain shall not be used.
6. CONTRACTOR shall be liable to correct any pipe installed off line or grade (whether by horizontal directional drilling or other means).

3.5 POLYVINYL CHLORIDE (PVC) GRAVITY PIPE INSTALLATION REQUIREMENTS

A. Push-on Joints

1. Bevel all field-cut pipe, remove all burrs and provide a reference mark the correct distance from the pipe end.
2. Clean the pipe end and the bell thoroughly before making the joint. Insert the O-ring gasket, making certain it is properly oriented. Lubricate the spigot well with an approved lubricant; do not lubricate the bell or O-ring. Insert the spigot end of the pipe carefully into the bell until the reference mark on the spigot is flush with the bell.

3.6 FIBERGLASS PIPE INSTALLATION REQUIREMENTS

- A. Pipe Handling: Use textile slings, other suitable materials or a forklift. Use of chains or cables is not permitted.

B. Jointing:

1. Clean ends of pipe and coupling components.
2. Apply joint lubricant to pipe ends and elastomeric seals of coupling. Use only lubricants approved by the pipe manufacturer.
3. Use suitable equipment and end protection to push or pull the pipes together.
4. Do not exceed forces recommended by the manufacturer for coupling pipe.
5. Join pipes in straight alignment then deflect to required angle. Do not allow the deflection angle to exceed the deflection permitted by the manufacturer.

3.7 GENERAL TESTING REQUIREMENTS

A. General:

1. Test all piping.
2. All piping shall be tested prior to post-construction CCTV operations.
3. Notify SD1 at least 48 hours in advance of testing.
4. Conduct all tests in the presence of SD1.
5. Remove or protect any pipeline-mounted devices which may be damaged by the test pressure.

6. Provide all apparatus and services required for testing, including but not limited to, the following:
 - a. Test pumps, bypass pumps, hoses, calibrated gauges, meters, test containers, valves and fittings.
 - b. Temporary bulkheads, bracing, blocking and thrust restraints.
 7. Provide air if an air test is required and power if pumping is required.
 8. CONTRACTOR shall provide fluid required for testing.
- B. Force Mains Test Schedule:
1. The required hydrostatic test pressures shall be as specified by the Design ENGINEER and approved by SD1.
 2. Unless otherwise specified, the required hydrostatic test pressures are at the lowest elevation of the pipeline.
- C. Pressure Test Procedure for Force Mains:
1. Complete backfill and compaction of entire pipe before testing, unless otherwise required or approved by ENGINEER
 2. Fill section to be tested slowly with water and expel all air. Install corporation cocks, if necessary, to remove all air.
 3. Apply specified test pressure for two hours and observe pressure gage. Check carefully for leaks while test pressure is being maintained.
 4. A successful test shall be defined as zero drop in the specified test pressure during the two hour testing period.
- D. Displacement of Pipe
1. The sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade have occurred as each portion of the sewer is completed between manhole locations. When the test is required by SD1, it shall be as follows:
 - a. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between manhole locations or by utilizing a laser beam.
 - b. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.
 - c. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect to the satisfaction of SD1.
 - d. This test may be done after the pipe sections have been laid, the joints completed and the bedding completed to twelve (12) inches above the pipe sections, or after completion of the sewer and all backfilling has been undertaken or both.

E. Deflection of Pipe

1. A deflection test shall be performed on all gravity sanitary sewers using flexible pipe. The test shall be conducted after the final backfill has been in place at least thirty (30) days. No pipe shall exceed a deflection of five percent (5%). The deflection test is to be run by using a rigid mandrel, or equal means approved by SD1, and shall have a diameter equal to ninety-five percent (95%) of the inside diameter of the pipe, including the pipe manufacturer's tolerances. The test shall be performed without mechanical pulling devices. All tests must be witnessed and approved by a representative of SD1.
2. A deflection test shall be performed on all ductile iron gravity sanitary sewers exceeding twelve (12) feet in depth. The test shall be conducted after the final backfill has been in place at least thirty (30) days. No pipe shall exceed a deflection of five percent (5%). The deflection test is to be run by using a rigid fin style mandrel fitted with rubber inline skate wheels, rubber padding on the fins, or equal means to prevent damage to the internal lining of the pipe. If a wheeled mandrel is used each fin shall have 2 wheels made of polyurethane with a Shore Scale durometer value of between 78A and 82A. Any damages to the lining from the mandrel testing shall be repaired to the satisfaction of SD1 at the sole expense of the CONTRACTOR. Final diameter of the protected mandrel shall be equal to ninety-five percent (95%) of the inside diameter of the pipe, including the pipe manufacturers' tolerances. The test shall be performed without mechanical pulling devices. All tests must be witnessed and approved by a representative of SD1.

F. Air Test for Gravity Sewers 42" and Smaller

1. The CONTRACTOR shall test the tightness of the pipe sections, joints and appurtenances of all gravity sewers by means of the low pressure air test.
2. No tests shall be made until the backfill is consolidated over the pipe and all service lines in the section to be tested have been connected and plugged.
3. The low pressure air test shall be conducted in accordance with procedures outlined in UNIBELL Specification UNI B-6. If the section of sewer being tested is below the elevation of ground water in the trench, the test pressure shall be 0.433 psi for each foot of ground water above the invert of the pipe.
4. All tests must be witnessed and approved by a representative of SD1.
5. Any leaks determined from the air test shall be replaced by the CONTRACTOR to the satisfaction of SD1.
6. The minimum air test pressure for all gravity sewers shall be 7 psi.

G. Individual Pipe Joint Testing for Gravity Sewers 48" and Greater.

1. The CONTRACTOR shall test each individual joint of the gravity sewers using the following procedure:
 - a. The test pressure shall be 22 psig for 10 minutes using the

- individual joint apparatus, based in the ASTM 4161 joint test standards. The pressure gage used shall read in one (1) psi increments.
- b. Center the joint tester over the joint. Inflate the outer element to the manufacturer's specified pressure over the desired test pressure.
 - c. Fill the center of the joint tester cavity with water or air, dependent upon test used, until it flows evenly from the bleed off valve, which removes air from the outer cavity. The bleed off valve shall be located at the top of the joint tester assembly. Close the bleed -off valve and pressurize the cavity to the test pressure. Allow pressure to stabilize (10 to 15 seconds).
 - d. The test time period is 10 minutes. If the pressure in the cavity drops below 22 psig, the joint is defective and fails the test.
 - e. When the joint test is completed, all pressure must be exhausted from the center cavity and from the end element to 0 psig. The joint tester can then be transported and positioned on the next joint to be tested.

H. Repair of Failed Pipe Sections:

1. Contact SD1 24 hours prior to making any repairs to failed pipe sections. SD1 shall be present during the entire duration of time repairs are being made to failed sections of pipe.
2. The CONTRACTOR shall remove and replace, at no extra cost to SD1 all sections of pipe which fail any of the tests specified in this section in accordance with the following procedures:
 - a. Excavate failed sections of pipe in accordance with Section 02220.
 - b. Cut out and/or remove failed sections and relay new pipe beginning at nearest joint.
 - c. Close pipe with pipe coupling per manufacturer's recommendation and approval of SD1.
3. The CONTRACTOR shall provide all material, labor, and equipment necessary to remove and replace the failed pipe section.
4. Retest the replaced sewer sections to meet the requirements listed in this section.

3.8 CLEANING AND DISINFECTION

A. Cleaning:

1. Thoroughly clean all piping and flush in a manner approved by ENGINEER, prior to placing in service.

2. Piping 24 inches in diameter and larger shall be inspected from inside and all debris, dirt and foreign matter removed.
3. If piping which requires disinfection has not been kept clean during storage or installation, CONTRACTOR shall swab each section individually before installation with a five percent hypochlorite solution, to ensure clean piping.

B. Disinfection:

1. Disinfect all potable and finished water piping.
2. A suggested procedure for accomplishing complete and satisfactory disinfection is specified below. Other procedures will be considered for approval by the ENGINEER.
 - a. Thoroughly flush piping prior to disinfection with water. For pipelines 24 inches in diameter and larger, pipelines shall be manually cleaned, carefully removing all sweepings, dirt and debris prior to disinfection.
 - b. Conform to procedures described in AWWA C651. Continuous feed method of disinfecting shall be used unless alternative method is acceptable to ENGINEER.
3. CONTRACTOR shall supply water for initial flushing, testing and chlorination. CONTRACTOR shall provide all temporary piping, hose, valves, appurtenances and services required. Cost of water required for re-disinfection will be paid by CONTRACTOR.
4. Chlorine will be supplied by CONTRACTOR.
5. Bacteriologic tests will be performed by SD1. A certified test laboratory report will be made available to CONTRACTOR, if requested.
6. After the required retention period, the heavily chlorinated water shall be flushed to wet well at a rate acceptable to SD1.

3.9 CLEAN-UP

Upon completion of the installation of the piping and appurtenances, the CONTRACTOR shall remove all debris and surplus construction materials resulting from the work. The CONTRACTOR shall grade the ground along each side of pipe trenches in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line. Refer to Section 02900, Landscaping, for restoration.

- END OF SECTION -

SECTION 02651

TELEVISION INSPECTION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. CONTRACTOR shall provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to perform Post- Installation television (TV) inspection of all sanitary and storm sewers, as specified herein.

1.2 DEFINITIONS

- A. Post-Installation TV Inspection: Video inspection to determine that rehabilitation of an existing sewer or construction of new sanitary and/or storm sewers have been completed according to Specifications.

1.3 PERFORMANCE REQUIREMENTS

- A. Inspection shall be done one sewer line section (i.e. manhole to manhole) at a time.
- B. Quality of inspection recording shall be acceptable to SD1 when viewed on a 19" monitor.
- C. Inspection shall be performed by a SCREAM™ or NASSCO *Pipeline Assessment Certification Program* (PACP) certified operator and shall meet the coding and reporting standards and guidelines as set by SCREAM™ or PACP. All report annotations, pipe conditions and pipe defects shall be identified properly using SCREAM™ or PACP codes as defined by SCREAM™ or NASSCO.

1.4 SUBMITTALS

- A. Submit one copy of Electronic Inspection Reports and TV videos on portable hard drive, CD, DVD, or other digital media.

1.5 REFERENCE STANDARDS

- A. NASSCO prepared *Pipeline Assessment and Certification Program* (PACP), Current Edition Reference Manual. This manual includes a standard TV inspection form and sewer condition codes.

PART 2 – PRODUCTS

2.1 TELEVISION EQUIPMENT

- A. Closed Circuit TV Equipment: Select and use closed-circuit television equipment that will produce a color digital recording.
- B. Pipe Inspection Camera: Produce a video using a pan-and-tilt, radial viewing, pipe inspection camera or a hand-held video camera that pans \pm 275 degrees and rotates 360 degrees. Use an accurate footage counter to measure the exact distance of the camera from the centerline of the starting point. Use a camera with camera height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised. Provide a lighting system that allows the features and condition of the pipe to be clearly seen. A reflector in front of the camera may be required to enhance lighting in humidity conditions. The camera shall be operative in 100 percent humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing a minimum 500-line resolution colored video picture. Picture quality and definition shall be to the satisfaction of the ENGINEER. If unsatisfactory, equipment shall be removed and no payment made for an unsatisfactory inspection.
- C. Television Inspection Logs: Prepare printed location records to clearly identify the location of each source of infiltration or defect discovered using a standard stationing system. Other data of significance includes:
 - 1. Estimation of extraneous flows observed from holes, joints, cracks, and from the annular space between rehabilitated sliplined pipe.
 - 2. Unusual conditions.
 - 3. Roots.
 - 4. Cracked or collapsed sections.
 - 5. Sags or low spots in the pipe.
 - 6. Presence of scale and corrosion.
 - 7. Structural deficiencies.
 - 8. Signs of previous leakage.
 - 9. Sewer line sections that the camera failed to pass through and reasons for the failure.
 - 10. Other discernible features.
- D. For off-road work, CONTRACTOR shall provide the appropriate vehicle(s) for the terrain in order to access the sewers and allow for proper inspection of the sewers and manholes.
- E. Data shall be recorded digitally and a copy of the television inspection logs shall be supplied to the OWNER or ENGINEER in the form of a bound report. A table listing acronyms and their meaning shall be

included in the report. CONTRACTOR shall also supply the OWNER a copy of the television inspection logs on an electronic file that is Microsoft Excel compatible.

- F. Video Capture - Full time live color video files shall be captured for each pipe segment inspected. The files shall be stored in industry standard MPEG format viewable from an external hard drive on an external personal computer that utilizes a standard digital media player to view the recording. The MPEG video shall be ISO-MPEG Level 1 (MPEG-1) coding with a resolution of at least 352 pixels (x) by 240 pixels (y) and an encoded frame rate of 29.97 frames per second. System shall perform an automatic disk image/file naming structure to allow saved video/data sections to be saved to a portable hard drive. The video recording shall be free of electrical interference and shall produce a clear and stable image. The digital recordings and inspection data shall be cross-referenced to allow instant access to any point of interest within the digital recording.

PART 3 – EXECUTION

3.1 POST INSTALLATION TELEVISION INSPECTION

ALL NEWLY CONSTRUCTED SEWERS SHALL BE CLEANED AND FREE FROM DEBRIS PRIOR TO PERFORMING THE POST INSTALLATION TELEVISION INSPECTION. THIS COST SHALL BE CONSIDERED INCIDENTAL TO THE POST INSTALLATION TELEVISION INSPECTION.

- A. Televiser each sewer line to document the structural and maintenance conditions of the line. The sewer inspections shall be compatible with the SCREAM™ defect coding system for sewers and manholes, which is SD1's standard defect coding system. The CONTRACTOR shall either use the SCREAM™ sewer defect coding system or SD1 will allow the CONTRACTOR to use an industry standard defect coding system, such as NASSCO PACP in lieu of using the SCREAM™ sewer defect codes, to conduct the sewer inspections.

The following data for the defect observations shall be recorded:

- Observation Data
 - Observation#, unique per defect
 - Footage
 - Clock position (1 – 12)
 - Defect/Description (use code)
 - Comments
- B. In addition to recording the defects for the sewers and manholes, CONTRACTOR shall also record the following attribute data as "fields" in their inspections:
- Upstream MH#

- Downstream MH#
 - Date of inspection
 - Direction of inspection
 - 1 = upstream to downstream
 - 2 = downstream to upstream
 - Length of pipe (as noted by last observation footage)
 - Diameter/height (inches)
 - Shape (use shape code or text)
 - Material (use pipe material code or text)
 - Pipe width, non-circular (inches)
 - Crew
 - Video (name as USMH_DSMH_Direction_date.mpg)
 - Comments
- A. Immediately after cleaning, televise the sewer line to document its condition and to locate existing points of infiltration or other defects. Notify the OWNER and ENGINEER 24 hours in advance of any TV inspection so that the OWNER and ENGINEER may observe inspection operations.
- B. Perform TV inspection of the sewer as follows:
1. A NEW inspection shall be started where a manhole, junction, or diversion chamber is located. This includes new manholes, junctions, or diversion chambers identified in the field, but not previously identified in SD1 mapping. Therefore, no manholes, junctions, or diversion chambers shall be at a midpoint of an inspection log, only at the beginning and the end of each inspection. Inspection runs shall begin and end at manholes or junctions unless an obstruction is encountered. Lateral connections from inlets/catch basins, material changes or breaks in grade are not approved locations to begin/end an inspection. Said features shall be logged on the recording. If CONTRACTOR uses a lateral connection from inlets/catch basins, material changes or breaks in grade as a begin/end point for televising, SD1 will reject said segment and the sewer data shall be reorganized to match the data requirements at no additional cost to SD1.
 2. Perform Survey TV Inspection immediately after cleaning.
 - a. Move the camera through the line in either direction at a uniform rate not exceeding 30 feet per minute, stopping when necessary to ensure proper documentation of the sewer's condition. The intent is to perform the inspection per the NASSCO and SCREAMTM standards. It may be

- necessary for a lower rate of speed depending on the defects encountered.
- b. Use manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions to move the camera through the sewer line.
 - c. Quantify visible leakage of extraneous flow into the sewer or other sags or defects in the sewer and record on electronic log and audio videotape. The video recording may be paused during observation. Record results of the flow observed on videotape and inspection logs.
3. Perform Post-Installation TV Inspection to confirm completion of rehabilitation work or proper installation of new sewers. Verify that the rehabilitation work or new sewer construction conforms to the requirements of the Specifications. Provide a color, digital recording videotape showing the completed Work. Prepare and submit a log providing location of any discrepancies.
 4. Camera shall pan beginning and ending manholes to demonstrate that all debris has been removed. Camera operator shall slowly pan clamped joints, and when pipe material transitions from one material to another. A log shall be completed for every segment that is submitted to the OWNER.
 5. Inspections shall be from center of the starting manhole to the center of the ending manhole. Distances along the pipe should be measured from the center of the upstream manhole. Measurement meters shall be accurate to the nearest foot per 100 feet of sewer being televised within the particular section of pipe (section of pipe being defined as the length of pipe between the upstream and downstream MHs). Prior to recording the location of defects and service connections, slack in the cable of the television inspection camera shall be taken up to assure metering device is designating proper footage. Accuracy of the measurement meters shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device.
 6. Center the camera in the middle of the pipe.
 7. Stop at every defective joint for a time long enough to properly assess and code the defective joint. Pan and tilt to observe and document areas of apparent deteriorated pipe surface.
 8. Stop at every lateral connection. Center the camera so that the lighting and the pan and tilt view can be used to inspect as far into the lateral connection as possible. Record all defects found in the service connection. Observe top, bottom and sides of lateral

connections. Where lateral flow is observed, observe flows from service connections for a length of time long enough to ascertain if the flow is sanitary or extraneous flow. The video recording may be paused during observation. Record results of the flow observed on the inspection. The inspection of the service lateral itself is not to be performed as part of the sewer mainline inspection.

9. TV inspection recordings shall be continuous for each pipe segment.
10. CONTRACTOR is responsible for adjusting light levels, cleaning fouled or fogged lenses, and allowing vapor to dissipate from camera lights in order to produce acceptable recordings.
11. Sewer inspections not meeting the requirements set forth in this specification as determined by SD1 shall be re-performed at no additional cost to SD1 until the inspection meets to SD1's satisfaction.
12. CONTRACTOR shall complete the post-installation CCTV within 30 days after the acceptance of the Mandrel test.

3.2 FLOW CONTROL

- A. No flow will be allowed in the line while performing Post-Installation TV Inspection.

3.3 ACCEPTANCE OF WORK

- A. Rehabilitation or completion of new sewer installation work shall only be accepted if no defects are found in the line upon TV inspection as determined by the OWNER.
- B. Contractor shall repair all defects to the piping in a manner acceptable to the OWNER at no additional cost to the OWNER.

3.4 INSPECTION DELIVERABLES

Pipe inspection logs shall be submitted as specified in section 2.1

- A. The CCTV videos shall be provided as specified in Section 2.1.
- B. All videos shall be divided into separate files for each manhole to manhole segment.
- C. Digital Inspection Recordings
 - 1. Provide digital inspection recordings. Inspection recordings must be viewable on a standard 19" computer monitor.
 - 2. Recording shall be of a quality sufficient for the ENGINEER to evaluate the condition of the sewer and manholes, locate the sewer service connections, and verify cleaning. If SD1 determines that the quality is not sufficient, CONTRACTOR shall re-televisize the sewer segment and/or re-inspect the manhole and provide a new recording and report at no additional compensation. Camera distortions, inadequate lighting, dirty lens, or blurred/hazy picture will be cause for rejection.
 - 3. Multiple project areas may be included on a given submittal, but the files must be organized in individual project folders. Each pipe segment must be its own electronic file. Electronic recording file must allow snap scrolling to allow easy and quick access of the entire recording.
 - 4. Each submittal must have a file index whose name contains the pipe segment reference number.
 - 5. Label each submittal with the following information:
 - a. Pipe Segments
 - b. CONTRACTOR's Name
 - c. Project Name
 - d. Contract Number
 - e. Inspection Type:
 - f. Date Televised

++ END OF SECTION ++

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install cast-in-place concrete, reinforcement and related materials.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the installation of items that must be installed in the concrete.

1.2 QUALITY ASSURANCE

A. Source Quality Control:

1. Concrete Testing Service:

- a. OWNER shall employ acceptable testing laboratory to perform materials evaluation, testing and design of concrete mixes.

B. Reference Standards: Comply with the applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ACI 301, Specifications for Structural Concrete for Buildings (includes ASTM Standards referred to herein except ASTM A 36).
2. ACI 304, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
3. ACI 305, Hot Weather Concreting.
4. ACI 306, Cold Weather Concreting.
5. ACI 315, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
6. ACI 318, Building Code Requirements for Reinforced Concrete.
7. ACI 347, Guide to Formwork for Concrete.
8. ACI 350, Environmental Engineering Concrete Structures.
9. ASTM A 36, Specification for Structural Steel.
10. Concrete Reinforcing Steel Institute, Manual of Standard Practice, includes ASTM Standards referred to herein.

1.3 SUBMITTALS

- ###### A. Samples: Submit samples of materials as specified and may be requested by ENGINEER, including names, sources and descriptions.

- B. Shop Drawings: Submit for approval the following:
1. Copies of manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures, bonding agents, and concrete related materials.
 2. Drawings for fabrication, bending, and placement of concrete reinforcement, and reinforcement accessories. Comply with ACI 315, Chapters 1 through 7.
 3. Concrete Mix Design Report:
 - a. All concrete mix design report shall be submitted to ENGINEER at least 15 days prior to start of Work. Do not begin concrete production until mixes have been reviewed and are acceptable to ENGINEER. Mix designs may be adjusted when material characteristics, job conditions, weather, test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and accepted by ENGINEER.
 - b. Concrete mix design proportions.
 - c. Mill test reports covering chemical and physical properties of cement included in concrete design mix.
 - d. Sieve analysis report of fine and coarse aggregates to show compliance with specified requirements.
 - e. Manufacturer's literature on all admixtures used in the mix design.
 - 1) All admixtures must be included and tested in the concrete design mix to predetermine satisfactory results.
- C. Laboratory Batch Trial Test Reports: ENGINEER'S review will be for general information only. Production of concrete to comply with specified requirements is the responsibility of CONTRACTOR.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver concrete reinforcement materials to the site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.
- B. All materials used for concrete must be kept clean and free from all foreign matter during transportation and handling and kept separate until measured and placed in the mixer. Bins or platforms having hard clean surfaces shall be provided for storage. Suitable means shall be taken during hauling, piling and handling to insure that segregation of the coarse and fine aggregate particles does not occur and the grading is not affected.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type II.
- B. Aggregates: ASTM C 33.
 - 1. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances. Dune sand, bank run sand and manufactured sand are not acceptable.
 - 2. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Washed gravel, either natural or crushed. Use of slag and pit or bank run gravel is not permitted.
- C. Coarse Aggregate Size: Size to be ASTM C 33, Nos. 57 or 67, unless permitted otherwise by ENGINEER.
- D. Water: Clean, drinkable.
- E. Air-Entraining Admixture: ASTM C 260.
- F. Water-Reducing Admixture: ASTM C 494, Type A. Only use admixtures which have been tested and accepted in mix designs. Only to be added onsite by a certified admixture representative of the concrete supplier.
- G. Water-Reducing High Range Admixture: ASTM C 494, Type F/G. Only use admixtures which have been tested and accepted in mix designs. Only to be added onsite by a certified admixture representative of the concrete supplier.
- H.

2.2 CONCRETE

- A. Proportioning and Design Mix
 - 1. Minimum compressive strength at 28 days: 4000 psi.
 - 2. Maximum water cement ratio by weight: 0.44.
 - 3. Minimum cement content: 564 pounds per cubic yard.
 - 4. Normal weight: 145 pounds per cubic foot.
 - 5. Use air-entraining admixture in all concrete: provide not less than 4 percent nor more than 8 percent entrained air for all concrete.
 - 6. Slump Limits:
 - a. Proportion and design mixes to result in concrete slump at the point of placement of not less than 1 inch and not more than 4 inches. If Water-Reducing Admixtures or Superplasticizers are used slump after addition of the admixture shall not exceed 8 inches.

7. Calcium Chloride: Do not use calcium chloride in concrete, unless otherwise authorized in writing by ENGINEER. Do not use admixtures containing calcium chloride.

2.3 FORM MATERIALS

- A. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
- B. Exposed Concrete Surfaces: Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces. Use largest practical sizes to minimize form joints.
- C. Unexposed Concrete Surfaces: Suitable material to suit project conditions.
- D. Provide 3/4-inch chamfer at all exposed corners.
- E. Form Ties:
 1. Provide factory-fabricated, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling of concrete surfaces upon removal. Materials used for tying forms will be subject to approval of ENGINEER.
 2. Unless otherwise, shown, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1-inch from the outer concrete surface. Unless otherwise shown, provide form ties that will leave a hole no larger than 1-inch diameter in the concrete surface.
 3. Ties for exterior walls and walls subject to hydrostatic pressure shall have waterstops.
 4. Provide wood or plastic cones for ties, where concrete is exposed in the finish structure and in the interior of tanks.
 5. Wire ties are not acceptable.

2.4 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60.
- B. Welded Wire Fabric: ASTM A 185.
- C. Steel Wire: ASTM A 82.
- D. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place.
 1. Use wire bar type supports complying with CRSI recommendations, except as specified below. Do not use wood, brick, or other unacceptable materials.
 2. For slabs on grade, use supports with sand plates or horizontal runners where base materials will not support chair legs.

3. For all concrete surfaces, where legs of supports are in contact with forms, provide supports complying with CRSI, Manual of Standard Practice as follows:
 - a. Either hot-dip galvanized, plastic protected or stainless steel legs.
- E. Adhesive Dowels:
 1. Where adhesive dowels are shown or required to be installed into concrete, adhesive material shall be used for the installation of all reinforcing bars.
 2. Adhesive Material:
 - a. Capsule or injectable adhesive material shall be a two-component system which includes a hardener and a resin.
 - b. Product and Manufacturer: Provide adhesive material by one of the following:
 - 1) HY 150 or HVA capsule by Hilti Fastening Systems, Inc.
 - 2) Power-Fast or Needle-Capsule by Powers Fastening, Inc.
 - 3) Or equal.
 3. Dowel:
 - a. Dowel reinforcing bars shall meet the ASTM standards for Grade 60, A615 steel.
- F. Form Savers: Form savers may be used as a mechanical connection in applications where drilling holes in form material is not desired. This connection shall be a full mechanical connection that shall develop in tension or compression, as required, at least 125 percent of specified yield strength (f_y) of the bar in accordance with ACI 318 Section 12.14.3.
 1. Product and Manufacturer: Provide one of the following:
 - a. Form Saver by Lenton Rebar Splicing Division of Erico Products, Inc.
 - b. Or equal.

2.5 RELATED MATERIALS

- A. Construction Joint Waterstops
 1. Polyvinylchloride (PVC) Waterstops:
 - a. Provide PVC waterstops complying with Corps of Engineers CRD-C572.
 - b. Provide serrated type with a minimum thickness of 3/8 inch by a minimum width of 6 inches may be provided in specific applications as approved by the ENGINEER.
 - c. Product and Manufacturer: Provide PVC waterstops as manufactured by one of the following:
 - 1) Style No. 783 or No. 724, Greenstreak Plastic Products company.
 - 2) Style No. R6-38T or No. RSB6-38, Vinylex Corporation.
 - 3) Or equal.
 2. Adhesive Waterstop:
 - a. Provide preformed adhesive waterstop in construction joint locations where shown, or as alternative to PVC waterstop where appropriate.

- b. The preformed waterstop shall meet or exceed all requirements of Federal Specifications SS-S-210A, "Sealing Compounds for Expansion Joints".
 - c. Product and Manufacturer: Provide waterstops as manufactured by one of the following:
 - 1) Synko-Flex Waterstop by Synko-Flex Products, Division of Henry Products, Inc.
 - 2) Or equal.
 - 3. Hydrophilic Waterstops:
 - a. Hydrophilic waterstop may be used as an alternate to the adhesive waterstop.
 - b. Product and Manufacturer: Provide waterstops as manufactured by one of the following:
 - 1) Hydrotite CJ-0725-3K and Leakmaster LV-1, Greenstreak Plastic Products Company.
 - 2) Adeka MC201OM and P201 by Adeka, Inc.
 - 3) Or equal.
 - B. Membrane-Forming Curing compound: ASTM C 309, Type I-D.
 - 1. Provide without fugitive dye when requested by ENGINEER.
 - C. Epoxy Bonding Agent:
 - 1. Two-component epoxy resin bonding agent.
 - a. Product and Manufacturer: Provide one of the following:
 - 1) Sikadur 32, Hi-Mod LPL, as manufactured by Sika Chemical Corporation.
 - 2) Epoxitite Binder (Code No. 2390), as manufactured by A.C. Horn, Incorporated.
 - 3) Or equal.
 - D. Latex Bonding Adhesive:
 - 1. Provide a latex bonding adhesive formulated for use in both interior and exterior locations. The bonding adhesive shall be stable in submerged locations and shall not be affected by chlorine. Adhesive shall be capable of being applied to damp or dry surfaces. The latex bonding adhesive shall comply with ASTM C1059, Type II, where specified.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Weld-Crete by Larsen Products Corp.
 - b. Or equal.

2.6 GROUT

- A. Nonshrink Grout:
 - 1. Prepackaged nonstaining cementitious grout requiring only the addition of water at the job site.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Euco N-S, as manufactured by the Euclid Chemical Company.
 - b. Masterflo 713, as manufactured by Master Builders Company.

- c. Or equal.
- B. Grout Fill:
 - 1. Except where otherwise specified use 1 part cement to 3 parts sand complying with the following:
 - a. Cement: ASTM C 150, Type II.
 - b. Fine and Coarse Aggregate (No. 7) meeting ASTM C 33.
 - c. Specified 28-day Compressive Strength: 3,000 psi.
 - d. Maximum Water-Cement Ratio by Weight: 0.50.
 - e. Air Content Percentage $7 \pm 1\%$.
 - f. Minimum Cement Content in Pounds per Cubic Yard: 611.

PART 3 - EXECUTION

3.1 INSPECTION

- A. CONTRACTOR and his installer shall examine the substrate and the conditions under which Work is to be performed and notify ENGINEER in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.2 FORMWORK

- A. Construct the concrete members and structures to correct size, shape, alignment, elevation and position, complying with ACI 347.
- B. Provide openings in formwork to accommodate Work of other trades. Accurately place and securely support items built into forms.
- C. Clean and adjust forms prior to concrete placement. Apply form release agents or wet forms, as required. Retighten forms during and after concrete placement if required to eliminate mortar leaks.

3.3 REINFORCEMENT MATERIALS

- A. Comply with the applicable recommendations of specified codes and standards, and CRSI, Manual of Engineering and Placing Drawings, for details and methods of reinforcement placement and supports.
- B. Clean reinforcement to remove loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- C. Position, support, and secure reinforcement against displacement during formwork construction or concrete placement, including sidewalks. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
 - 1. Place reinforcement to obtain the minimum concrete coverages as shown and as specified in ACI 318. Arrange, space, and securely tie bars and bar

- supports together with 16 gage wire to hold reinforcement accurately in position during concrete placement operations. Set with ties so that twisted ends are directed away from exposed concrete surfaces.
2. Reinforcing steel shall not be secured to forms with wire, nails or other ferrous metal. Metal supports subject to corrosion shall not touch formed or exposed concrete surfaces.
- D. Provide sufficient numbers of supports of strength required to carry reinforcement. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
- E. Splices:
1. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown for minimum lap of spliced bars in accordance with ACI 318.
- F. Install welded wire fabric in as long lengths as practical, lapping at least one mesh. Locate and support fabric by metal chairs, runners, bolsters, spacers and hangers, as required for proper placement of the concrete.
- G. Installation of Embedded Items: Set and build into the Work anchorage devices and embedded items required for other Work that is attached to, or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided under other Sections and other contracts for locating and setting. Refer also to Paragraph 1.1.B., Coordination.
- H. Adhesive Dowels:
1. Drilling equipment used and installation of adhesive dowel shall be in accordance with manufacturer's instructions.
 2. Assure that embedded items are protected from damage and are not filled in with concrete.
 3. Unless otherwise shown or approved by ENGINEER conform to following for adhesive dowels:

<u>Bar Size</u>	<u>Embedment Depth</u>
#3	3 ¾"
#4	5 ½"
#5	7"
#6	8 ½"
#7	10"
#8	11 ¾"
#9	12 ¾"

(If an alternate adhesive material is submitted, CONTRACTOR must submit embedment depths per manufacture's recommendation. Embedment depths

shall be based on a compressive strength of 2000 psi when embedded into existing concrete.)

4. The CONTRACTOR shall comply with the adhesive material manufacturer's installation instructions on the hole diameter. The CONTRACTOR shall properly clean out the hole utilizing a synthetic brush and compressed air to remove all loose material from the hole, prior to installing adhesive capsules or material. Proper mixing of the two-component system shall be done to the manufacturer's recommendations.
5. Adhesive material manufacturer's representative shall observe and demonstrate the proper installation procedures for the adhesive dowels and adhesive material at no additional expense to the OWNER. Each installer shall be certified in writing by the manufacturer to be qualified to install the adhesive dowels.

3.4 CONSTRUCTION JOINTS

- A. Comply with ACI 301, Chapter 6, and as specified below.
- B. Locate and install construction joints as shown. Additional construction joints shall be located as follows:
 1. In walls locate joints at a spacing of 50 feet maximum.
 2. Provide other additional construction joints as required to satisfactorily complete all work.
- C. Horizontal Joints:
 1. Roughen the surface in an acceptable manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, or damaged concrete at the surface.
 2. Remove laitance, waste mortar or other substance which may prevent complete adhesion.
 3. For concrete over 45 days old, apply concrete epoxy bonding adhesive prior to placing new concrete.
- D. Vertical Joints:
 1. Roughen the surface in an acceptable manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, or damaged concrete at the surface.
 2. Remove laitance, waste mortar or other substance which may prevent complete adhesion.
 3. For concrete over 45 days old, apply concrete epoxy bonding adhesive prior to placing new concrete.

3.5 BONDING TO HARDENED CONCRETE

- A. The surface of hardened concrete upon which fresh concrete is to be placed shall be rough, clean, sound, and damp. Before placement of new plastic concrete, the hardened surface shall be cleaned of all laitance and foreign substances (including curing compound), washed with clean water and wetted thoroughly.

- B. For bonding to hardened concrete less than 30 days old, coarse aggregate shall be omitted from the first batch or batches of concrete placed against hardened concrete. The mortar puddle shall cover the hardened concrete with at least 2 inches at every point.
- C. Use epoxy bonding agent for the following:
 - 1. Bonding of fresh concrete to concrete cured greater than 30 days or to existing concrete.
 - 2. Handle and store epoxy adhesive in compliance with the manufacturer's printed instructions, including safety precautions.
 - 3. Mix the epoxy adhesive in complete accordance with the instructions of the manufacturer.
 - 4. Before placing fresh concrete, thoroughly roughen and clean hardened concrete surfaces and coat with epoxy grout not less than 1/16-inch thick. Place fresh concrete while the epoxy material is still tacky, without removing the in-place grout coat, and as directed by the epoxy manufacturer.

3.6 LATEX BONDING ADHESIVE

- A. Use latex bonding adhesive as an alternative to epoxy bonding agent in specific applications as approved by the ENGINEER.
- B. Handle and store latex bonding adhesive in compliance with the manufacturer's printed instructions, including safety precautions.
- C. Mix the latex bonding adhesive in complete accordance with the instructions of the manufacturer.
- D. Before applying latex bonding adhesive, thoroughly roughen and clean hardened concrete surfaces.
- E. Latex bonding adhesive shall not be exposed to water from the time it is placed up to a period of at least 7 days after the concrete has been placed.

3.7 CONCRETE PLACEMENT

- A. CONTRACTOR is solely responsible for the means and methods used to properly transport concrete onsite from the unloading point to the point of placement. The mechanism and equipment used to properly transport concrete shall be closely considered when the CONTRACTOR is planning his Work. Pumping of concrete is not required, however, if the CONTRACTOR fails to place the concrete to the satisfaction of the OWNER and ENGINEER by means other than pumping, the concrete shall be pumped by the CONTRACTOR at no additional cost to the OWNER.
- B. Concrete shall not be placed until all reinforcement materials are inspected and permission for placing concrete is granted by ENGINEER. All concrete placed in violation of this provision will be rejected.

- C. Inspection: Notify OWNER and ENGINEER at least 1 full working day in advance before starting to place concrete.
- D. Manufacturing and delivery shall be in accordance with ASTM C 94.
- E. Discharge Time:
 - 1. As determined by set time, do not exceed 1-1/2 hours after adding cement to water unless special approved time delay admixtures are used. Coordinate time delay admixture information with manufacturer and ENGINEER prior to placing concrete.
 - 2. Maintain required slump throughout time of concrete placement and consolidation. Discontinue use of high range water reducing admixture (superplasticizers) and provide new mix design if it fails to maintain slump between 4 to 6 inches and produce good consolidation for the length of time required. Redesign mix adjusting set control admixtures to maintain setting time in range required.
- F. Job-Site Mixing: Not permitted for this project.
- G. All concrete for liquid retaining structures, and all concrete in contact with earth, water, or exposed directly to the elements shall be watertight.
- H. Concrete Placement: Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
- I. Provide sufficient illumination in the interior of forms so concrete deposition is visible, permitting confirmation of consolidation quality.
- J. Make all concrete solid, compact and smooth, and free of laitance, cracks and cold joints.
- K. Pumping of Concrete:
 - 1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to assure completion of concrete placement without cold joints in case of primary placing equipment breakdown.
 - 2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
 - 3. Replace pumping equipment and hoses (conduits) that are not functioning properly.
- L. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all parts of forms.
 - 1. Consolidate concrete with internal vibrators with minimum frequency of 8,000 cycles per minute and amplitude as required to consolidate concrete in section being placed.
 - 2. Provide at least one standby vibrator in operable condition at placement site prior to placing concrete.

3. Consolidation Equipment and Methods: ACI 309R.
 4. During concrete placement, vibration consolidation shall not exceed distance of 3 feet from point of top of concrete being placed.
 5. Vibrate concrete in vicinity of joints to obtain impervious concrete.
- M. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement, and curing.
1. In hot weather comply with ACI 305.
 2. In cold weather comply with ACI 306.

3.8 CURING

- A. Curing: Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours or apply curing compound immediately after final floating and finish. Continue curing through use of moisture-retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protection as required to prevent damage to exposed concrete surfaces.

3.9 FINISHES

- A. Slab Finish:
1. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened sufficiently. Use a wood float only. Check and level the surface plane to a tolerance not exceeding 1/4-inch in 10 feet when tested with a 10 foot straightedge placed on the surface at not less than 2 different angles. Cut down high spots and fill all low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture.
 2. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
 3. Consolidate the concrete surface by the final hand troweling operation. Finish shall be free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8-inch in 10 feet when tested with a 10-foot straight edge. Grind smooth surface defects which would telegraph through applied floor covering system.
 4. Use trowel finish for the following:
 - a. Interior exposed slabs unless otherwise shown or specified.
 5. Apply non-slip broom finish to exterior concrete slab and elsewhere as shown on the Drawings.
- B. Formed Surfaces:
1. Rough Form Finish:
 - a. Standard rough form finish shall be the concrete surface having the texture imparted by the form material used, with tie holes and defective areas repaired and patched with mortar of 1 part cement to 1 1/2 parts

- sand and all fins and other projections exceeding 1/4-inch in height rubbed down or chipped off.
- b. Use rough form finish for the following:
 - 1) Exterior vertical surfaces up to 1 foot below grade.
 - 2) Interior exposed vertical surfaces of liquid containers up to 1 foot below liquid level.
 - 3) Interior and exterior exposed beams and undersides of slabs.
 - 4) Other areas shown.
 - 2. Smooth Form Finish:
 - a. Produce smooth form finish by selecting form materials which will impart a smooth, hard, uniform texture. Arrange panels in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas as above with all fins or other projections completely removed and smoothed.
 - b. Use smooth form finish for surfaces that are to be covered with a coating material. The material may be applied directly to the concrete or may be a covering bonded to the concrete such as waterproofing, dampproofing, painting or other similar system.
 - 3. Smooth Rubbed Finish:
 - a. Provide smooth rubbed finish to concrete surfaces which have received smooth form finish as follows:
 - 1) Rubbing of concrete surfaces not later than the day after form removal.
 - 2) Moistening of concrete surfaces and rubbing with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
 - b. Except where surfaces have been previously covered as specified above, use smooth rubbed finish for the following:
 - 1) Interior exposed walls and other vertical surfaces.
 - 2) Exterior exposed walls and other vertical surfaces down to 1 foot below grade.
 - 3) Interior and exterior horizontal surfaces, except exterior exposed slabs and steps.
 - 4) Interior exposed vertical surfaces of liquid containers down to 1 foot below liquid level.
 - 5) Other areas shown.
 - 4. Grout Cleaned Finish:
 - a. Provide grout cleaned finish to concrete surfaces which have received smooth form finish as follows:
 - 1) Combine 1 part portland cement to 1-1/2 parts fine sand by volume, and mix with water to the consistency of thick paint. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that the final color of dry grout will closely match adjacent concrete surfaces.
 - 2) Thoroughly wet the concrete surface and apply grout uniformly by brushing or spraying immediately to the wetted surfaces.

Scrub surface with cork float or stone to coat surface and fill surface holes. Remove excess grout by scraping, followed by rubbing with clean burlap to remove any visible grout film. Keep grout damp during the setting period by means of fog spray at least 36 hours after final rubbing. Complete any area in the same day it is started, with the limits of any area being natural breaks in the finished surface.

- b. Except where surfaces have been previously covered as specified above, use grout cleaned finish for the following:
 - 1) Interior exposed walls and other vertical surfaces.
 - 2) Exterior exposed walls and other vertical surfaces down to 1 foot below grade.
 - 3) Interior and exterior horizontal surfaces, except exterior exposed slabs and steps.
 - 4) Interior exposed vertical surfaces of liquid containers down to 1 foot below liquid level.
 - 5) Other areas shown.
- 5. Related Unformed Surfaces:
 - a. At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching the adjacent formed surfaces. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surfaces, unless otherwise shown.

3.10 GROUT PLACEMENT

- A. Nonshrink:
 - 1. Place nonshrink grout as shown and in accordance with manufacturer's instructions. If manufacturer's instructions conflict with the Specifications do not proceed until ENGINEER provides clarification.
 - 2. Drypacking of nonshrink grout will not be permitted.
 - 3. Placing grout shall conform to the temperature and weather limitations described in Article 3.4 above.
- B. Grout Fill:
 - 1. Grout Fill shall be placed, cured, and finished as described in Article 3.7, 3.8 and 3.9.

3.11 FIELD QUALITY CONTROL

- A. Reinforcement Materials
 - 1. The CONTRACTOR shall correct improper workmanship, remove and replace, or correct as instructed, found unacceptable or deficient.
 - 2. Adhesive Dowels:
 - a. OWNER will retain an independent testing laboratory to perform field quality testing of installed adhesive dowels. A minimum of ten percent of the adhesive dowels shall be tested to fifty percent of the yield capacity of the reinforcing bar.

- b. CONTRACTOR shall provide access for the testing agency to places where work is being produced so that required inspection and testing can be accomplished.
- c. If failure of any of the adhesive dowels occur, the CONTRACTOR will be required to pay for the costs involved in testing the remaining ninety percent of the adhesive dowels.
- d. The CONTRACTOR shall pay for all corrections and subsequent tests required to confirm the integrity of the dowels.
- e. The independent testing and inspection agency shall complete a report on each area. The report should summarize the observations made by the inspector and be submitted to the ENGINEER.

B. Concrete Work

- 1. Quality Control: OWNER'S testing laboratory will perform sampling and testing during concrete placement, as follows:
 - a. Sampling: ASTM C 172.
 - b. Slump: ASTM C 143, one test for each load at point of discharge.
 - c. Air Content: ASTM C 31, one for each set of compressive strength specimens.
 - d. Compressive Strength: ASTM C 39, one set of 4 cylinders for each 50 cubic yards or fraction thereof of each class of concrete as directed by OWNER or ENGINEER; 1 specimen tested at 7 days, 2 specimens tested at 28 days, 1 specimen tested at 56 days.
 - e. Report test results in writing to ENGINEER on same day tests are made.
- 2. Cut out and properly replace to the extent ordered by ENGINEER, or repair to the satisfaction of ENGINEER, surfaces which contain cracks or voids, are unduly rough, or are in any way defective. Patches or plastering will not be acceptable.
- 3. Repair, removal, and replacement of defective concrete as ordered by ENGINEER shall be at no additional cost to OWNER.

++ END OF SECTION ++

SECTION 05536

FLOOR ACCESS HATCH COVERS WITH PROTECTIVE GRATING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish hinged floor access hatch covers.
 - 2. The types of floor access hatch covers include the following:
 - a. Aluminum covers with frames for drainage.
- B. Related Sections:
 - 1. Section 02606, Manholes.
 - 2. Section 03300, Cast-In-Place Concrete.
 - 3. Section 05501, Miscellaneous Metal Fabrications.
 - 4. Section 09900, Painting.

1.2 QUALITY ASSURANCE

- A. Manufacturer: All access hatch covers for the project shall be the product of a single manufacturer. Access hatch covers from more than one manufacturer will not be permitted.
- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. ASTM A 123, Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Dimensional plans of all access hatch covers, quantity schedule, details of fabrication and erection, and anchorage.

1.4 GUARANTEE

- A. CONTRACTOR shall furnish a written guarantee obtained from the manufacturer. Guarantee shall state the following:
1. Access hatch covers are to operate properly and be free of defects in material and workmanship for a period of five years from date of purchase.
 2. Should any part fail to function, or break in normal use during this period, manufacturer shall furnish a new part at no charge to OWNER.

PART 2 - PRODUCTS

2.1 MATERIALS AND FABRICATION

- A. General:
1. Provide manufacturer's standard fabricated units, modified, if necessary, to comply with the requirements. Where standard units are not available for the sizes and types required, custom fabricate units to match manufacturer's similar units.
 2. Fabricate each unit in the shop, complete with anchors, gaskets, hardware and accessory items as required.
- B. Covers with Frames for Drainage:
1. Provide mill finished aluminum covers of checkered or diamond plate or other approved non-slip surface, with channel frames for drainage, designed to withstand an AASHTO H-20 wheel loading.
 2. Both frames and door leaves shall be 1/4 inch thick, minimum.
 3. Furnish 316 stainless steel hardware for aluminum doors.
 4. Provide channel frame with 1-1/2" diameter drainage coupling connection and PVC piping.
 5. Provide single or double leaf covers as specified in the Floor Access Hatch Cover Schedule.
 6. Frames shall have anchorage devices.
 7. When open, door shall pivot so that the cover does not protrude into the channel frame.
 8. Door covers shall have torsion bars, springs, or other approved means, for counterbalanced operations.
 9. Covers shall be designed to receive a padlock and shall have a recessed hasp covered by a hinged lid flush with surface.
 10. Covers shall be equipped with 316 stainless steel hold open devices fastened to the frame with 1/2-inch 316 stainless steel bolts
 11. Provide integral fall-through protection grating panels. Protective gratings shall comply with OSHA fall-through protection and controlled confine space entry standards.
 12. Grating shall be designed to withstand a minimum live load of 300 pounds per square foot.

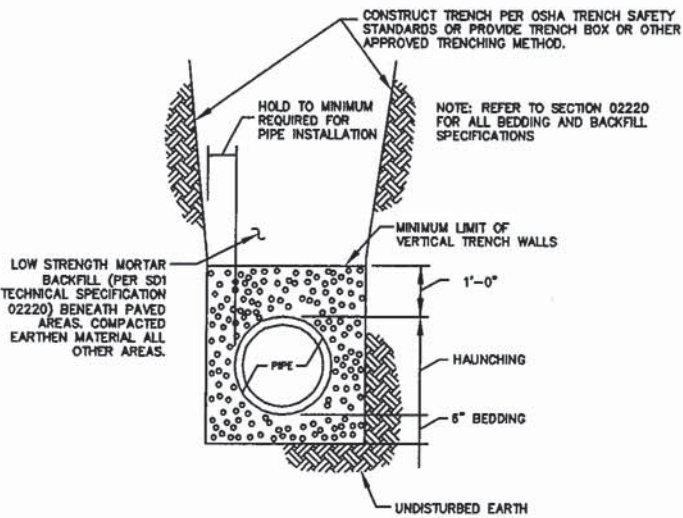
13. Design of covers must assure that the fall through protection is in place before the doors can be closed.
 14. Grates shall be hinged and capable of being locked in the open and closed positions. Grates in the open position shall create a physical barrier around the opening.
 15. Grating shall be safety orange or yellow.
 12. Product and Manufacturer:
 - a. Single leaf door covers fabricated of aluminum.
 - 1) H1C, as manufactured by Halliday Products. Fall protection grating shall be ordered separately and shall be the "Retro Grate" as manufactured by Halliday and shall be installed in the factory. Fall protection grating shall not be a part of the H-20 load rating reinforcement.
 - 2) Type J-ALH20, as manufactured by The Bilco Company. Fall protection grating shall be ordered separately and shall be installed at the factory. Fall protection grating shall not be a part of the H-20 load rating reinforcement.
 - 3) Or equal.
 - b. Double leaf door covers fabricated of aluminum.
 - 1) H2C, as manufactured by Halliday Products. Fall protection grating shall be ordered separately and shall be the "Retro Grate" as manufactured by Halliday and shall be installed in the factory. Fall protection grating shall not be a part of the H-20 load rating reinforcement.
 - 2) Type JD-ALH20, as manufactured by The Bilco Company. Fall protection grating shall be ordered separately and shall be installed at the factory. Fall protection grating shall not be a part of the H-20 load rating reinforcement.
 - 3) Or equal.
- C. Safety Post: Each floor access hatch cover in which a fixed access ladder or manhole steps are shown on the Drawings below the hatch shall be provided with a safety post.
1. Safety post shall be a telescoping tubular section that locks automatically when fully extended.
 2. Materials of Construction: Type 304 stainless steel.
 3. Acceptable manufacturers:
 - a. The Bilco Company (Ladder Up).
 - b. Halliday Products, Series LIE Safety Extension.
 - c. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

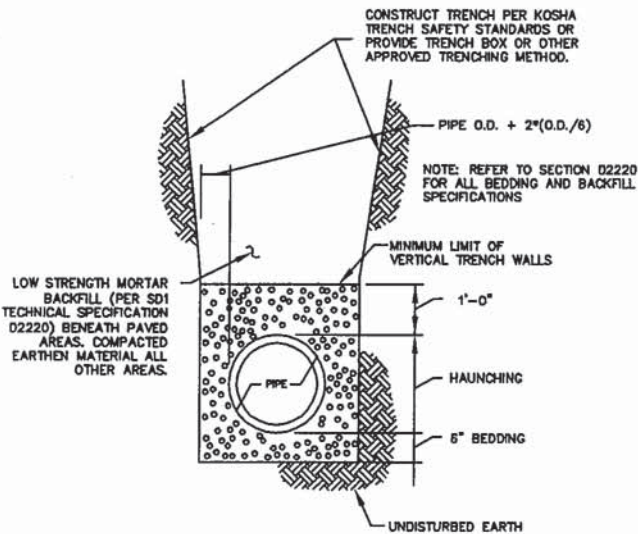
- A. Install doors in accordance with approved Shop Drawings.
- B. Set doors and covers plumb, level and true to line or grade, without warp or rack, for anchoring under other Sections of these Specifications.
- C. Install PVC piping between coupling connection and sump as shown on the drawings.
- D. Protection of Aluminum from Dissimilar Materials: Paint in accordance with Section 09900.

++ END OF SECTION ++



FLEXIBLE PIPE	MIN TRENCH WIDTH
PIPE LESS OR EQUAL TO 36" DIA	PIPE O.D. + 24"
PIPE GREATER THAN 36" DIA	PIPE O.D. + 48"

PIPE BEDDING – FLEXIBLE PIPE
N.T.S.



RIGID PIPE	MIN TRENCH WIDTH
PIPE LESS OR EQUAL TO 36" DIA	PIPE O.D. + 24"
PIPE GREATER THAN 36" DIA	PIPE O.D. + 2*(O.D./6)

PIPE BEDDING – RIGID PIPE
N.T.S.

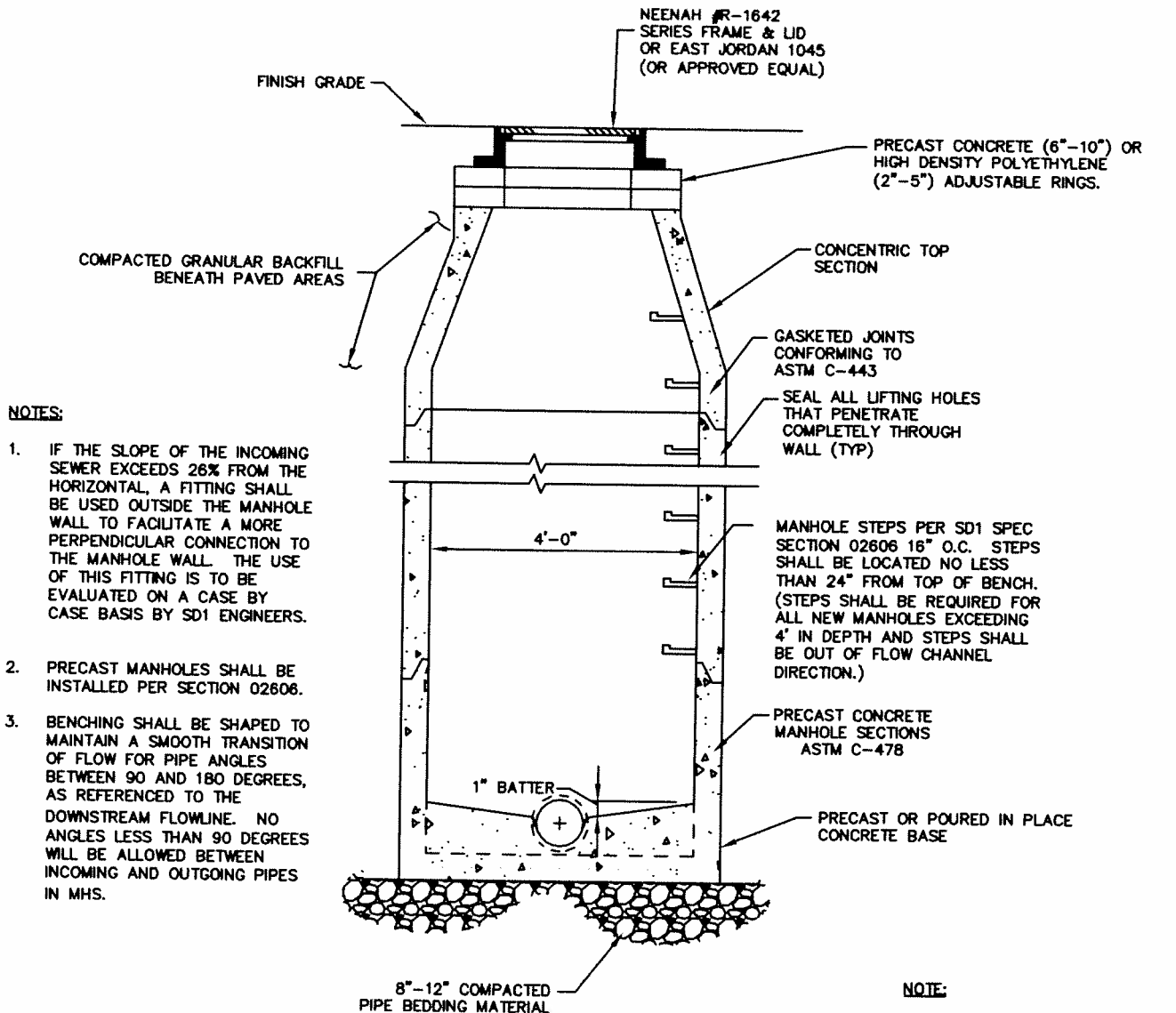
REVISION	BY	DATE



SANITATION DISTRICT NO. 1
1045 Eaton Drive
FT. Wright, Kentucky 41017
Ph: (859) 578-7460
Fax: (859) 331-2436

DATE:
MARCH 2010

STANDARD
DRAWING NO:
110



STANDARD MANHOLE

N.T.S.

REVISION	BY	DATE

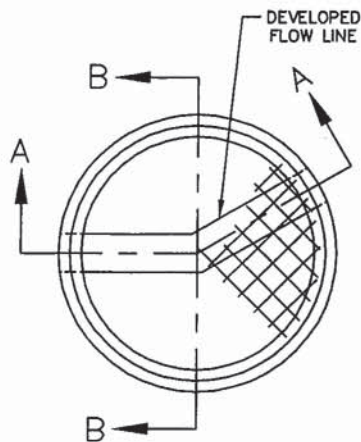


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**STANDARD
DRAWING NO:**

113



PLAN
MANHOLE BASE

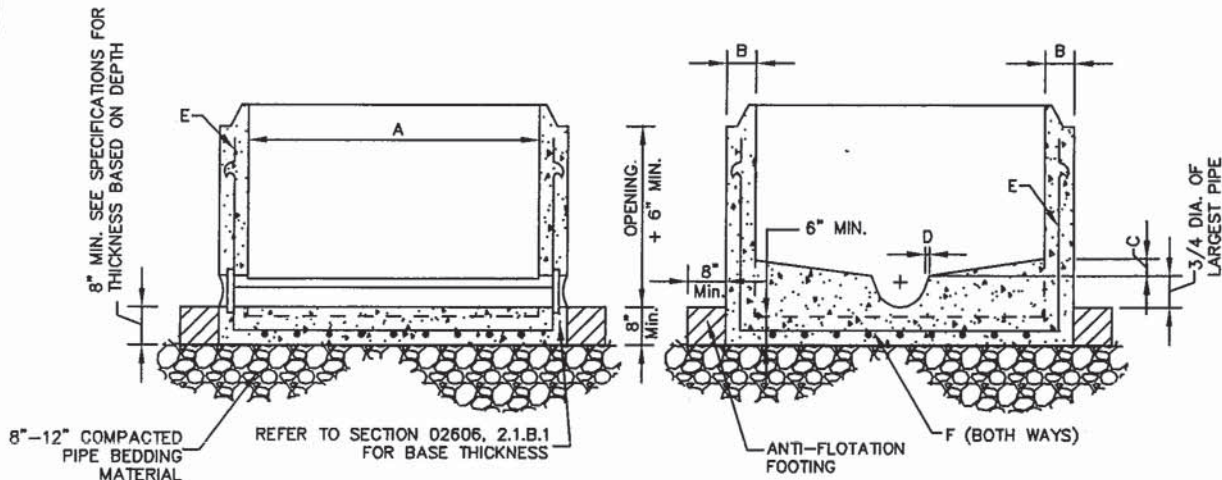
NOTES:

- 1. THE PRECAST BASE SHALL HAVE THE FLOOR AND SIDE WALL CAST AS ONE UNIT; IF THE FLOW LINE (CHANNEL) AND BENCHES ARE NOT CAST AS A PART OF FLOOR AND SIDE WALL, THEY SHALL BE CAST IN PLACE.
- 2. ALL NOTES ON STANDARD DRAWING 113 SHALL APPLY

PIPE DIAMETER	DIMENSION			
	B	C	D	
8" THRU 18"	48"	5"	2"-3"	UP TO 1 1/2"
21" & 24"	48" 60"	5" 6"	2"-3"	"
27" - 36"	60"	6"	2"-3"	UP TO 1 1/2"

* MOVABLE PANEL CONSTRUCTION MAY BE USED PROVIDING 5" MIN. THICKNESS PROVIDED.

DIAMETER	REINFORCEMENT STEEL PER A.S.T.M. C478	
	E	F
48"	A ^s = 0.12 Sq. In./Ft. (CIRCUMFERENTIAL)	A ^s = 0.12 Sq. In./Ft. (BOTH WAYS)
60"	A ^s = 0.15 Sq. In./Ft. (CIRCUMFERENTIAL)	A ^s = 0.12 Sq. In./Ft. (BOTH WAYS)



STANDARD PRECAST CONCRETE MANHOLE BASE

N.T.S.

REVISION	BY	DATE



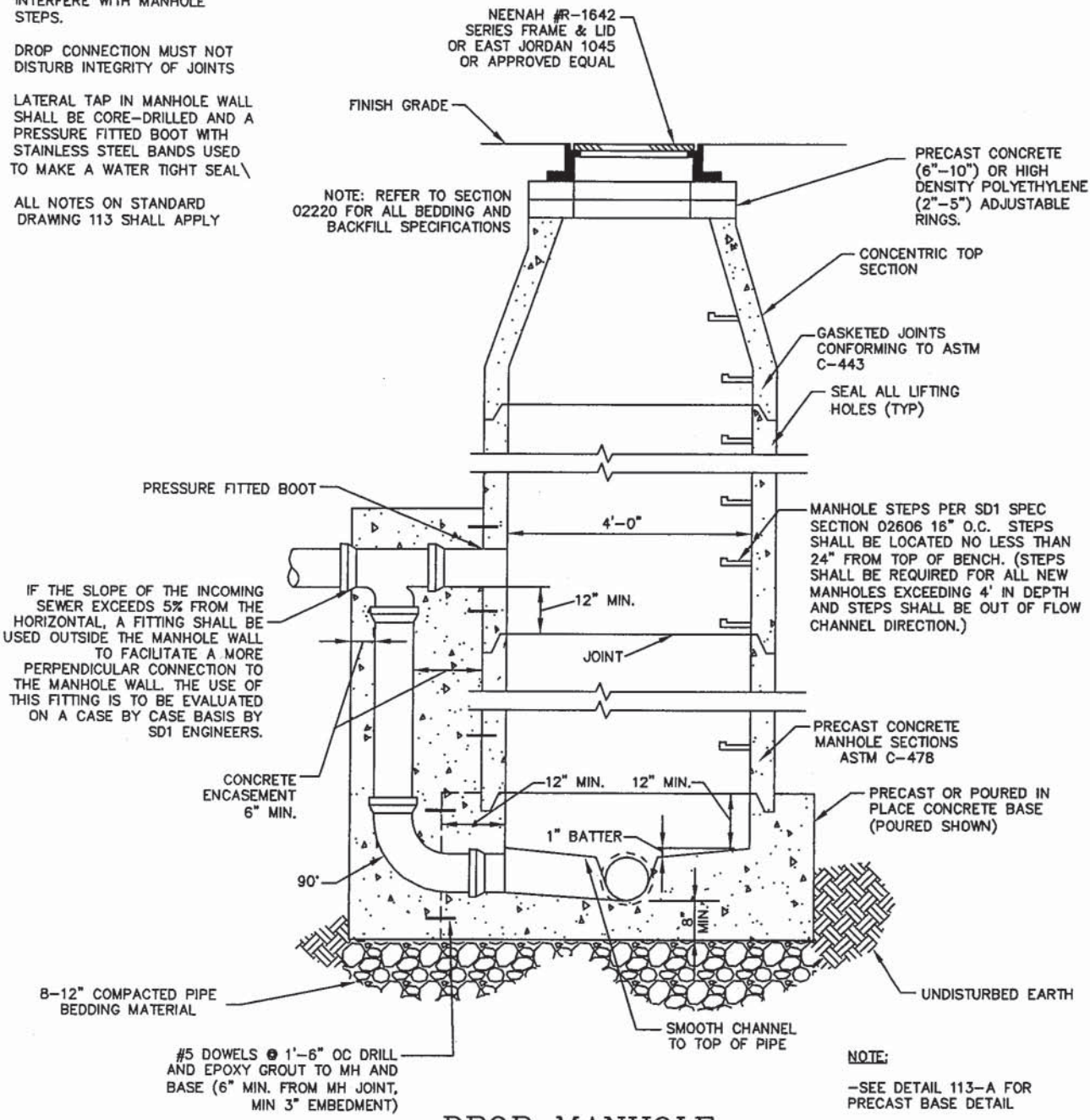
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DATE:
APRIL 2010

STANDARD
DRAWING NO:
113-A

NOTES

- 1. PERMIT FEE AND INSPECTION REQUIRED
- 2. DROP CONNECTION TO BE MADE BELOW CONE SECTION.
- 3. DROP CONNECTION SHALL NOT INTERFERE WITH MANHOLE STEPS.
- 4. DROP CONNECTION MUST NOT DISTURB INTEGRITY OF JOINTS
- 5. LATERAL TAP IN MANHOLE WALL SHALL BE CORE-DRILLED AND A PRESSURE FITTED BOOT WITH STAINLESS STEEL BANDS USED TO MAKE A WATER TIGHT SEAL\
- 6. ALL NOTES ON STANDARD DRAWING 113 SHALL APPLY



DROP MANHOLE
N.T.S.

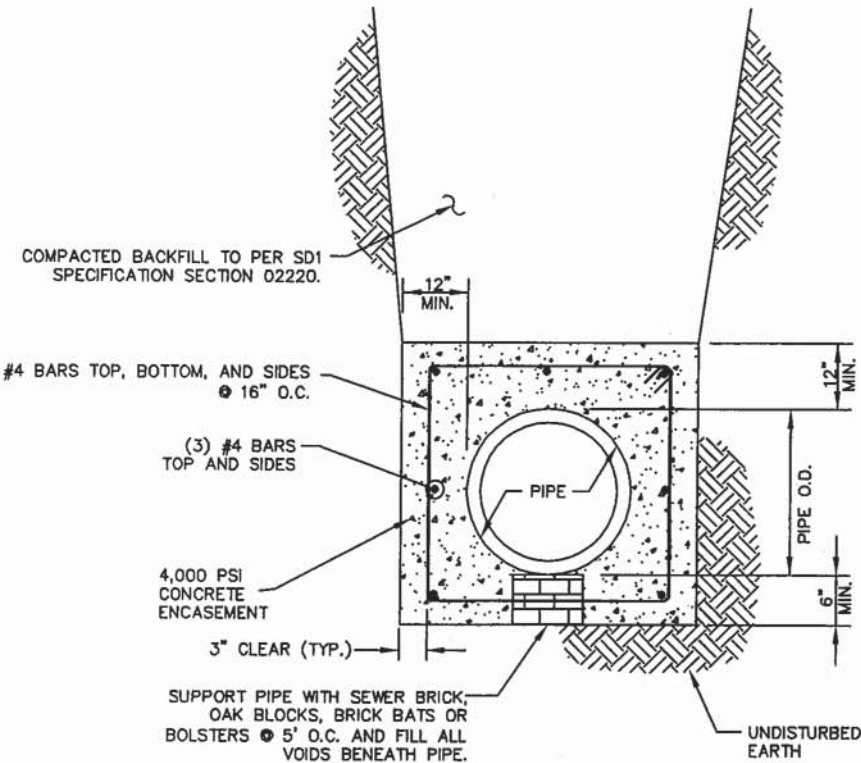
NOTE:
-SEE DETAIL 113-A FOR PRECAST BASE DETAIL
-ANTI-FLOTATION FLANGES MAY BE REQUIRED IN AREAS WHERE THE MANHOLE IS SUBJECT TO GROUND WATER PER SD1 SPECIFICATION 02606

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DATE: APRIL 2010
STANDARD DRAWING NO: 114



CONCRETE PIPE ENCASEMENT
(FOR UTILITY CROSSINGS)
N.T.S.

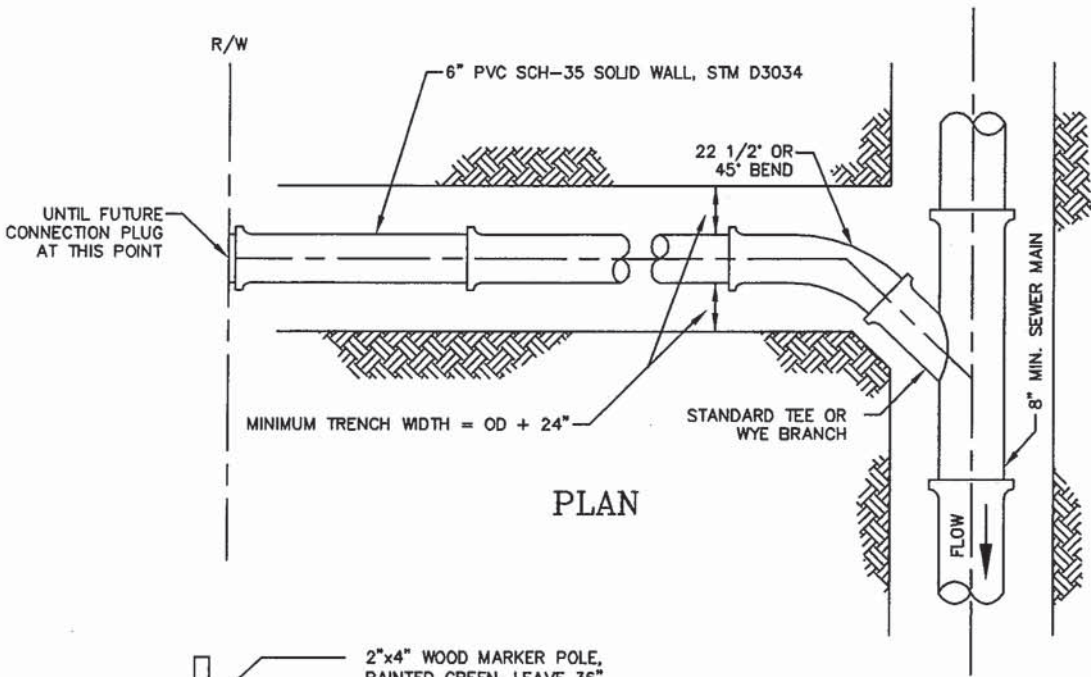
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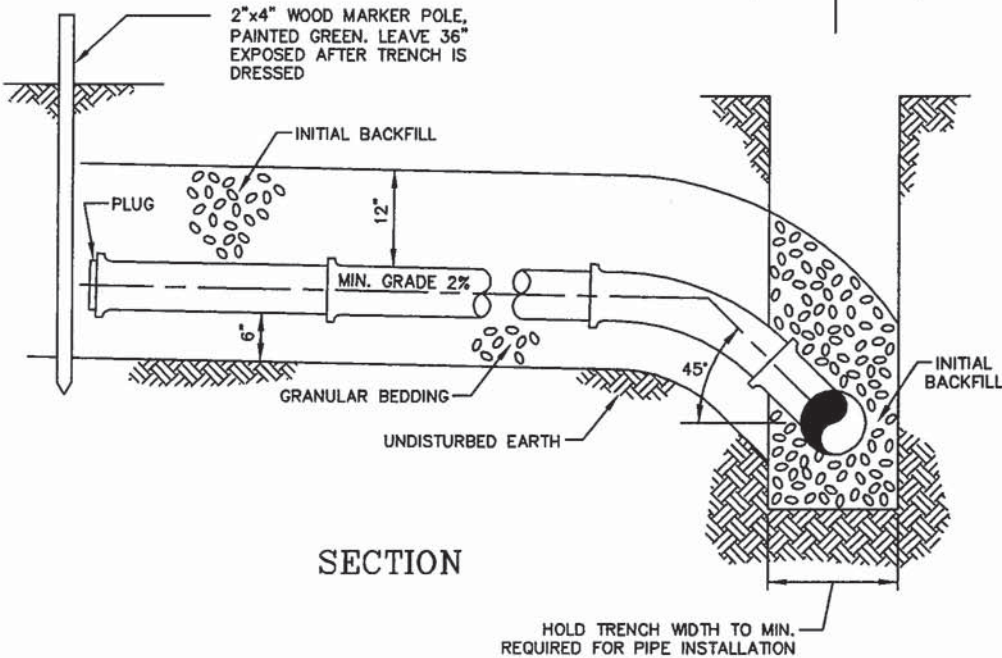
DATE:
APRIL 2010

STANDARD
DRAWING NO:
118



NOTE:

- SEWER SERVICE CONNECTION TO SEWER LATERAL SHALL BE BY MEANS OF FLEXIBLE PIPE CONNECTORS (COUPLING OR DONUT TYPE) WHEN JOINING PIPES OF DIFFERENT MATERIAL. DETAIL ALSO APPLIES FOR ALL 4" SEWER SERVICE LATERALS IF SHOWN ON DRAWINGS.
- ALL LATERAL CONNECTIONS SHALL BE MADE BETWEEN THE 10 AND 11 O'CLOCK AND THE 1 AND 2 O'CLOCK POSITIONS TO THE SEWER MAIN.
- FOR ALL SEWER LATERAL CONSTRUCTION BEYOND PUBLIC R/W, REFER TO STD. DWG. 113.
- LATERAL INSTALLATIONS SHALL FOLLOW ALL BEDDING AND BACKFILL REQUIREMENTS IN SD1 STANDARD SPECIFICATIONS, SECTION 02220.



SEWER LATERAL INSTALLATION

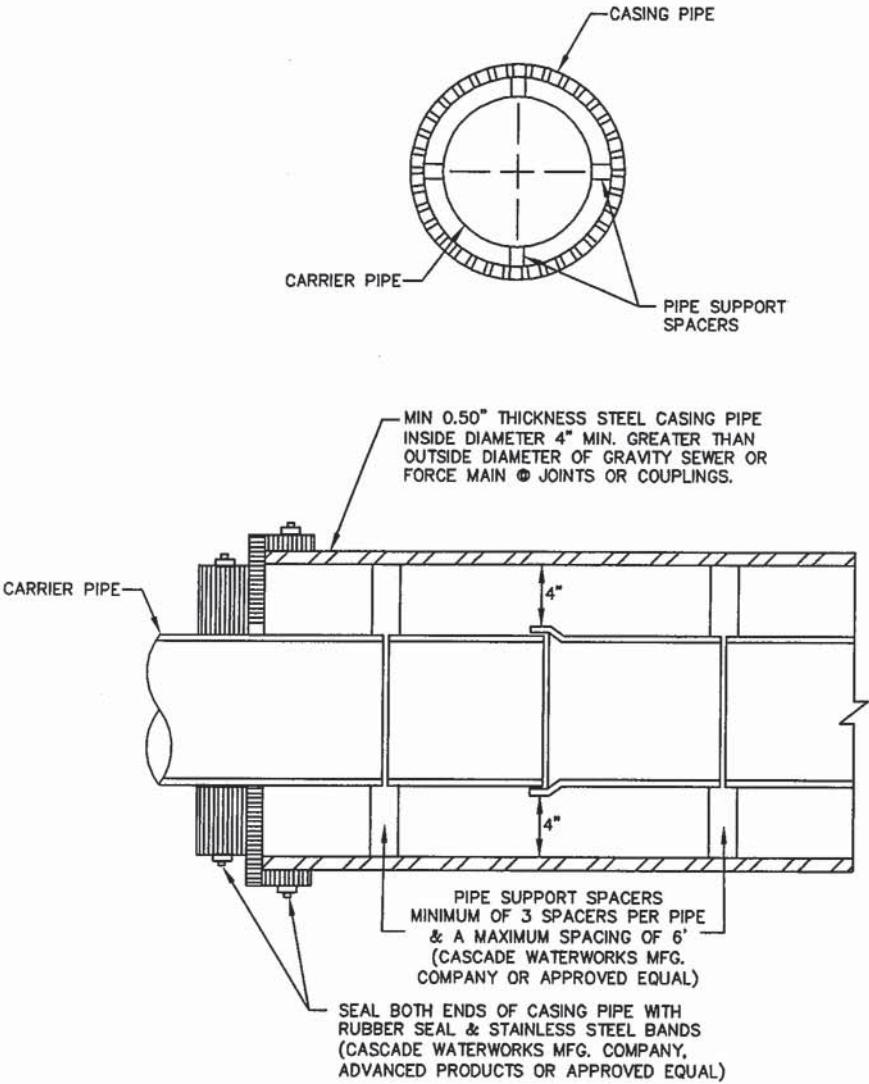
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DRAWING NO:
120



STEEL CASING PIPE
N.T.S.

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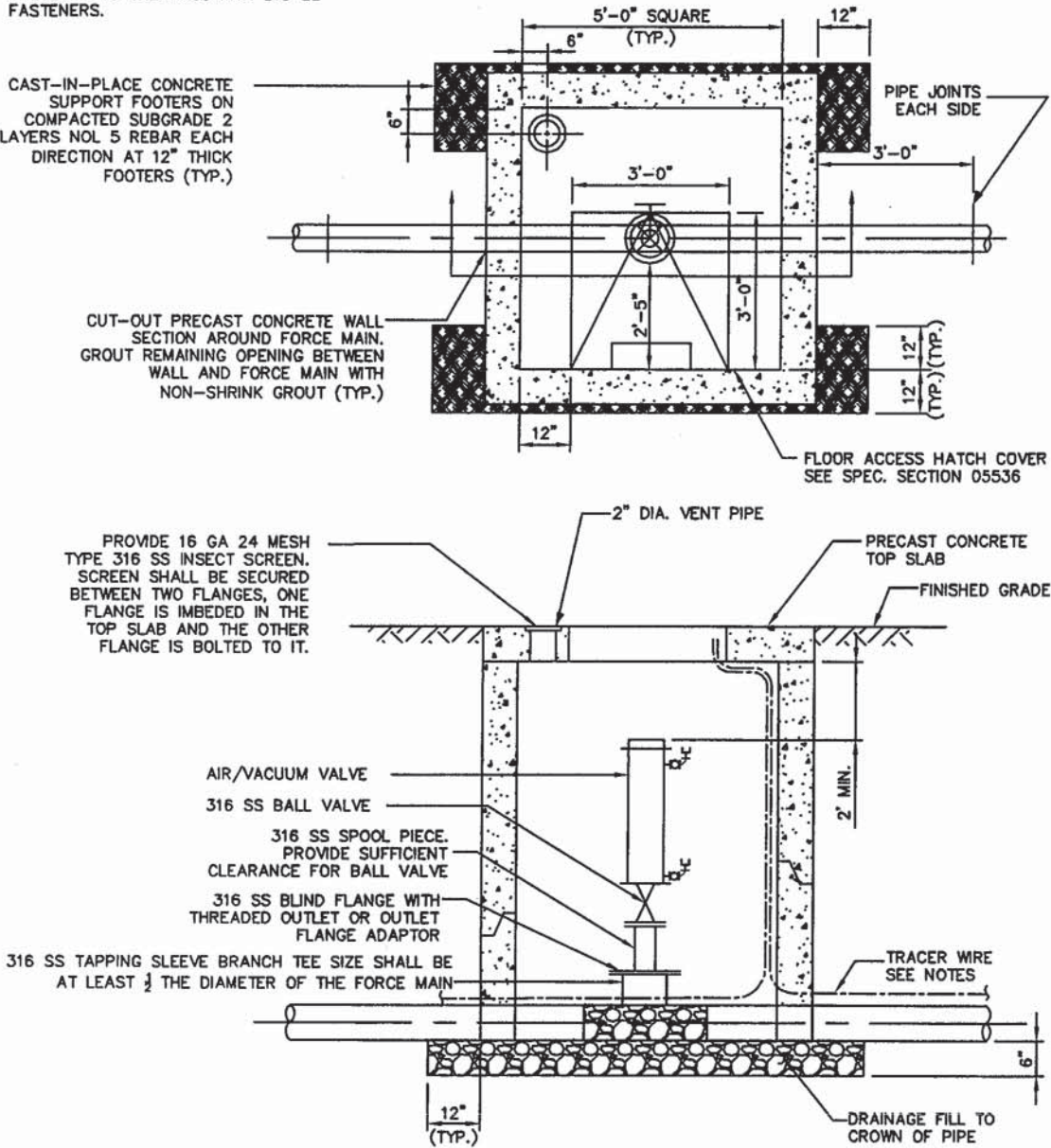
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STANDARD
DRAWING NO:

121

NOTES:

- 1. PROVIDE 316 STAINLESS STEEL BOLTS AT ALL CONNECTIONS.
- 2. TOP SLAB AND HATCH SHALL MEET AASHTO H-20 LOADING REQUIREMENTS
- 3. TAPPING SLEEVE SIZE MAY CHANGE IF HDPE PIPE IS USED.
- 4. TRACER WIRE SHALL BE RUN TO THE INSIDE OF THE HATCH OPENING AND FASTENED TO THE WALL WITH 316 SS FASTENERS.



AIR RELEASE VAULT DETAIL
N.T.S.

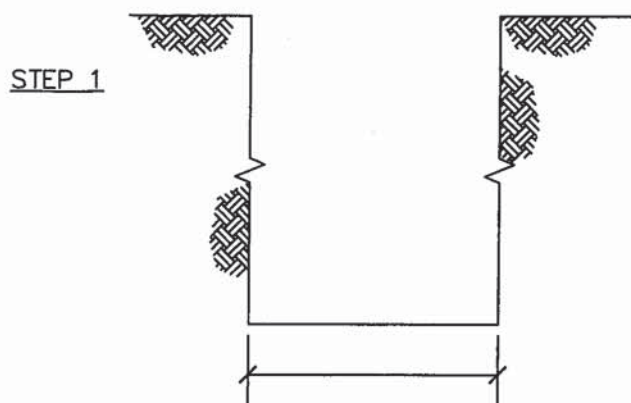
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DATE:
APRIL 2010
STANDARD
DRAWING NO:
124

NKSD1 Requirements for Sewer Trench Compaction



MINIMUM TRENCH WIDTH
SEE NOTES BELOW

- EXCAVATED TRENCH
- PIPE NOT INSTALLED YET
- EXAMINE TRENCH BOTTOM:
 - IF FIRM & SOLID, PROCEED TO NEXT STEP
 - IF UNSUITABLE SUBGRADE IS ENCOUNTERED, CONTRACTOR SHALL OVER EXCAVATE BOTTOM TO REMOVE UNSUITABLE MATERIAL & REPLACE WITH SUITABLE BACKFILL

FLEXIBLE PIPE

PIPE LESS OR EQUAL TO 36" DIA
PIPE GREATER THAN 36" DIA

MIN TRENCH WIDTH

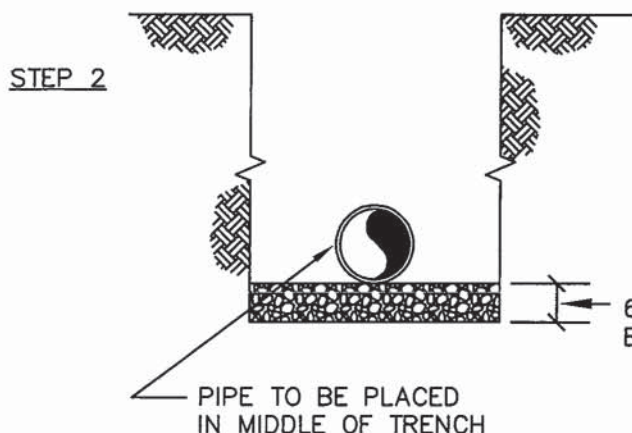
PIPE O.D. + 24"
PIPE O.D. + 48"

RIGID PIPE

PIPE LESS OR EQUAL TO 36" DIA
PIPE GREATER THAN 36" DIA

MIN TRENCH WIDTH

PIPE O.D. + 24"
PIPE O.D. + 2*(O.D./6)

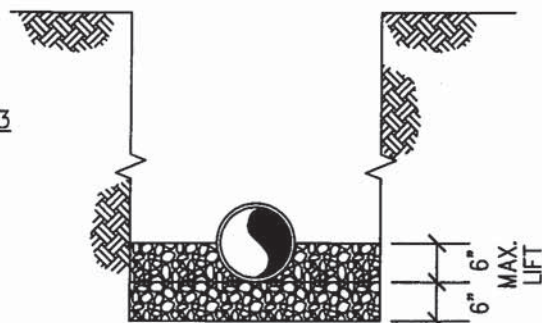


- PLACE 6" EMBEDMENT MAT'L IN TRENCH
- COMPACT GRANULAR & SAND
DENSITY (ASTM D 4253 AND D 4254).
- PLACE PIPE ON TOP OF COMPACTED MATERIALS TO AT LEAST 75% RELATIVE MATERIAL.

NOTES

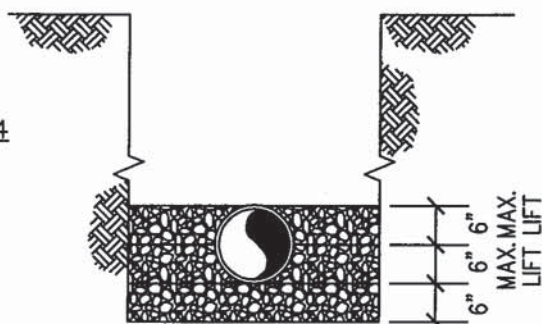
- * APPLIES TO ALL AREAS, EXCEPT BENEATH STRUCTURES, FOUNDATIONS, AND ROADWAYS WHERE COMPACTION TO AT LEAST 85% RELATIVE DENSITY IS REQUIRED.

STEP 3



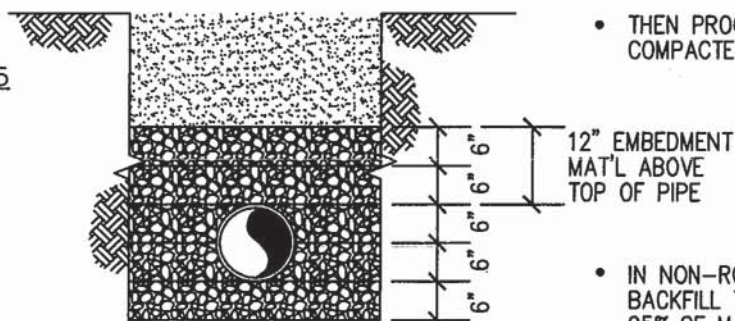
- PLACE EMBEDMENT MATERIAL IN A 6" LIFT MAXIMUM ALONG SIDES OF PIPE.
- HAVE CONTRACTOR SLICE MAT'L UNDER HAUNCHES OF PIPE WITH SHOVEL OR OTHER DEVICE TO FILL IN ALL VOID AREAS.
- COMPACT GRANULAR AND SAND MATERIALS TO AT LEAST 75% RELATIVE DENSITY. SEE STEP 2.

STEP 4



- PLACE NEXT 6" MAXIMUM LIFT OF EMBEDMENT MATERIAL ABOVE PREVIOUS LIFT.
- COMPACT EMBEDMENT MAT'L TO AT LEAST 75% RELATIVE DENSITY IN ACCORDANCE WITH STEP 2.
- CONTINUE PLACING EMBEDMENT MAT'L IN 6" LIFTS AND COMPACTING UNTIL REACH TOP OF PIPE.

STEP 5



- CONTINUE PLACING EMBEDMENT MATERIAL IN 6" MAXIMUM LIFTS AND COMPACT SAME AS ABOVE, UNTIL THERE IS 12" EMBEDMENT MATERIAL ABOVE THE TOP OF THE PIPE.
- THEN PROCEED WITH SOIL BACKFILL IN 8" COMPACTED LIFTS ABOVE EMBEDMENT MATERIAL.
- IN NON-ROADWAY AREAS, SUITABLE BACKFILL TO BE COMPACTED TO 95% OF MAXIMUM STANDARD PROCTOR DRY UNIT WEIGHT AS DETERMINED BY ASTM D 698. FOR COMPACTION OF BACKFILL IN OTHER AREAS, SEE SECTION 02220.



Kentucky Transportation Cabinet

Highway District 6

and

_____ **(2), Construction**

**Kentucky Pollutant Discharge Elimination System
Permit KYR10**

Best Management Practices (BMP) Plan

Groundwater Protection Plan

For Highway Construction Activities

For

**KY 237 – Pleasant Valley Road &
Camp Ernst Widening (Section 3)**

Contract ID (2)

Six Year Plan 6-8001.25

Revised
1-28-08

KYTC BMP Plan for Contract ID ##### (6-8001.25)

Project Information

Note – (1) = Design (2) = Construction (3) = Contractor

1. Owner – Kentucky Transportation Cabinet, District 6
2. Resident Engineer: (2)
3. Contractor Name: (2)
 Address: (2)
 Phone number: (2)
 Contact: (2)
 Responsible Person: (3)
4. Contract ID Number: (2)
5. Route (Address): KY 237, from Rogers Lane to KY 18
6. Latitude/Longitude (project mid-point) 39.020950, -84.701286
7. County (project mid-point): Boone
8. Project start date (date work will begin): (2)
9. Projected completion date: (2)

KYTC BMP Plan for Contract ID ##### (6-8001.25)

1.0 SITE DESCRIPTION.

- 1) Nature of construction activity (from letting project description): Widen and improve KY 237 from Rogers Lane to beyond KY 18. Also, construct ramps along KY 18 to a new bridge which crosses over KY 18. Major structures included are bridge at KY 237/KY 18 and MSE Walls for ramps to bridge.
- 2) Order of major soil disturbing activities: (2) and (3)
- 3) Projected volume of material to be moved: 254,363 cy
- 4) Estimate of total project area (acres): 72.26 ac
- 5) Estimate of area to be disturbed (acres): 72.26 ac
- 6) Post construction runoff coefficient is 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: Reference Soil Data sheets included in Roadway Plan set, Sheets R110 – R118. (2)
- 8) Data describing existing discharge water quality (if any): (2)
- 9) Receiving water name: **Allen Fork and Gunpowder Creek**
- 10) TMDLs and Pollutants of Concern in Receiving Waters: While the projects directly drains to unnamed tributaries with no identified pollutants of concern, several pollutants have been identified for the receiving stream of Gunpowder Creek including: sedimentation/siltation; nutrient/eutrophication/biological indicators; organic enrichment (sewage) biological indicators and unknown causes. Kentucky Division of Water (KDOW) completed nutrient and pathogen monitoring in 2007. KDOW will pursue development of the nutrient and organic enrichment TMDL when nutrient targets are available per section 4.2.2.2 of the *2010 Integrated Report to Congress of the Condition of Water Resources in Kentucky*.
- 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)

KYTC BMP Plan for Contract ID ##### (6-8001.25)

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.

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 gravel and temporary mulch and/or vegetation.
- 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.
 - 3) Silt Traps Type A for small areas.
 - 4) Silt Traps Type C in front of existing and drop inlets which are to be saved.
 - 5) Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.

KYTC BMP Plan for Contract ID ##### (6-8001.25)

- 6) Brush and/or other barriers to slow and/or divert runoff.
- 7) Silt fences to catch sheet runoff on short slopes. For longer slopes, multiple rows of silt fence may be considered.
- 8) Temporary Mulch for areas which are not feasible for the fore mentioned types of protections.
- 9) Non-standard or innovative methods.

D) Cut and Fill 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) Temporary Mulch and/or seeding for areas where construction activities will be ceased for 21 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. Probable 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.
- 4) Temporary Mulch for areas where Permanent Seeding and Protection cannot be done within 21 days.
- 5) Special BMPs such as Karst Policy.

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 or Permanent Seeding and Protection on moderate grades.
- 2) Permanent Seeding and Protection.
- 3) Placing Sod.
- 4) Planting trees and/or shrubs where they are included in the project.

G) Post Construction. BMPs including Storm Water Management Devices such as velocity dissipation devices and Karst policy BMPs to be installed during construction to control the pollutants in storm water discharges that will occur after construction has been completed are: Reference Roadway Plan set and Standard Specifications for Road and Bridge Construction.

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2.4 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.

2.5 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.

2.6 The following product-specific practices will be followed onsite:

- 1) **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.

- 2) **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.
- 3) **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

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drainage or storm sewer system but will be properly disposed of according to manufacturers' instructions or state and local regulations.

- 4) **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
- 5) **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:
 - a) 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.
 - b) 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.
 - c) All spills will be cleaned up immediately after discovery.
 - d) The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
 - e) Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.
 - f) The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
 - g) Spills of products will be cleaned up promptly. Wastes from spill clean up will be disposed in accordance with appropriate regulations.

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

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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.

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.

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 weekly and post rain event inspections with action being taken by the Contractor to correct deficiencies.

Post Construction maintenance will be a function of normal highway maintenance operations. Following final project acceptance by the Cabinet, district highway crews will be responsible for identification and correction of deficiencies regarding ground cover and cleaning of storm water BMPs. The project manager shall identify any BMPs that will be for the purpose of post construction storm water management with specific guidance for any non-routine maintenance: N/A – Boone County Public Works to maintain detention facilities constructed as part of this project.

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 once each week and following any rain of one-half inch or more.
- 2) Inspections will be conducted by individuals that have received KYTC Grade Level II training or other qualification as prescribed by the cabinet that includes instruction concerning sediment and erosion control.

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- 3) Inspection reports will be written, signed, dated, and kept on file.
- 4) Areas at final grade will be seeded and mulched within 14 days.
- 5) Areas that are not at final grade where construction has ceased for a period of 21 days or longer and soil stock piles shall receive temporary mulch no later than 14 days from the last construction activity in that area.
- 6) 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 5 calendar days.
- 7) Built-up sediment will be removed from behind the silt fence before it has reached halfway up the height of the fence.
- 8) Silt fences will be inspected for bypassing, overtopping, undercutting, depth of sediment, tears, and to ensure attachment to secure posts.
- 9) Sediment basins will be inspected for depth of sediment, and built-up sediment will be removed when it reaches 70 percent of the design capacity and at the end of the job.
- 10) 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.
- 11) 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.
- 12) 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 from 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)

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The following activities, as enumerated by 401 KAR 5:037 Section 2. (2) requiring the preparation and implementation of a groundwater protection plan, will or may be conducted as part of this construction project:

_____ (e) Land treatment or land disposal of a pollutant;

_____ (f) 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);

_____ (g) Handling of materials in bulk quantities (equal or greater than 55 gallons or 100 pounds net dry weight transported held in an individual container) that, if released to the environment, would be a pollutant;

_____ (j) Storing or related handling of road oils, dust suppressants, or deicing agents at a central location;

_____ (k) Application or related handling of road oils, dust suppressants or deicing materials, (does not include use of chloride-based deicing materials applied to roads or parking lots);

_____ (m) Installation, construction, operation, or abandonment of wells, bore holes, or core holes, (this does not include bore holes for the purpose of explosive demolition);

Or, check the following only if there are no qualifying activities

_____ There are no activities for this project as listed in 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan.

The Contractor is responsible for the preparation of a plan that addresses the 401 KAR 5:037 Section 3. (3) Elements of site specific groundwater protection plan:

- (a) General information about this project is covered in the Project information;
- (b) Activities that require a Groundwater Protection Plan have been identified above;
- (c) Practices that will protect groundwater from pollution are addressed in Section C. Other control measures.
- (d) Implementation schedule – all practices required to prevent pollution of groundwater are to be in place prior to conducting the activity;
- (e) Training is required as a part of the ground water protection plan. All employees of the Contractor, Sub-Contractor and Resident Engineer personnel will be trained to understand the nature and requirements of this plan as they pertain to their job function(s). Training will be accomplished within one week of employment and annually thereafter. A record of training will be maintained by the Contractor with a copy provide to the Resident Engineer.

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- (f) Areas of the project and Groundwater Plan activities will be inspected as part of the weekly sediment and erosion control inspections
- (g) Certification (see signature page.)

Contractor and Resident Engineer Plan Certification

The Contractor that is responsible for implementing this BMP plan is identified in the Project Information section of this plan.

The following certification applies to all parties that are signatory to this BMP plan:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Further, this plan complies with the requirements of 401 KAR 5:037. By this certification, the undersigned state that the individuals signing the plan have reviewed the terms of the plan and will implement its provisions as they pertain to ground water protection.

Contractor and Resident Engineer Certification:

(3)
Signed _____ Title _____ , _____
Type or Print Name¹ Signature

(2)
Signed _____ Title _____ , _____
Type or Print Name² Signature

- 1. Contractor’s Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.
- 2. KYTC’s Note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the Resident Engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601 Reference the Contract ID number and KPDES number when one has been issued.

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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 Sub-Contractor is responsible to implement is:

I certify under penalty of law that I understand the terms and conditions of the general Kentucky Pollutant Discharge Elimination System permit that authorizes the storm water discharges, the BMP plan that has been developed to manage the quality of water to be discharged as a result of storm events associated with the construction site activity and management of non-storm water pollutant sources identified as part of this certification.

Signed _____ Title _____ , _____
Type or Print Name¹ Signature

1. Sub-Contractor’s Note: To be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Contract ID number and KPDES number when one has been issued.

SPECIAL NOTE

**KPDES Stormwater Permit
eNOI Process**

**Boone County
Item No. 6-8001.25**

Effective August 1, 2009, the Kentucky Division of Water implemented a new process for obtaining coverage under the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Stormwater Discharges Associated with Construction Activities (KYR10). Notices of Intent should be submitted electronically using their form (eNOI) which is located at the following link:

<https://dep.gateway.ky.gov/eForms/default.aspx?FormID=7>.

The eNOI for this project has been initiated by the District 6 KYTC Project Development Branch and can be retrieved for completion using the following transaction ID number:

8177e666-e6ad-46a9-aeec-ae137a757ece

Please be advised that the eNOI will be completed and submitted by District 6 personnel at some time after the project is let to construction and that no earth-disturbing activities can occur on the project until an official approval is obtained from the Kentucky Division of Water.

If there are any questions regarding this note, please contact David Waldner, Director, Division of Environmental Analysis, TCOB, 200 Mero Street, Frankfort, KY 40622, Phone: (502) 564-7250.

KENTUCKY TRANSPORTATION CABINET
COMMUNICATING ALL PROMISES (CAP)

SYP8161

10 AUG 2012

<u>Item No.</u>	6 - 8001.25			<u>Project Mgr.</u>	CAROL CALLAN- RAMLER
			<u>County</u>	BOONE	<u>Route</u> KY-237
<u>CAP #</u>	<u>Date of Promise</u>	<u>Promise made to:</u>	<u>Location of Promise</u>		
1	06-JAN-12	C. Callan-Ramer / Tim Flynn	D6 Design & ROW		
<u>CAP Description</u>					
PARCEL 345: PER MOU: 50' ENTRANCE. STATE AGREES TO REPAIR AND RE-ESTABLISH PARKING AREA WITHIN 6 DAY CONSTRUCTION PERIOD AND PROPERTY OWNER TO RECEIVE NOTICE TWO WEEKS PRIOR TO CONTRACTOR STARTING CONSTRUCTION OF ENTRANCE AND PARKING AREA. ALSO, STATE AGREES TO INSTALL STORM DRAIN AT ESTABLISHED LOW SPOT OF RE-CONSTRUCTED PARKING AREA/ENTRANCE.					

N O T I C E

**DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
(LETTER OF PERMISSION AUTHORIZATION)**

PROJECT: Item No. 6-8001.25; Boone County
KY-237 Reconstruction and Widening

The Section 404 activities for this project have been previously permitted under the authority of the Department of the Army Individual Permit under the “Letter of Permission” for linear transportation projects. In order for this authorization to be valid, the attached conditions must be followed. The contractor shall post a copy of this Permit 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, DEA Permit Coordinator, for office records and for informational purposes.



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

REPLY TO
ATTENTION OF:

July 2, 2012

Operations Division
Regulatory Branch (South)
ID No. LRL-2012-254-pjl

Mr. John W. Purdy
Kentucky Transportation Cabinet
220 Mero Street
Frankfort, Kentucky 40622

Dear Mr. Purdy:

This is in regard to your application for a Department of the Army (DA) permit dated May 25, 2012, concerning a plan to reconstruct and widen KY-237 from Rogers Lane to KY-18 near Burlington in Boone County, Kentucky. The project would result in impacts to intermittent and ephemeral tributaries of Allen Fork and Gunpowder Creek. We have reviewed your application and have made the following determinations: the work is minor in nature, will not have a significant impact on the environment, and should encounter no opposition.

Based on these determinations, your proposed work satisfies the Letter of Permission criteria, as specified in our regulations and the procedures outlined in the Letter Of Permission No. 200600250-pgj issued on October 3, 2007. Therefore, you are authorized, in accordance with 33 USC 404 of the Clean Water Act, to discharge dredged and fill materials into waters of the United States associated with filling, channel alignment, grading and/or culvert placement at 4 locations involving tributaries to Allen Fork and Gunpowder Creek. This permission is granted with the following conditions:

- a. The project shall be constructed in accordance with plans included in the May 25, 2012 application for Kentucky Transportation Cabinet, Item No. 6-8001.25 for Department of the Army Permit.
- b. The permittee shall install and maintain adequate erosion/sedimentation controls around all disturbed earthen areas until such time as those areas have been stabilized and revegetated.
- c. The permittee shall provide to the District Engineer written proof of purchase of 964.8 adjusted mitigation units (AMUs) from the Northern Kentucky Stream Corridor Restoration Fund prior to conducting work in "waters of the United States."

- d. The time limit for completing the work authorized ends five years from the date of this letter. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least 1 month before the above date is reached.
- e. Upon completion of construction you are to notify the District Engineer. The enclosed Completion Report form must be completed and returned to this office.
- f. You must agree to comply with the enclosed General Conditions.

This authorization will be effective as soon as we receive your signed acceptance of these conditions. Please sign and date the duplicate copy of this letter in the space provided and return the signed copy in the enclosed envelope. Note that we also perform periodic inspections to ensure compliance with our permit conditions and appropriate Federal laws.

This letter contains a proffered permit for your proposed project as well as Approved and Preliminary Jurisdictional Determinations (JD) for the project site. If you object to this decision or the approved JD (Preliminary JDs are not appealable), you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this decision you must submit a completed RFA form to the Lakes and Rivers Division Office at the following address:

Regulatory Appeals Officer
U.S. Army Engineer Division
Great Lakes and Ohio River
550 Main Street - Room 10032
Cincinnati, Ohio 45202-3222
(513) 684-6212

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by August 29, 2012.

It is not necessary to submit an RFA form to the Division office if you do not object to the decision in this letter.

Copies of this letter will be sent to the appropriate coordinating agencies (see enclosure for addresses).


FOR THE DISTRICT ENGINEER:



Pam Loeffler
Regulatory Specialist
Regulatory Branch

Enclosures

(I accept the conditions of this authorization):



Kentucky Transportation Cabinet

7.6.12

Date

GENERAL CONDITIONS:

1. Discharges of dredged or fill material into "waters of the U.S." must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site). In determining the minimal impact threshold, the Districts will consider the direct, secondary, and cumulative impacts of the fill or work and any mitigation measures.
2. The permittee shall provide a mitigation/monitoring plan for impacts resulting from the placement of fill into "waters of the U.S." in excess of 300 linear feet of intermittent or perennial stream; the filling of greater than 0.10 acre (4,356 sq. feet) of waters of the U.S; or work causing more than minimal effects, to compensate for impacts to the "waters of the U.S." These impact thresholds are applied for each crossing. When mitigation is required, the permittee will develop the mitigation site concurrently with, or in advance of, the site construction unless the Corps determines on a project specific basis that it is not practical to do so. This will ensure that aquatic functions are not lost for long periods of time (e.g. temporal loss) which could adversely affect water quality and wildlife. The requirement for conservation easements or deed restrictions will be determined on a project specific basis.
3. The permittee shall ensure that sedimentation and soil erosion control measures are in place prior to commencement of construction activities. These measures will remain in place and be properly maintained throughout construction. Sedimentation and soil control measures shall include the installation of straw bale barriers, silt fencing and/or other approved methods to control sedimentation and erosion. Sedimentation and erosion controls will not be placed in "waters of the U.S." except if specifically approved by the District.
4. The permittee shall ensure that areas disturbed by any construction activity, including channel and stream banks, are immediately stabilized and revegetated with a combination of non-invasive plants (grasses, legumes and shrubs) which are compatible with the affected area and will not compete with native vegetation.
5. The permittee shall ensure that no in-stream construction activity is performed during periods of high stream flow or during the fish spawning season (April 1 through June 30) without first contacting the Kentucky Department of Fish and Wildlife Resources (KDFWR) for their expertise on impacts to the fishery resource. Additionally, the discharge of dredged and/or fill material in known waterfowl breeding and wintering areas must be avoided to the maximum extent practicable.
6. The permittee will ensure that the activity authorized will not disrupt movement of those aquatic species indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's specific purpose is to impound water.
7. The permittee shall ensure that all construction equipment is refueled and maintained on an upland site away from existing streams, drainageways and wetland areas. Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.

8. The permittee must comply with any case specific special conditions added by the Corps or by the State Section 401 Water Quality Certification (WQC). The conditions imposed in the State Section 401 WQC are also conditions of this LOP.

9. The permittee shall ensure that no activity authorized by the LOP may cause more than a minimal adverse effect on navigation.

10. The permittee shall ensure proper maintenance of any structure or fill authorized by the LOP, in good condition and in conformance with the terms and conditions of the LOP, including maintenance to ensure public safety. The permittee is not relieved of this requirement if the permitted activity is abandoned, although the permittee may make a good faith transfer to a third party. Should the permittee wish to cease to maintain the authorized activity or desire to abandon it without a good faith transfer, the permittee must obtain a modification to the LOP from the Corps, which may require restoration of the area.

11. The permittee shall not perform any work within any Wild and Scenic Rivers or in any river officially designated as a "study river" for possible inclusion in the system, unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity authorized by the LOP will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal Land Management agency in the area (e.g. U.S. Forest Service, Bureau of Land Management, the National Parks Service, or the U.S. Fish and Wildlife Service).

12. The permittee shall not perform any work under the LOP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. The permittee shall notify the Corps and coordinate the proposed action with the USFWS to determine if any listed species or critical habitat might be affected and/or adversely modified by the proposed work. No activity is authorized under the LOP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. At the direction of the Corps, the permittee shall complete the necessary consultation with the USFWS, satisfying the requirements of Section 7(a)(2) of the Endangered Species Act. The permittee shall not begin work until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Authorization of an activity under the LOP does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act.

Obligations under Section 7 of the Act must be reconsidered by the Corps Districts if (1) new information reveals impacts of the proposed action may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during consultation, or (3) new species are listed or critical habitat designated that might be affected

13. The permittee shall not perform any activity under the LOP which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The permittee must notify the District Engineer if the activity authorized by the LOP may affect any historic properties listed, determined to be eligible or which the permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin construction until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the Kentucky Heritage Council.

If the permittee discovers any previously unknown historic or archaeological remains while accomplishing the activity authorized by the LOP, work must be immediately stopped and this office immediately notified regarding the discovery. The District will initiate the Federal, Tribal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

14. The permittee shall not perform any work under the LOP where the discharge of dredged and/or fill material will occur in the proximity of a public water supply intake.

15. No activity, including structures or work in "waters of the U.S." or discharges of dredged or fill material may consist of unsuitable materials (e.g. trash, debris, car bodies, asphalt, etc.) and that materials used for construction or discharge must be free from toxic pollutants in toxic amounts.

16. The permittee shall, to the maximum extent practicable, design the project to maintain pre-construction downstream flow conditions. Furthermore, the work must not permanently restrict or impede the passage of normal or expected high flows and the structure or discharge of fill must withstand expected high flows. The project must provide, to the maximum extent practicable, for retaining excess flows from the site and for establishing flow rates from the site similar to pre-construction conditions.

17. The permittee shall ensure that all temporary fills, authorized under the LOP, be removed in their entirety and the affected areas returned to pre-construction elevation.

18. Representatives from the Corps of Engineers and/or the State of Kentucky may inspect any authorized activity or mitigation site at any time deemed necessary to ensure compliance with the terms and conditions of the LOP, Section 401 WQC, and applicable laws.

19. All work authorized by this LOP must be completed within five years after the date of the Corps authorization letter. If you find you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least three months before the expiration date.

20. The permittee, after completion of work under the LOP, shall submit a signed certification letter regarding the completed work and required mitigation, if applicable. The certification letter will include a statement that the work was done in accordance with the LOP authorization including compliance with all general and special conditions and completion of mitigation work.

21. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of the LOP.

22. For Section 10 waters, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

N O T I C E

DIVISION OF WATER (WATER QUALITY CERTIFICATION)

PROJECT: Boone Co; Item No. 6-8001.25
KY-237 Reconstruction and Widening

The Division of Water has approved the Section 401 activities for this project by issuance of a Individual Water Quality Certification. In order for this authorization to be valid, the attached conditions must be followed. The contractor shall post a copy of this Water Quality Certification 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 appropriate permit agency. A copy of any request 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.

Note: KYTC is required to notify the KY Division of Water, Water Quality Section two weeks prior to construction commencement. Also, careful attention to sediment and erosion control is mandatory throughout the duration of this project as the Licking River is designated as an Outstanding State Resource Water.



Ernie Fletcher
Governor

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET

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Frankfort, Kentucky 40601
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Teresa J. Hill
Secretary

**General Certification--Nationwide Permit # 14
Linear Transportation Projects**

This General Certification is effective March 19, 2007, 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.

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 5, 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. This general certification shall not apply to nationwide permits issued for individual crossings that are part of a larger road segment project where the cumulative, unmitigated wetland impacts within a 14-HUC total one (1) acre or more.
2. The individual stream crossing will impact less than 300 linear feet of intermittent or perennial streams, unless excluded by condition # 3. Impacts to ephemeral streams are not limited under this general certification.
3. This general certification shall not apply to nationwide permits issued for individual crossings which meet condition # 2 but that are part of a larger road segment project where the cumulative, unmitigated intermittent and perennial stream impacts within a 14-HUC exceed 500 linear feet.
4. The activity will not occur within waters of the Commonwealth identified by the Kentucky Division of Water as Outstanding State or National Resource Waters, Cold Water Aquatic Habitat, or Exceptional Waters.

General Certification--Nationwide Permit #14
Linear Transportation Crossings
Page Two

5. Stream impacts covered under this nationwide permit 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.
6. Projects that do not meet the conditions of this general certification require an individual Section 401 water quality certification.
7. Activities qualifying for coverage under this general water quality certification are subject to the following conditions:
 - Stream crossings shall be constructed in such a manner that does not impede the movement of aquatic organisms.
 - Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
 - In areas not riprapped or otherwise stabilized, revegetation of stream banks and riparian zones shall occur concurrently with project progression. At a minimum, revegetation will approximate pre-disturbance conditions.
 - To the maximum extent practicable, all in stream work under this certification shall be performed during low flow.
 - Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances where such 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 riprap is utilized, it is to be of such weight and size that bank stress or slump conditions will not be created because of its placement.
 - If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when work will be done.

General Certification--Nationwide Permit #14
Linear Transportation Crossings
Page Three

- Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.
- Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling 800/928-2380.

Non-compliance with the conditions of this general certification or violation of Kentucky state water quality standards may result in civil penalties.

This general certification will expire on March 19, 2012, or sooner if the USACE makes significant changes to this nationwide permit.



STEVEN L. BESHEAR
GOVERNOR

LEONARD K. PETERS
SECRETARY

ENERGY AND ENVIRONMENT CABINET

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

DIVISION OF WATER

200 FAIR OAKS LANE, 4TH FLOOR

FRANKFORT, KENTUCKY 40601

www.kentucky.gov

May 30, 2012

Mr. David Waldner, Director
KYTC Division of Environmental Analysis
200 Mero Street, 5th Floor
Frankfort, KY 40622

Re: Water Quality Certification # 2008-0058-1M
KY 237 - Boone Co
KYTC Item No.: 6-8001.25 Modified WQC
USACE ID No.: LRL-2012-254
AI No.: 96587; Activity ID: APE20120001
Boone County, Kentucky

Dear Mr. Waldner:

Pursuant to Section 401 of the Clean Water Act (CWA), the Commonwealth of Kentucky certifies it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 303, 304, 306, and 307 of the CWA, will not be violated by the above referenced project provided that the U.S. Army Corps of Engineers authorizes the activity under 33 CFR part 330, and the attached conditions are met.

All future correspondence on this project must reference **AI No. 96587**. **The attached document is your official Water Quality Certification; please read it carefully.** If you should have any questions concerning the conditions of this water quality certification, please contact Adam Jackson of my staff by calling (502) 564-3410.

Sincerely,

A handwritten signature in black ink that reads "Barbara J. Scott".

Barbara Scott, Supervisor
Water Quality Certification Section
Kentucky Division of Water

BJS: AJ

Attachment

cc: Pam Loeffler, USACE: Louisville District
Lee Andrews, USFWS: Frankfort
John Purdy, KYTC DEA

KTC Water Quality Certification

KY 237 - Boone Co

Facility Requirements

Permit Number:WQC# 2008-0058-1I

Activity ID No.: APE20120001

AAZZ0000000001 (KYTC Item 6-8001.25) Reconstruct and Widen KY 237:

Submittal/Action Requirements:

Condition No.	Condition
S-1	The Kentucky Transportation Cabinet shall submit notification: Due prior to construction commencement to the Water Quality Certification Section of the Kentucky Division of Water. This notification shall consist of payment verification of an in-lieu-fee payment to the Northern Kentucky Stream Corridor Restoration Fund. The required in-lieu-fee payment shall be identified within the U.S. Army Corps of Engineers' authorization. [Clean Water Act]

Narrative Requirements:

Condition No.	Condition
T-1	The work approved by this certification shall be limited to: <ul style="list-style-type: none">- the loss of 599 linear feet of poor quality unnamed intermittent stream within the Allen Fork watershed, specifically 439 linear feet (Station 33+00) and 160 linear feet (Station 36+00).- the loss of 365 linear feet of an unnamed intermittent tributary to Gunpowder Creek due to a culvert placement (Station 58+00). [Clean Water Act]
T-2	The Kentucky Division of Water accepts the anticipated USACE mitigation requirement of 964.8 Adjusted Mitigation Units (AMUs) for the 804 linear feet of intermittent stream impacts (Stations 33+00 and 58+00) associated with the reconstruction and widening of KY 237 from Rogers Lane to KY 18. Payment shall be made to the Northern Kentucky Stream Corridor Restoration Fund. [Clean Water Act]
T-3	All work performed under this certification shall adhere to the design and specifications set forth in the Revised Application for Water Quality Certification package (KYTC Item No. 6-8001.25; Boone County), received by the Kentucky Division of Water on March 22, 2012. [Clean Water Act]
T-4	The Kentucky Transportation Cabinet shall notify the Kentucky Division of Water, Water Quality Certification Section at the start of construction. [Clean Water Act]
T-5	The Kentucky Transportation Cabinet shall notify the Kentucky Division of Water, Water Quality Certification Section once construction is complete. [Clean Water Act]
T-6	The Kentucky Transportation Cabinet is responsible for preventing degradation of waters of the Commonwealth from soil erosion. An erosion and sedimentation control plan must be designed, implemented, and maintained in effective operating condition at all times during construction. [Clean Water Act]

KTC Water Quality Certification

KY 237 - Boone Co
Facility Requirements
Permit Number:WQC# 2008-0058-1I
Activity ID No.: APE20120001

AAZZ0000000001 (continued):

Narrative Requirements:

Condition No.	Condition
T-7	The Division of Water reserves the right to modify or revoke this certification should it be determined that the activity is in noncompliance with any condition set forth in this certification. [Clean Water Act]
T-8	If construction does not commence within two years of the date of this letter, this certification will become void. A letter requesting a renewal should be submitted. [Clean Water Act]
T-9	Other permits may be required from the Division of Water for this project. If this project takes place within the floodplain, a permit may be required from the Surface Water Permits Branch. The contact person is Todd Powers. If this project will disturb one acre or more of land, a KPDES general storm water permit will be required from the Surface Water Permits Branch. The contact person is Allen Ingram. Both can be reached at 502-564-3410. [Clean Water Act]



STEPHEN L.
BESHEAR
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
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FRANKFORT, KENTUCKY 40601
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LEONARD K. PETERS
SECRETARY

ATTENTION APPLICANT

If your project involves one or more of the following activities, you may need more than one permit from the Kentucky Division of Water.

- *building in a floodplain**
- *road culvert in a stream**
- *streambank stabilization**
- *stream cleanup**
- *utility line crossing a stream**
- *construction sites an acre or more**

- If the project will disturb one acre or more of land, or is part of a larger common plan of development or sale that will ultimately disturb one acre or more of land, a Kentucky Pollution Discharge Elimination System (KPDES) stormwater permit shall be required from the Operational Permits Section. This permit requires the creation of an erosion control plan.

Contact Allen Ingram.

- Projects that involve filling in the floodplain will require a stream construction permit from the Floodplain Management Section.

Contact Todd Powers.

- Projects that involve work IN a stream, such as bank stabilization, road culverts, utility line crossings, and stream alteration will require a stream construction permit and a Water Quality Certification from the Water Quality Certification Section.

Contact Barbara Scott.

All three contacts listed above can be reached at 502/564-3410. A complete listing of environmental programs administered by the Kentucky Department for Environmental Protection is available from Pete Goodman by calling 502/564-3410.

GENERAL CONDITIONS FOR WATER QUALITY CERTIFICATION

1. 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.
2. Nationwide permits issued by the U.S. Army Corps of Engineers for projects in Outstanding State Resource Waters, Cold Water Aquatic Habitats, and Exceptional Waters as defined by 401 KAR 10:026 shall require individual water quality certifications.
3. 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.
4. Sediment and erosion control measures (e.g., check-dams, silt fencing, or hay bales) 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, placement shall not be conducted in such a manner that may cause instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control measures shall be removed and the natural grade restored prior to withdrawal from the site.
5. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
6. To the maximum extent practicable, all in-stream work under this certification shall be performed during low flow.
7. Heavy equipment (e.g. bulldozers, backhoes, draglines, etc.), if required for this project, should not be used or operated within the stream channel. In those instances where such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize re-suspension of sediments and disturbance to the channel, banks, or riparian vegetation.
8. If there are water supply intakes located downstream that may be affected by increased turbidity, the permittee shall notify the operator when work will be performed.
9. Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.
10. Should stream pollution, wetland impairment, and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling 800/564-2380.

PART II

SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2012* and *Standard Drawings, Edition of 2012 with the 2012 Revision*.

**Supplemental Specifications to the Standard Specifications for Road and
Bridge Construction, 2012 Edition**

(Effective with the August 17, 2012 Letting)

Subsection:	402.03.02 Contractor Quality Control and Department Acceptance.
Part:	D) Testing Responsibilities.
Number:	4) Density.
Revision:	Replace the second sentence of the Option A paragraph with the following: Perform coring by the end of the following work day.
Subsection:	606.03.17 Special Requirements for Latex Concrete Overlays.
Part:	A) Existing Bridges and New Structures.
Number:	1) Prewetting and Grout-Bond Coat.
Revision:	Add the following sentence to the last paragraph: Do not apply a grout-bond coat on bridge decks prepared by hydrodemolition.
Subsection:	609.03 Construction.
Revision:	Replace Subsection 609.03.01 with the following: 609.03.01 A) Swinging the Spans. Before placing concrete slabs on steel spans or precast concrete release the temporary erection supports under the bridge and swing the span free on its supports. 609.03.01 B) Lift Loops. Cut all lift loops flush with the top of the precast beam once the beam is placed in the final location and prior to placing steel reinforcement. At locations where lift loops are cut, paint the top of the beam with galvanized or epoxy paint.

SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

This Special Note will apply when indicated on the plans or in the proposal.

1.0 DESCRIPTION. Furnish, install, operate, and maintain variable message signs at the locations shown on the plans or designated by the Engineer. Remove and retain possession of variable message signs when they are no longer needed on the project.

2.0 MATERIALS.

2.1 General. Use LED Variable Message Signs Class I, II, or III, as appropriate, from the Department's List of Approved Materials.

Unclassified signs may be submitted for approval by the Engineer. The Engineer may require a daytime and nighttime demonstration. The Engineer will make a final decision within 30 days after all required information is received.

2.2 Sign and Controls. All signs must:

- 1) Provide 3-line messages with each line being 8 characters long and at least 18 inches tall. Each character comprises 35 pixels.
- 2) Provide at least 40 preprogrammed messages available for use at any time. Provide for quick and easy change of the displayed message; editing of the message; and additions of new messages.
- 3) Provide a controller consisting of:
 - a) Keyboard or keypad.
 - b) Readout that mimics the actual sign display. (When LCD or LCD type readout is used, include backlighting and heating or otherwise arrange for viewing in cold temperatures.)
 - c) Non-volatile memory or suitable memory with battery backup for storing pre-programmed messages.
 - d) Logic circuitry to control the sequence of messages and flash rate.
- 4) Provide a serial interface that is capable of supporting complete remote control ability through land line and cellular telephone operation. Include communication software capable of immediately updating the message, providing complete sign status, and allowing message library queries and updates.
- 5) Allow a single person easily to raise the sign to a satisfactory height above the pavement during use, and lower the sign during travel.
- 6) Be Highway Orange on all exterior surfaces of the trailer, supports, and controller cabinet.
- 7) Provide operation in ambient temperatures from -30 to + 120 degrees Fahrenheit during snow, rain and other inclement weather.
- 8) Provide the driver board as part of a module. All modules are interchangeable, and have plug and socket arrangements for disconnection and reconnection. Printed circuit boards associated with driver boards have a conformable coating to protect against moisture.
- 9) Provide a sign case sealed against rain, snow, dust, insects, etc. The lens is UV stabilized clear plastic (polycarbonate, acrylic, or other approved material) angled to prevent glare.
- 10) Provide a flat black UV protected coating on the sign hardware, character PCB, and appropriate lens areas.
- 11) Provide a photocell control to provide automatic dimming.

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- 12) Allow an on-off flashing sequence at an adjustable rate.
- 13) Provide a sight to aim the message.
- 14) Provide a LED display color of approximately 590 nm amber.
- 15) Provide a controller that is password protected.
- 16) Provide a security device that prevents unauthorized individuals from accessing the controller.
- 17) Provide the following 3-line messages preprogrammed and available for use when the sign unit begins operation:

/KEEP/RIGHT/⇒⇒⇒/	/MIN/SPEED/**MPH/
/KEEP/LEFT/⇐⇐⇐/	/ICY/BRIDGE/AHEAD/ /ONE
/LOOSE/GRAVEL/AHEAD/	LANE/BRIDGE/AHEAD/
/RD WORK/NEXT/**MILES/	/ROUGH/ROAD/AHEAD/
/TWO WAY/TRAFFIC/AHEAD/	/MERGING/TRAFFIC/AHEAD/
/PAINT/CREW/AHEAD/	/NEXT/***/MILES/
/REDUCE/SPEED/**MPH/	/HEAVY/TRAFFIC/AHEAD/
/BRIDGE/WORK/***() FT/	/SPEED/LIMIT/**MPH/
/MAX/SPEED/**MPH/	/BUMP/AHEAD/
/SURVEY/PARTY/AHEAD/	/TWO/WAY/TRAFFIC/

*Insert numerals as directed by the Engineer.

Add other messages during the project when required by the Engineer.

2.3 Power.

- 1) Design solar panels to yield 10 percent or greater additional charge than sign consumption. Provide direct wiring for operation of the sign or arrow board from an external power source to provide energy backup for 21 days without sunlight and an on-board system charger with the ability to recharge completely discharged batteries in 24 hours.

3.0 CONSTRUCTION. Furnish and operate the variable message signs as designated on the plans or by the Engineer. Ensure the bottom of the message panel is a minimum of 7 feet above the roadway in urban areas and 5 feet above in rural areas when operating. Use Class I, II, or III signs on roads with a speed limit less than 55 mph. Use Class I or II signs on roads with speed limits 55 mph or greater.

Maintain the sign in proper working order, including repair of any damage done by others, until completion of the project. When the sign becomes inoperative, immediately repair or replace the sign. Repetitive problems with the same unit will be cause for rejection and replacement.

Use only project related messages and messages directed by the Engineer, unnecessary messages lessen the impact of the sign. Ensure the message is displayed in either one or 2 phases with each phase having no more than 3 lines of text. When no message is needed, but it is necessary to know if the sign is operable, flash only a pixel.

When the sign is not needed, move it outside the clear zone or where the Engineer directs. Variable Message Signs are the property of the Contractor and shall be removed from the project when no longer needed. The Department will not assume ownership of these signs.

4.0 MEASUREMENT. The final quantity of Variable Message Sign will be

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the actual number of individual signs acceptably furnished and operated during the project. The Department will not measure signs replaced due to damage or rejection.

5.0 PAYMENT. The Department will pay for the Variable Message Signs at the unit price each. The Department will not pay for signs replaced due to damage or rejection. Payment is full compensation for furnishing all materials, labor, equipment, and service necessary to, operate, move, repair, and maintain or replace the variable message signs. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

SPECIAL NOTE FOR TURF REINFORCING MAT

1.0 DESCRIPTION. Install turf reinforcement mat at locations specified in the Contract or as the Engineer directs. Section references herein are to the Department's 2008 Standard Specifications for Road and Bridge Construction.

2.0 MATERIALS.

2.1 Turf Reinforcement Mat (TRM). Use a Turf Reinforcement Mat defined as permanent rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a three-dimensional matrix of sufficient thickness and from the Department's List of Approved Materials. Mats must be 100% UV stabilized materials. For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting exclusively. Ensure product labels clearly show the manufacturer or supplier name, style name, and roll number. Ensure labeling, shipment and storage follows ASTM D-4873. The Department will require manufacturer to provide TRMs that are machine constructed web of mechanically or melt bonded nondegradable fibers entangled to form a three dimensional matrix. The Department will require all long term performance property values in table below to be based on non degradable portion of the matting alone. Approved methods include polymer welding, thermal or polymer fusion, or placement of fibers between two high strength biaxially oriented nets mechanically bound by parallel stitching with polyolefin thread. Ensure that mats designated in the plans as Type 4 mats, are not to be manufactured from discontinuous or loosely held together by stitching or glued netting or composites. Type 4 mats shall be composed of geosynthetic matrix that exhibits a very high interlock and reinforcement capacities with both soil and root systems and with high tensile modulus. The Department will require manufacturer to use materials chemically and biologically inert to the natural soil environments conditions. Ensure the blanket is smolder resistant without the use of chemical additives. When stored, maintain the protective wrapping and elevate the mats off the ground to protect them from damage. The Department will not specify these materials for use in heavily acidic coal seam areas or other areas with soil problems that would severally limit vegetation growth.

- A) Dimensions. Ensure TRMs are furnished in strips with a minimum width of 4 feet and length of 50 feet.
- B) Weight. Ensure that all mat types have a minimum mass per unit area of 7 ounces per square yard according to ASTM D 6566.
- C) Performance Testing: The Department will require AASHTO's NTPEP index testing. The Department will also require the manufacturer to perform internal MARV testing at a Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP) accredited laboratory for tensile strength, tensile elongation, mass per unit area, and thickness once every 24,000 yds of production or whatever rate is required to ensure 97.7% confidence under ASTM D4439& 4354. The Department will require Full scale testing for slope and channel applications shear stress shall be done under ASTM D 6459, ASTM D 6460-07 procedures.

2.2 Classifications

The basis for selection of the type of mat required will be based on the long term shear stress level of the mat of the channel in question or the degree of slope to protect and will be designated in the contract. The Type 4 mats are to be used at structural backfills protecting critical

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structures, utility cuts, areas where vehicles may be expected to traverse the mat, channels with large heavy drift, and where higher factors of safety, very steep slopes and/or durability concerns are needed as determined by project team and designer and will be specified in the plans by designer.

Turf Reinforcement Matting					
Properties ¹	Type 1	Type 2	Type 3	Type 4	Test Method
Minimum tensile Strength lbs/ft	125	150	175	3000 by 1500	ASTM D6818 ²
UV stability (minimum % tensile retention)	80	80	80	90	ASTM D4355 ³ (1000-hr exposure)
Minimum thickness (inches)	0.25	0.25	0.25	0.40	ASTM D6525
Slopes applications	2H:1V or flatter	1.5H:1V or flatter	1H:1V or flatter	1 H: 1V or greater	
Shear stress lbs/ft ² Channel applications	6.0 ⁴	8.0 ⁴	10.0 ⁴	12.0 ⁴	ASTM D6459 ASTM D6460-07

¹ For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting alone.

²Minimum Average Roll Values for tensile strength of sample material machine direction.

³Tensile Strength percentage retained after stated 1000 hr duration of exposure under ASTM D4355 testing. Based on nondegradable components exclusively.

⁴Maximum permissible shear design values based on short-term (0.5 hr) vegetated data obtained by full scale flume testing ASTM D6459, D6460-07. Based on nondegradable components exclusively. Testing will be done at Independent Hydraulics Facility such as Colorado State University hydraulics laboratory, Utah State University hydraulics laboratory, Texas Transportation Institute (TTI) hydraulics and erosion control laboratory.

2.3 Quality Assurance Sampling, Testing, and Acceptance

- A) Provide TRM listed on the Department's List of Approved Materials. Prior to inclusion on the LAM, the manufacturer of TRM must meet the physical and performance criteria as outlined in the specification and submit a Letter Certifying compliance of the product under the above ASTM testing procedures and including a copy of report from Full Scale Independent Hydraulics Facility that Fully Vegetated Shear Stress meets shear stress requirements tested under D6459 and D6460-07.
- B) Contractors will provide a Letter of Certification from Manufacturer stating the product name, manufacturer, and that the product MARV product unit testing results meets Department criteria. Provide Letters once per project and for each product.
- C) Acceptance shall be in accordance with ASTM D-4759 based on testing performed by a Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP) accredited laboratory using Procedure A of ASTM D-4354.

Current mats meeting the above criteria are shown on the Department’s List of Approved Materials.

2.4 Fasteners. When the mat manufacturer does not specify a specific fastener, use steel wire U-shaped staples with a minimum diameter of 0.09 inches (11 gauge), a minimum width of one inch and a minimum length of 12 inches. Use a heavier gauge when working in rocky or clay soils and longer lengths in sandy soils as directed by Engineer or Manufacturer’s Representative. Provide staples with colored tops when requested by the Engineer.

3.0 CONSTRUCTION. When requested by the Engineer, provide a Manufacturer’s Representative on-site to oversee and approve the initial installation of the mat. When requested by the Engineer, provide a letter from the Manufacturer approving the installation. When there is a conflict between the Department’s criteria and the Manufacturer’s criteria, construct using the more restrictive. The Engineer and Manufacturer’s Representative must approve all alternate installation methods prior to execution. Construct according to the Manufacturer’s recommendations and the following as minimum installation technique:

3.1 Site Preparation. Grade areas to be treated with matting and compact. Remove large rocks, soil clods, vegetation, roots, and other sharp objects that could keep the mat from intimate contact with subgrade. Prepare seedbed by loosening the top 2 to 3 inch of soil.

3.2 Installation. Install mats according to Standard Drawing Sepias “Turf Mat Channel Installation” and “Turf Mat Slope Installation.” Install mats at the specified elevation and alignment. Anchor the mats with staples with a minimum length of 12 inches. Use longer anchors for installations in sandy, loose, or wet soils as directed by the Engineer or Manufacturer’s Representative. The mat should be in direct contact with the soil surface.

4.0 MEASUREMENT. The Department will measure the quantity of Turf Reinforcement Mat by the square yard of surface covered. The Department will not measure preparation of the bed, providing a Manufacturer’s Representative, topsoil, or seeding for payment and will consider them incidental to the Turf Reinforcement Mat. The Department will not measure any reworking of slopes or channels for payment as it is considered corrective work and incidental to the Turf Reinforcement Mat. Seeding and protection will be an incidental item.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
23274EN11F	Turf Reinforcement Mat 1	Square Yard
23275EN11F	Turf Reinforcement Mat 2	Square Yard
23276EN11F	Turf Reinforcement Mat 3	Square Yard
23277EN11F	Turf Reinforcement Mat 4	Square Yard

April 18, 2009

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 contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

- 1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
- 2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

- 1. **Instructions for Certification – First Tier Participants:**
 - a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
 - b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

- 1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
- 2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

- 1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
 - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
 - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- 2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
- 3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

**KENTUCKY TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS**

**EMPLOYMENT REQUIREMENTS
RELATING TO
NONDISCRIMINATION OF EMPLOYEES
(APPLICABLE TO FEDERAL-AID SYSTEM CONTRACTS)**

**AN ACT OF THE KENTUCKY GENERAL ASSEMBLY
TO PREVENT DISCRIMINATION IN EMPLOYMENT**

**KRS CHAPTER 344
EFFECTIVE JUNE 16, 1972**

The contract on this project, in accordance with KRS Chapter 344, provides that during the performance of this contract, the contractor agrees as follows:

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (between forty and seventy); or limit, segregate, or classify his employees in any way which would deprive or tend to deprive an individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, national origin, sex, disability or age (between forty and seventy). The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor shall not print or publish or cause to be printed or published a notice or advertisement relating to employment by such an employer or membership in or any classification or referral for employment by the employment agency, indicating any preference, limitation, specification, or discrimination, based on race, color, religion, national origin, sex, disability or age (between forty and seventy), except that such notice or advertisement may indicate a preference, limitation, or specification based on religion, or national origin when religion, or national origin is a bona fide occupational qualification for employment.

3. If the contractor is in control of apprenticeship or other training or retraining, including on-the-job training programs, he shall not discriminate against an individual because of his race, color, religion, national origin, sex, disability or age (between forty and seventy), in admission to, or employment in any program established to

provide apprenticeship or other training.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

REVISED: 12-3-92

EXECUTIVE BRANCH CODE OF ETHICS

In the 1992 regular legislative session, the General Assembly passed and Governor Brereton Jones signed Senate Bill 63 (codified as KRS 11A), the Executive Branch Code of Ethics, which states, in part:

KRS 11A.040 (6) provides:

No present or former public servant shall, within six (6) months of following termination of his office or employment, accept employment, compensation or other economic benefit from any person or business that contracts or does business with the state in matters in which he was directly involved during his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved in state government. This subsection shall not prohibit the performance of ministerial functions, including, but not limited to, filing tax returns, filing applications for permits or licenses, or filing incorporation papers.

KRS 11A.040 (8) states:

A former public servant shall not represent a person in a matter before a state agency in which the former public servant was directly involved, for a period of one (1) year after the latter of:

- a) The date of leaving office or termination of employment; or
- b) The date the term of office expires to which the public servant was elected.

This law is intended to promote public confidence in the integrity of state government and to declare as public policy the idea that state employees should view their work as a public trust and not as a way to obtain private benefits.

If you have worked for the executive branch of state government within the past six months, you may be subject to the law's prohibitions. The law's applicability may be different if you hold elected office or are contemplating representation of another before a state agency.

Also, if you are affiliated with a firm which does business with the state and which employs former state executive-branch employees, you should be aware that the law may apply to them.

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, Room 136, Capitol Building, 700 Capitol Avenue, Frankfort, Kentucky 40601; telephone (502) 564-7954.

KENTUCKY TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS
TRAINING SPECIAL PROVISIONS

This Training Special Provision supersedes subparagraph 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," (Attachment 1), and is in implementation of 23 U.S.C. 140(a).

As part of the contractor's equal employment opportunity affirmative action program training shall be provided as follows:

The contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification involved.

The number of trainees to be trained under these special provisions and in this contract is shown in "Special Notes Applicable to Project" in the bid proposal.

In the event that a contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction the contractor shall submit to the Kentucky Transportation Cabinet, Department of Highways for its approval, an acceptable training program on forms provided by the Cabinet indicating the number of trainees to be trained in each selected classification. Failure to provide the Cabinet with the proper documentation evidencing an acceptable training program prior to commencing construction shall cause the Cabinet to suspend the operations of the contractor with (if applicable) working days being charged as usual against the contract time or (if applicable), no additional contract time being granted for the suspension period. The Cabinet will not be liable for the payment of any work performed during the suspension period due to the failure of the contractor to provide an acceptable training program. Said suspension period shall be terminated when an acceptable training program is received by the Cabinet. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeymen status is a primary objective of this Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the findings in each case. The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Kentucky Transportation Cabinet, Department of Highways and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs

registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the contractor will be reimbursed for each hour of training given an employee on this contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The contractor shall furnish the trainee a copy of the program he will follow in providing the training. The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

General Decision Number: KY120126 08/17/2012 KY126

Superseded General Decision Number: KY20100212

State: Kentucky

Construction Type: Highway

Counties: Boone, Campbell, Kenton and Pendleton Counties in Kentucky.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Modification Number	Publication Date
0	01/06/2012
1	03/02/2012
2	04/06/2012
3	04/13/2012
4	06/01/2012
5	06/22/2012
6	07/13/2012
7	07/20/2012
8	08/03/2012
9	08/17/2012

BRKY0002-005 06/01/2009

	Rates	Fringes
BRICKLAYER.....	\$ 26.12	9.73

BROH0001-005 06/01/2008

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 25.75	8.60

CARP0698-001 05/01/2009

BOONE, CAMPBELL, KENTON & PENDLETON COUNTIES:

	Rates	Fringes
Carpenter & Piledrivermen.....	\$ 27.05	9.69
Diver.....	\$ 40.58	9.69

* ELEC0212-007 05/28/2012

	Rates	Fringes
ELECTRICIAN.....	\$ 26.11	15.42

ELEC0212-013 06/27/2011

	Rates	Fringes
Sound & Communication Technician.....	\$ 21.55	8.46

ENGI0018-013 05/01/2009

	Rates	Fringes
OPERATOR: Power Equipment		
GROUP 1.....	\$ 29.49	12.25
GROUP 2.....	\$ 29.37	12.25
GROUP 3.....	\$ 28.33	12.25
GROUP 4.....	\$ 27.15	12.25
GROUP 5.....	\$ 21.69	12.25
GROUP 6.....	\$ 29.74	12.25
GROUP 7.....	\$ 30.00	12.25

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker); Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradall; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; & Wheel Excavator

GROUP 2 - Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring Machine More than 48"; Bulldozer; Endloader; Hydro Milling Machine; Horizontal Directional Drill (over 500,000 ft. lbs. thrust); Kolman-type Loader (production type-Dirt); Lead Greaseman; Lighting & Traffic Signal Installation Equipment (includes all groups or classifications); Material Transfer Equipment (Shuttle Buggy) Asphalt; Pettibone-Rail Equipment; Power Grader; Power Scraper; Push Cat; Rotomill (all), Grinders & Planers of All types; Trench Machine (24" wide & under); & Vermeer type Concrete Saw

GROUP 3 - A-Frame; Air Compressor on Tunnel Work (low

pressure); Asphalt Plant Engineer; Bobcat-type and/or Skid Steer Loader with or without Attachments; Highway Drills (all types); Locomotive (narrow gauge); Material Hoist/Elevator; Mixer, Concrete (more than one bag capacity); Mixer, one bag capacity (Side Loader); Power Boiler (Over 15 lbs. Pressure) Pump Operator installing & operating Well Points; Pump (4" & over discharge); Roller, Asphalt; Rotovator (lime soil stabilizer); Switch & Tie Tampers (without lifting & aligning device); Utility Operator (Small equipment); & Welding Machines

GROUP 4 - Backfiller; Ballast Re-locator; Bars, Joint & Mesh Installing Machine; Batch Plant; Boring Machine Operator (48" or less); Bull Floats; Burlap & Curing Machine; Concrete Plant (capacity 4 yd. & under); Concrete Saw (Multiple); Conveyor (Highway); Crusher; Deckhand; Farm-type Tractor with attachments (highway) except Masonry); Finishing Machine; Fireperson, Floating Equipment (all types); Fork Lift (highway); Form Trencher; Hydro Hammer; Hydro Seeder; Pavement Breaker; Plant Mixer; Post Driver; Post Hole Digger (Power Auger); Power Brush Burner; Power Form Handling Equipment; Road Widening Trencher; Roller (Brick, Grade & Macadam); Self-Propelled Power Spreader; Self-Propelled Power Subgrader; Steam Fireperson; Tractor (Pulling Sheepfoot, Roller or Grader); & Vibratory Compactor with Integral Power

GROUP 5 - Compressor (Portable, Sewer, Heavy & Highway); Drum Fireperson (Asphalt); Generator; Masonry Fork Lift; Inboard-Outboard Motor Boat Launch; Masonry Fork Lift; Oil Heater (asphalt plant); Oiler; Power Driven Heater; Power Sweeper & Scrubber; Pump (under 4" discharge); Signalperson; Tire Repairperson; & VAC/ALLS

GROUP 6 - Master Mechanic & Boom from 150 to 180

GROUP 7 - Boom from 180 and over

IRON0044-008 06/01/2012		
	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 22.50	18.10
Structural.....	\$ 24.80	18.10

IRON0372-004 06/01/2012		
	Rates	Fringes
IRONWORKER, REINFORCING		
Beyond 30-mile radius of		
Hamilton County, Ohio		
Courthouse.....	\$ 26.59	18.58
Up to & including 30-mile		
radius of Hamilton County,		
Ohio Courthouse.....	\$ 26.34	18.58

LABO0189-004 07/01/2012		

PENDLETON COUNTY:

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 21.15	11.41
GROUP 2.....	\$ 21.40	11.41
GROUP 3.....	\$ 21.45	11.41
GROUP 4.....	\$ 22.05	11.41

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushhammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Driller (All Types); Powderman & Blaster; Troxler & Concrete Tester if Laborer is Utilized

LAB00265-009 05/01/2011

BOONE, CAMPBELL & KENTON COUNTIES:

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 25.82	8.75
GROUP 2.....	\$ 25.99	8.75
GROUP 3.....	\$ 26.32	8.75

GROUP 4.....\$ 26.77 8.75

LABORER CLASSIFICATIONS

GROUP 1 - Asphalt Laborer; Carpenter Tender; Concrete Curing Applicator; Dump Man (Batch Truck); Guardrail and Fence Installer; Joint Setter; Laborer (Construction); Landscape Laborer; Highway Lighting Worker; Signalization Worker; Mesh Handlers & Placer; Right-of-way Laborer; Riprap Laborer & Grouter; Scaffold Erector; Seal Coating; Surface Treatment or Road Mix Laborer; Sign Installer; Slurry Seal; Utility Man; Bridge Man; Handyman; Waterproofing Laborer; Flagperson; Hazardous Waste (level D); Diver Tender; Zone Person & Traffic Control

GROUP 2 - Skid Steer; Asphalt Raker; Concrete Puddler; Kettle Man (Pipeline); Machine Driven Tools (Gas, Electric, Air); Mason Tender; Brick Paver; Mortar Mixer; Power Buggy or Power Wheelbarrow; Sheeting & Shoring Man; Surface Grinder Man; Plastic Fusing Machine Operator; Pug Mill Operator; & Vacuum Devices (wet or dry); Rodding Machine Operator; Diver; Screwman or Paver; Screed Person; Water Blast, Hand Held Wand; Pumps 4" & Under (Gas, Air or Electric) & Hazardous Waste (level C); Air Track and Wagon Drill; Bottom Person; Cofferdam (below 25 ft. deep); Concrete Saw Person; Cutting with Burning Torch; Form Setter; Hand Spiker (Railroad); Pipelayer; Tunnel Laborer (without air) & Caisson; Underground Person (working in Sewer and Waterline, Cleaning, Repairing & Reconditioning); Sandblaster Nozzle Person; & Hazardous Waste (level B)

GROUP 3 - Blaster; Mucker; Powder Person; Top Lander; Wrencher (Mechanical Joints & Utility Pipeline); Yarner; Hazardous Waste (level A); Concrete Specialist; Concrete Crew in Tunnels (With Air-pressurized - \$1.00 premium); Curb Setter & Cutter; Grade Checker; Utility Pipeline Tapper; Waterline; and Caulker

GROUP 4 - Miner; & Gunite Nozzle Person

TUNNEL LABORER WITH AIR-PRESSURIZED ADD \$1.00 TO BASE RATE

SIGNAL PERSON WILL RECEIVE THE RATE EQUAL TO THE RATE PAID THE LABORER CLASSIFICATION FOR WHICH HE OR SHE IS SIGNALING.

PAIN0012-016 05/01/2012

	Rates	Fringes
Painters:		
Bridge.....	\$ 24.10	8.33
Bridge Equipment Tender and Containment Builder.....	\$ 20.49	8.33
Brush & Roller.....	\$ 23.10	8.33
Sandblasting & Water Blasting.....	\$ 23.85	8.33
Spray.....	\$ 23.60	8.33

PLUM0392-008 06/01/2012

	Rates	Fringes
PLUMBER.....	\$ 29.30	16.59

SUKY2010-161 02/05/1996		

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 15.85	4.60
GROUP 2.....	\$ 16.29	4.60

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Driver

GROUP 2 - Euclid Wagon; End Dump; Lowboy; Heavy Duty
Equipment; Tractor-Trailer Combination; & Drag

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification
and wage rates that have been found to be prevailing for the
cited type(s) of construction in the area covered by the wage
determination. The classifications are listed in alphabetical
order of "identifiers" that indicate whether the particular
rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with
characters other than "SU" denotes that the union
classification and rate have found to be prevailing for that
classification. Example: PLUM0198-005 07/01/2011. The
first four letters , PLUM, indicate the international union and
the four-digit number, 0198, that follows indicates the local
union number or district council number where applicable ,
i.e., Plumbers Local 0198. The next number, 005 in the
example, is an internal number used in processing the wage
determination. The date, 07/01/2011, following these
characters is the effective date of the most current
negotiated rate/collective bargaining agreement which would be
July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any

changes in the collective bargaining agreements governing the rate.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

These rates are listed pursuant to the Kentucky Determination No. CR-III-IV-HWY dated September 5, 2012.

No laborer, workman or mechanic shall be paid at a rate less than that of a Journeyman except those classified as bona fide apprentices.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request from any interested person.

Before using apprentices on the job the contractor shall present to the Contracting Officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U. S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U. S. Bureau of Apprenticeship and Training.

The contractor shall submit to the Contracting Officer, written evidence of the established apprenticeship-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

TO: EMPLOYERS/EMPLOYEES

PREVAILING WAGE SCHEDULE:

The wages indicated on this wage schedule are the least permitted to be paid for the occupations indicated. When an employee works in more than one classification, the employer must record the number of hours worked in each classification at the prescribed hourly base rate.

OVERTIME:

Overtime is to be paid after an employee works eight (8) hours a day or forty (40) hours a week, whichever gives the employee the greater wages. At least time and one-half the base rate is required for all overtime. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. Wage violations or questions should be directed to the designated Engineer or the undersigned.

Ryan Griffith, Director
Division of Construction Procurement
Frankfort, Kentucky 40622

**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
11.0%	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 Boone 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

CONTRACT ID: 121349
COUNTY: BOONE
PROPOSAL: STP 8200 (014)PAGE: 1
LETTING: 10/19/12
CALL NO: 111

LINE NO	ITEM	DESCRIPTION	APPROXIMATE UNIT QUANTITY	UNIT PRICE	AMOUNT
SECTION 0001 PAVING ALT GROUP AA1 (ALTERNATE NO 1)					
0010	00001	DGA BASE	940.000 TON		
0020	00003	CRUSHED STONE BASE	54,382.000 TON		
0030	00013	LIME STABILIZED ROADBED	104,562.000 SQYD		
0040	00014	LIME	1,938.000 TON		
0050	00020	TRAFFIC BOUND BASE	127.000 TON		
0060	00100	ASPHALT SEAL AGGREGATE	140.400 TON		
0070	00103	ASPHALT SEAL COAT	17.000 TON		
0080	00214	CL3 ASPH BASE 1.00D PG64-22	60,582.000 TON		
0090	00358	ASPHALT CURING SEAL	104.000 TON		
0100	00388	CL3 ASPH SURF 0.38B PG64-22	8,245.000 TON		
0110	01810	STANDARD CURB AND GUTTER	13,996.000 LF		
0120	02084	JPC PAVEMENT-8 IN	399.000 SQYD		
0130	02101	CEM CONC ENT PAVEMENT-8 IN	323.000 SQYD		
0140	02702	SAND FOR BLOTTER	260.000 TON		
0150	10020NS	FUEL ADJUSTMENT	150,137.000 DOLL	1.00	150,137.00
0160	10030NS	ASPHALT ADJUSTMENT	165,814.000 DOLL	1.00	165,814.00
SECTION 0002 PAVING ALT GROUP AA2 (ALTERNATE NO 2)					
0170	00001	DGA BASE	940.000 TON		
0180	00003	CRUSHED STONE BASE	89,341.000 TON		
0190	00013	LIME STABILIZED ROADBED	104,266.000 SQYD		

CONTRACT ID: 121349
COUNTY: BOONE
PROPOSAL: STP 8200 (014)PAGE: 2
LETTING: 10/19/12
CALL NO: 111

LINE NO	ITEM	DESCRIPTION	APPROXIMATE UNIT QUANTITY	UNIT PRICE	AMOUNT
0200	00014	LIME	1,932.000 TON		
0210	00020	TRAFFIC BOUND BASE	127.000 TON		
0220	00100	ASPHALT SEAL AGGREGATE	140.400 TON		
0230	00103	ASPHALT SEAL COAT	17.000 TON		
0240	00214	CL3 ASPH BASE 1.00D PG64-22	32,415.000 TON		
0250	00358	ASPHALT CURING SEAL	104.000 TON		
0260	00388	CL3 ASPH SURF 0.38B PG64-22	8,245.000 TON		
0270	01811	STANDARD CURB AND GUTTER MOD	13,996.000 LF		
0280	02084	JPC PAVEMENT-8 IN	399.000 SQYD		
0290	02101	CEM CONC ENT PAVEMENT-8 IN	323.000 SQYD		
0300	02702	SAND FOR BLOTTER	260.000 TON		
0310	10020NS	FUEL ADJUSTMENT	122,683.000 DOLL	1.00	122,683.00
0320	10030NS	ASPHALT ADJUSTMENT	97,956.000 DOLL	1.00	97,956.00
0330	20263ED	GEOGRID REINFORCEMENT	104,266.000 SQYD		
SECTION 0003 ROADWAY					
0340	00021	DRAINAGE BLANKET-EMBANKMENT	1,254.000 CUYD		
0350	01000	PERFORATED PIPE-4 IN	68.000 LF		
0360	01010	NON-PERFORATED PIPE-4 IN	8.000 LF		
0370	01792	ADJUST MANHOLE	2.000 EACH		
0380	01875	STANDARD HEADER CURB	621.000 LF		
0390	01891	ISLAND HEADER CURB TYPE 2	767.000 LF		

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0400	01917	STANDARD BARRIER MEDIAN TYPE 2	10.500 SQYD		
0410	02091	REMOVE PAVEMENT	5,857.000 SQYD		
0420	02159	TEMP DITCH	19,424.000 LF		
0430	02223	GRANULAR EMBANKMENT	5,089.000 CUYD		
0440	02230	EMBANKMENT IN PLACE	249,274.000 CUYD		
0450	02242	WATER	735.000 MGAL		
0460	02262	FENCE-WOVEN WIRE TYPE 1	8,293.000 LF		
0470	02351	GUARDRAIL-STEEL W BEAM-S FACE	7,875.000 LF		
0480	02360	GUARDRAIL TERMINAL SECTION NO 1	6.000 EACH		
0490	02363	GUARDRAIL CONNECTOR TO BRIDGE END TY A	4.000 EACH		
0500	02369	GUARDRAIL END TREATMENT TYPE 2A	3.000 EACH		
0510	02391	GUARDRAIL END TREATMENT TYPE 4A	13.000 EACH		
0520	02429	RIGHT-OF-WAY MONUMENT TYPE 1	93.000 EACH		
0530	02430	RIGHT-OF-WAY MONUMENT TYPE 1A	2.000 EACH		
0540	02432	WITNESS POST	5.000 EACH		
0550	02484	CHANNEL LINING CLASS III	1,682.000 TON		
0560	02545	CLEARING AND GRUBBING (72.26 ACRES)	(1.00) LS		
0570	02585	EDGE KEY	266.000 LF		
0580	02597	FABRIC-GEOTEXTILE TYPE II	44,160.000 SQYD		
0590	02598	FABRIC-GEOTEXTILE TYPE III	8,397.000 SQYD		
0600	02600	FABRIC GEOTEXTILE TY IV FOR PIPE	51,631.000 SQYD		

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0610	02650	MAINTAIN & CONTROL TRAFFIC	(1.00) LS		
0620	02671	PORTABLE CHANGEABLE MESSAGE SIGN	10.000 EACH		
0630	02690	SAFELOADING	46.840 CUYD		
0640	02701	TEMP SILT FENCE	19,424.000 LF		
0650	02703	SILT TRAP TYPE A (1)	72.000 EACH		
0660	02703	SILT TRAP TYPE A (2)	72.000 EACH		
0670	02704	SILT TRAP TYPE B	72.000 EACH		
0680	02705	SILT TRAP TYPE C	72.000 EACH		
0690	02706	CLEAN SILT TRAP TYPE A (1)	432.000 EACH		
0700	02706	CLEAN SILT TRAP TYPE A (2)	432.000 EACH		
0710	02707	CLEAN SILT TRAP TYPE B	432.000 EACH		
0720	02708	CLEAN SILT TRAP TYPE C	432.000 EACH		
0730	02709	CLEAN TEMP SILT FENCE	19,424.000 LF		
0740	02720	SIDEWALK-4 IN CONCRETE	5,399.000 SQYD		
0750	02721	REMOVE CONCRETE SIDEWALK	63.000 SQYD		
0760	02726	STAKING	(1.00) LS		
0770	02775	ARROW PANEL	2.000 EACH		
0780	05950	EROSION CONTROL BLANKET	20,773.000 SQYD		
0790	05952	TEMP MULCH	350,415.000 SQYD		
0800	05953	TEMP SEEDING AND PROTECTION	350,415.000 SQYD		
0810	05966	TOPDRESSING FERTILIZER	11.810 TON		

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0820	05985	SEEDING AND PROTECTION	228,138.000 SQYD		
0830	05990	SODDING	6,383.000 SQYD		
0840	06510	PAVE STRIPING-TEMP PAINT-4 IN	70,100.000 LF		
0850	06514	PAVE STRIPING-PERM PAINT-4 IN	79,378.000 LF		
0860	06516	PAVE STRIPING-PERM PAINT-8 IN	2,730.000 LF		
0870	06565	PAVE MARKING-THERMO X-WALK-6 IN	660.000 LF		
0880	06568	PAVE MARKING-THERMO STOP BAR-24IN	489.000 LF		
0890	06570	PAVE MARKING-PAINT CROSS-HATCH	20,041.000 SQFT		
0900	06572	PAVE MARKING-DOTTED LANE EXTEN	1,343.000 LF		
0910	06574	PAVE MARKING-THERMO CURV ARROW	71.000 EACH		
0920	06576	PAVE MARKING-THERMO ONLY	4.000 EACH		
0930	06589	PAVEMENT MARKER TYPE V-MW	254.000 EACH		
0940	06591	PAVEMENT MARKER TYPE V-BY	245.000 EACH		
0950	06592	PAVEMENT MARKER TYPE V-B W/R	304.000 EACH		
0960	06593	PAVEMENT MARKER TYPE V-B Y/R	92.000 EACH		
0970	08100	CONCRETE-CLASS A	57.210 CUYD		
0980	08150	STEEL REINFORCEMENT	2,104.000 LB		
0990	20818ND	GAS UTILITY COORDINATION	(1.00) LS		
1000	23158ES505	DETECTABLE WARNINGS	1,201.000 SQFT		
1010	23274EN11F	TURF REINFORCEMENT MAT 1	1,981.000 SQYD		
1020	23649EC	DRAIN POND	(1.00) LS		

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1030	23791EC	PAVE STRIPING-CHEVRON MARKINGS	17,351.000 SQFT		
1040	23979EC	CRASH CUSHION TY VI CLASS C TL3	2.000 EACH		
1050	24466EN	FENCE-SPECIAL	1,406.000 LF		
SECTION 0004 DRAINAGE					
1060	00439	ENTRANCE PIPE-12 IN	54.000 LF		
1070	00440	ENTRANCE PIPE-15 IN	28.000 LF		
1080	00441	ENTRANCE PIPE-18 IN	250.000 LF		
1090	00464	CULVERT PIPE-24 IN	185.000 LF		
1100	00520	STORM SEWER PIPE-12 IN	8.000 LF		
1110	00521	STORM SEWER PIPE-15 IN	6,248.000 LF		
1120	00522	STORM SEWER PIPE-18 IN	1,445.000 LF		
1130	00524	STORM SEWER PIPE-24 IN	2,556.000 LF		
1140	00526	STORM SEWER PIPE-30 IN	209.000 LF		
1150	00528	STORM SEWER PIPE-36 IN	467.000 LF		
1160	00529	STORM SEWER PIPE-42 IN	138.000 LF		
1170	00530	STORM SEWER PIPE-48 IN	19.000 LF		
1180	01371	METAL END SECTION TY 1-18 IN	2.000 EACH		
1190	01373	METAL END SECTION TY 1-24 IN	1.000 EACH		
1200	01456	CURB BOX INLET TYPE A	55.000 EACH		
1210	01487	CURB BOX INLET TYPE F	2.000 EACH		
1220	01496	DROP BOX INLET TYPE 3	6.000 EACH		

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1230	01538	DROP BOX INLET TYPE 7	2.000 EACH		
1240	01544	DROP BOX INLET TYPE 11	7.000 EACH		
1250	01559	DROP BOX INLET TYPE 13G	4.000 EACH		
1260	01568	DROP BOX INLET TYPE 13S	5.000 EACH		
1270	01650	JUNCTION BOX	3.000 EACH		
1280	01756	MANHOLE TYPE A	4.000 EACH		
1290	01761	MANHOLE TYPE B	3.000 EACH		
1300	01767	MANHOLE TYPE C	5.000 EACH		
1310	04811	ELECTRICAL JUNCTION BOX TYPE B	4.000 EACH		
1320	23131ER701	PIPELINE VIDEO INSPECTION	5,637.500 LF		
SECTION 0005 BRIDGE					
1330	01845	ISLAND INTEGRAL CURB	352.200 LF		
1340	02000	CONCRETE BARRIER WALL MOD	478.700 LF		
1350	02231	STRUCTURE GRANULAR BACKFILL	786.000 CUYD		
1360	02998	MASONRY COATING	1,125.000 SQYD		
1370	03299	ARMORED EDGE FOR CONCRETE	421.000 LF		
1380	08018	RETAINING WALL	9,091.000 SQFT		
1390	08020	CRUSHED AGGREGATE SLOPE PROT	154.000 TON		
1400	08033	TEST PILES	148.000 LF		
1410	08039	PRE-DRILLING FOR PILES	1,232.000 LF		
1420	08046	PILES-STEEL HP12X53	2,246.000 LF		

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1430	08094	PILE POINTS-12 IN	68.000 EACH		
1440	08100	CONCRETE-CLASS A	186.600 CUYD		
1450	08104	CONCRETE-CLASS AA	929.700 CUYD		
1460	08151	STEEL REINFORCEMENT-EPOXY COATED	192,065.000 LB		
1470	21119ED	CONCRETE FORM LINER	223.000 SQYD		
1480	21532ED	RAIL SYSTEM TYPE III	66.700 LF		
1490	21877EN	BARRIER INTEGRAL CURB	182.700 LF		
1500	23315EC	DECORATIVE FENCE	244.000 LF		
1510	24490ED	BARRIER INTEGRAL CURB MOD	85.200 LF		
1520	24527EC	PPC I-BEAM HN 48-61	3,705.000 LF		
SECTION 0006 GAS LINE					
1530	20731ND	INST M-C SHORT-SIDE SERVICE PIPING-1 IN	3.000 EACH	360.00	1,080.00
1540	22181NN	INST M-C SHORT-SIDE SERVICE PIPING-3 IN	1.000 EACH	655.00	655.00
1550	22802EN	GAS MAIN PL-2 IN	45.000 LF	46.00	2,070.00
1560	22803EN	GAS MAIN PL-4 IN	80.000 LF	50.00	4,000.00
1570	22804EN	GAS MAIN PL-6 IN	4,600.000 LF	60.00	276,000.00
1580	23296EC	VALVE AND BOX-3 IN	1.000 EACH	385.00	385.00
1590	23471EC	GAS MAIN-8 IN PL	2,690.000 LF	58.00	156,020.00
1600	23472EC	GAS MAIN-8 IN SWPC	855.000 LF	88.00	75,240.00
1610	23738EC	VALVE ASSEMBLY-2 IN PL	1.000 EACH	310.00	310.00
1620	24058EC	VALVE ASSEMBLY-4 IN PL	2.000 EACH	410.00	820.00

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1630	24080EC	VALVE ASSEMBLY-6 IN PL	2.000 EACH	575.00	1,150.00
1640	24551EC	GAS MAIN PL-3 IN	140.000 LF	60.00	8,400.00
SECTION 0007 SEWER					
1650	01051	SEWER PIPE-6 IN (LATERAL PIPE)	170.000 LF		
1660	01055	SEWER PIPE-15 IN (SANITARY GRAVITY MAIN)	951.000 LF		
1670	01056	SEWER PIPE-18 IN (SANITARY GRAVITY MAIN)	529.000 LF		
1680	01105	DUCTILE IRON PIPE-18 IN (SANITARY GRAVITY MAIN)	370.000 LF		
1690	01789	RECONSTRUCT MANHOLE	2.000 EACH		
1700	01799	SANITARY SEWER MANHOLE	5.000 EACH		
1710	02690	SAFELOADING	35.000 CUYD		
1720	03495	AIR RELEASE VALVE (3 IN W/ 5 FT X 5 FT CONCRETE CHAMBER)	1.000 EACH		
1730	03495	AIR RELEASE VALVE (4 IN W/ 5 FT X 5 FT CONCRETE CHAMBER)	1.000 EACH		
1740	03502	VALVE-12 IN (INSERT)	1.000 EACH		
1750	03532	GATE VALVE-12 IN (RESILIENT SEATED)	1.000 EACH		
1760	03551	TAPPING SLEEVE & VALVE (12 INCH)	1.000 EACH		
1770	20057ES601	CONCRETE ENCASEMENT	42.000 LF		
1780	20139EC	BUTTERFLY VALVE (24 IN DUCTILE IRON)	2.000 EACH		
1790	20881ED	STEEL ENCASEMENT PIPE 28 IN (BY BORE AND JACK)	91.000 LF		
1800	20985ND	CLEANOUT (6 INCH)	2.000 EACH		
1810	21193ND	CONNECT TO 4 IN	2.000 EACH		
1820	22139NN	CONNECT TO SEWER MAIN (24 IN FORCE MAIN)	1.000 EACH		

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1830	22782NN	RESTRAINED JOINT BEND-12 IN	3.000 EACH		
1840	22801NN	ABANDON AND SAFELOAD MANHOLE	6.000 EACH		
1850	23013EN	SANITARY SEWER FORCE MAIN (12 IN D.I.P.)	253.000 LF		
1860	23013EN	SANITARY SEWER FORCE MAIN (16 IN D.I.P.)	10.000 LF		
1870	23013EN	SANITARY SEWER FORCE MAIN (24 IN D.I.P.)	6,665.000 LF		
1880	23197EC	PLUG-24 IN (SANITARY SEWER PIPE)	1.000 EACH		
1890	23330EC	WYE CONNECTION (24 IN X 24 IN X 12 IN)	1.000 EACH		
1900	23566NC	RESTRAINED JOINT BEND -24 IN	5.000 EACH		
1910	23726EC	SANITARY SEWER MANHOLE-DOGHOUSE	2.000 EACH		
1920	23774EC	MANHOLE-6 FT (6 FT DIAMETER WITH DROP)	1.000 EACH		
1930	23922EC	CONNECT TO MANHOLE WITH DROP-6 IN	1.000 EACH		
1940	24244EC	REMOVE AIR RELEASE PIT	6.000 EACH		
1950	24486ED	TEE (15 IN X 15 IN X 6 IN)	2.000 EACH		
1960	24486ED	TEE (24 IN X 24 IN X 16 IN)	1.000 EACH		
SECTION 0008 SIGNING					
1970	04904	BARRIER MOUNTING BRACKET	4.000 EACH		
1980	06405	SBM ALUMINUM PANEL SIGNS	216.000 SQFT		
1990	06406	SBM ALUM SHEET SIGNS .080 IN	432.000 SQFT		
2000	06407	SBM ALUM SHEET SIGNS .125 IN	145.000 SQFT		
2010	06410	STEEL POST TYPE 1	269.000 LF		
2020	06411	STEEL POST TYPE 2	756.000 LF		

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2030	06490	CLASS A CONCRETE FOR SIGNS	8.000 CUYD		
2040	06491	STEEL REINFORCEMENT FOR SIGNS	145.000 LB		
2050	20815ED	GMSS GALV STEEL TYPE C	1,072.000 LB		
2060	20912ND	BARRIER WALL POST	4.000 EACH		
2070	21596ND	GMSS TYPE D	15.000 EACH		
SECTION 0009 SIGNALIZATION					
2080	02562	SIGNS	32.000 SQFT		
2090	04792	CONDUIT-1 IN	145.000 LF		
2100	04795	CONDUIT-2 IN	2,100.000 LF		
2110	04810	ELECTRICAL JUNCTION BOX	6.000 EACH		
2120	04811	ELECTRICAL JUNCTION BOX TYPE B	14.000 EACH		
2130	04820	TRENCHING AND BACKFILLING	2,200.000 LF		
2140	04830	LOOP WIRE	6,700.000 LF		
2150	04844	CABLE-NO. 14/5C	5,850.000 LF		
2160	04845	CABLE-NO. 14/7C	200.000 LF		
2170	04850	CABLE-NO. 14/1 PAIR	11,100.000 LF		
2180	04873	POLE 45 FT WOODEN	2.000 EACH		
2190	04886	MESSENGER-15400 LB	1,170.000 LF		
2200	04895	LOOP SAW SLOT AND FILL	2,950.000 LF		
2210	04931	INSTALL CONTROLLER TYPE 170	2.000 EACH		
2220	04932	INSTALL STEEL STRAIN POLE	12.000 EACH		

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2230	04933	TEMP SIGNAL 2 PHASE	1.000 EACH		
2240	04934	TEMP SIGNAL MULTI PHASE	1.000 EACH		
2250	04950	REMOVE SIGNAL EQUIPMENT	2.000 EACH		
2260	20093NS835	INSTALL PEDESTRIAN HEAD-LED	12.000 EACH		
2270	20094ES835	TEMP RELOCATION OF SIGNAL HEAD	60.000 EACH		
2280	20188NS835	INSTALL LED SIGNAL-3 SECTION	20.000 EACH		
2290	20189NS835	INSTALL LED SIGNAL-5 SECTION	2.000 EACH		
2300	20275EC	VIDEO DETECTION-INSTALL	1.000 EACH		
2310	20390NS835	INSTALL COORDINATING UNIT	1.000 EACH		
2320	20408ES835	INSTALL LED BEACON-12 IN	4.000 EACH		
2330	20456NS835	INSTALL TEMP VIDEO CAMERA	1.000 EACH		
2340	21743NN	INSTALL PEDESTRIAN DETECTOR	10.000 EACH		
2350	23157EN	TRAFFIC SIGNAL POLE BASE	57.000 CUYD		
2360	23235EC	INSTALL PEDESTAL POST	4.000 EACH		
2370	23982EC	INSTALL ANTENNA	1.000 EACH		
2380	24526ED	INSTALL-BEACON CONTROLLER-2 CIRCUIT	2.000 EACH		
SECTION 0010 LIGHTING					
2390	04701	POLE 40 FT MTG HT	56.000 EACH		
2400	04720	BRACKET 4 FT	23.000 EACH		
2410	04721	BRACKET 6 FT	4.000 EACH		
2420	04722	BRACKET 8 FT	1.000 EACH		

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2430	04723	BRACKET 10 FT	3.000 EACH		
2440	04724	BRACKET 12 FT	13.000 EACH		
2450	04725	BRACKET 15 FT	18.000 EACH		
2460	04740	POLE BASE	54.000 EACH		
2470	04741	POLE BASE IN MEDIAN WALL	2.000 EACH		
2480	04750	TRANSFORMER BASE	54.000 EACH		
2490	04761	LIGHTING CONTROL EQUIPMENT	3.000 EACH		
2500	04770	HPS LUMINAIRE	66.000 EACH		
2510	04780	FUSED CONNECTOR KIT	124.000 EACH		
2520	04793	CONDUIT-1 1/4 IN	12,038.000 LF		
2530	04795	CONDUIT-2 IN	945.000 LF		
2540	04800	MARKER	9.000 EACH		
2550	04820	TRENCHING AND BACKFILLING	12,038.000 LF		
2560	04832	WIRE-NO. 12	5,864.000 LF		
2570	04833	WIRE-NO. 8	30,150.000 LF		
2580	04834	WIRE-NO. 6	8,886.000 LF		
2590	20391NS835	ELECTRICAL JUNCTION BOX TYPE A	14.000 EACH		
2600	20394ES835	PVC CONDUIT-3 IN- IN MEDIAN BARRIER WALL	450.000 LF		
2610	20454NS835	TEMPORARY LIGHTING	(1.00) LS		
2620	21543EN	BORE AND JACK CONDUIT	945.000 LF		
SECTION 0011 WATERLINE					

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2630	01090	DUCTILE IRON PIPE-3 IN (CLASS 50 W/ POLYWRAP)	20.000 LF		
2640	01093	DUCTILE IRON PIPE-6 IN (CLASS 50 W/ POLYWRAP)	72.000 LF		
2650	01095	DUCTILE IRON PIPE-8 IN (CLASS 50 W/ POLYWRAP)	6,049.000 LF		
2660	01099	DUCTILE IRON PIPE-12 IN (CLASS 50 W/ POLYWRAP)	3,743.000 LF		
2670	01103	DUCTILE IRON PIPE-16 IN (CLASS 50 W/ POLYWRAP)	930.000 LF		
2680	03360	COPPER PIPE-3/4 IN	942.000 LF		
2690	03361	COPPER PIPE-1 IN	50.000 LF		
2700	03426	ADJUST FIRE HYDRANT (TO GRADE)	7.000 EACH		
2710	03431	RELOCATE WATER METER	20.000 EACH		
2720	03433	RELOCATE FIRE HYDRANT	13.000 EACH		
2730	03437	RECONNECT SERVICE	20.000 EACH		
2740	03438	RECONNECT TO MAIN	20.000 EACH		
2750	03526	GATE VALVE-6 IN (RESILIENT SEATED)	28.000 EACH		
2760	03528	GATE VALVE-8 IN (RESILIENT SEATED)	16.000 EACH		
2770	03532	GATE VALVE-12 IN (RESILIENT SEATED)	17.000 EACH		
2780	03572	BEND AND BLOCK (3 IN)	2.000 EACH		
2790	20056NN	REDUCER (6 IN X 3 IN)	1.000 EACH		
2800	20057ES601	CONCRETE ENCASEMENT	300.000 LF		
2810	20081NN	CONNECT TO WATER MAIN (3 IN)	1.000 EACH		
2820	20551NC	TEE AND BLOCK 8 IN X 8 IN X 6 IN	3.000 EACH		
2830	20554NC	BEND AND BLOCK-6 IN	2.000 EACH		

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2840	20555NC	BEND AND BLOCK-8 IN	23.000 EACH		
2850	20556NC	PLUG AND BLOCK-8 IN	1.000 EACH		
2860	20559NC	CONNECT TO 6 IN	2.000 EACH		
2870	20784ND	ANCHOR TEE AND BLOCK 8IN X 8IN X 6 IN	11.000 EACH		
2880	20786ND	TEE AND BLOCK 16IN X 16 IN X 8 IN	1.000 EACH		
2890	20788ND	BEND AND BLOCK-12 IN	12.000 EACH		
2900	20789ND	BEND AND BLOCK-16 IN	8.000 EACH		
2910	20790ND	CONNECT TO 12 IN	1.000 EACH		
2920	20791ND	CONNECT TO 16 IN	4.000 EACH		
2930	20792ND	ADJUST WATER VALVE BOXES (ALL SIZES)	15.000 EACH		
2940	20824ND	REDUCER 12 IN X 8 IN	4.000 EACH		
2950	20864ND	FIRE HYDRANT ASSEMBLY	12.000 EACH		
2960	21844EN	BORE AND JACK PIPE-22 IN (STEEL CASING PIPE)	672.000 LF		
2970	22101NN	TEE AND BLOCK- 12 X 12 X 12 IN	5.000 EACH		
2980	22170NN	PLUG AND BLOCK-6 IN	1.000 EACH		
2990	22186NN	FLUSHING DEVICE-2 IN	2.000 EACH		
3000	22447NN	CONNECT TO 8 IN	14.000 EACH		
3010	22761ND	ANCHORING TEE AND BLOCK-12X12X6 IN	6.000 EACH		
3020	22762ND	TEE AND BLOCK-12X12X8 IN	1.000 EACH		
3030	22815NN	TEE AND BLOCK-12 X 12 X 6 IN	1.000 EACH		
3040	22818NN	ANCHORING TEE AND BLOCK-16 X 16 X 6 IN	1.000 EACH		

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LINE NO	ITEM	DESCRIPTION	APPROXIMATE UNIT QUANTITY	UNIT PRICE	AMOUNT
3050	22822NN	BUTTERFLY VALVE-16 IN (DUCTILE IRON)	3.000 EACH		
3060	23094ND	REDUCER-12 IN X 6 IN	1.000 EACH		
3070	23199EC	TEE-8 IN X 8 IN (RESTRAINED JOINT-NO BLOCK)	3.000 EACH		
3080	23572EC	RESTRAINED JOINT DIP-CL50 W/POLYWRAP-8IN	755.000 LF		
3090	24239ED	OPEN CUT W/ STEEL ENCASEMENT-22 IN	255.000 LF		
3100	24269NC	TEE-8 IN X 6 IN (NO BLOCK)	6.000 EACH		
SECTION 0012 RETAINING WALL					
3110	02200	ROADWAY EXCAVATION	4,486.000 CUYD		
3120	02223	GRANULAR EMBANKMENT	1,668.000 CUYD		
3130	02998	MASONRY COATING	6,083.000 SQYD		
3140	08018	RETAINING WALL	39,741.000 SQFT		
3150	21119ED	CONCRETE FORM LINER	808.000 SQYD		
3160	23635EC	MOMENT SLAB FOR BARRIER	3,138.000 LF		
3170	23636EC	BARRIER ON MSE WALL	3,138.000 LF		
SECTION 0013 TRAINEES					
3180	02742	TRAINEE PAYMENT REIMBURSEMENT 1 EQUIPMENT OPERATOR GROUP 2	1,400.000 HOUR		
SECTION 0014 MOBILIZATION / DEMOBILIZATION					
3190	02568	MOBILIZATION (NO MORE THAN 5%)	LUMP		
3200	02569	DEMOBILIZATION (AT LEAST 1.5%)	LUMP		
		TOTAL BID			