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Project Manual
for
LWC Interconnect
Transmission Main and Pump Station Improvements
Jefferson and Hardin County, Kentucky

Hardin County Water District No. 1

July 2015



Prepared by:

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LWC INTERCONNECT – TRANSMISSION MAIN AND PUMP STATION IMPROVEMENTS

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SECTION 00010
ADVERTISEMENT FOR BIDS

Sealed Bids for “**LWC Interconnect-Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky,**” will be received by **Hardin County Water District No. 1** at the district office at 1400 Rogersville Road, Radcliff, Kentucky 40160 on December 18th, 2015, until 11:00 a.m. (Eastern), and then publicly opened and read aloud.

The scope of work is as follows:

Transmission Main Contract – Includes the installation of 22,460 lf of 16-inch and 24-inch DI water main pipe and appurtenances; installation of 1,070 lf of HDPE pipe; horizontal directional drill of 750 lf of 24-inch fusible PVC pipe/30-inch HDPE pipe; bore and jack 430 lf of 36-inch steel casing pipe (total of four crossings); installation of underground packaged meter vault; installation of water valves, drain assemblies and air release valves along existing 14-inch DI water main; flushing, pressure testing and disinfecting of 41,660 lf of existing 14-inch DI water main; and all related work including maintenance of traffic and erosion protection and sediment control.

Pump Station Contract – Includes site clearing and grubbing; placement of 2,400 cy of fill; construction of asphalt paved access road and turn around; construction of concrete foundation and slab and above ground package booster pump station (three (3) 250 HP pumps rated at 1,700 gpm at 425’ TDH each); installation of electric service, ATS and 750 KW generator; and installation security fence and related site work.

The Instructions to Bidders, Bid Form, Agreement Forms, Performance and Payment Bonds, Plans, Specifications, and other associated documents may be examined at the following locations:

HDR Engineering, Inc.
One Riverfront Plaza
401 West Main Street, Suite 500
Louisville, Kentucky 40202
(502) 909-3234

Dodge Data & Analytics
(FKA McGraw Hill Dodge)
3315 Central Avenue
Hot Springs, Arkansas 71913
(866) 794-6093

Hardin County Water District No. 1
1400 Rogersville Road
Radcliff, Kentucky 40160
(270) 351-3222

HDR Engineering, Inc.
2517 Sir Barton Way
Lexington, Kentucky 40509
(859) 629-4800

Builders Exchange
2300 Meadow Drive, #100
Louisville, KY 40218
(502) 459-9800

Plans, Specifications and Contract Documents (including electronic copy of each) shall be obtained from the issuing office, Lynn Imaging, 11460 Bluegrass Parkway, Louisville, KY 40299, (502) 499-8400. Copies of the construction plans and specifications will be available online at lynnimaging.com, upon payment of a non-refundable price of \$210.00 plus shipping and handling.

Copies of reports of explorations and tests of subsurface conditions at or contiguous to the Site that the ENGINEER has reviewed or used in preparing the Contract Documents are a part of the Contract Documents. Statements of limitation concerning the information in these reports and tests are contained in the Contract Documents.

A **Mandatory Pre-Bid Meeting** for prospective BIDDERS will be held at 10:00 a.m. (local time) on December 4th, 2015 at the West Point Fire Department, 602 Elm Street, West Point, KY 40177. Bidders not in attendance at the Mandatory Pre-Bid Meeting will be considered non-responsive.

The OWNER reserves the right to waive any informality or to reject any or all bids.

Each BIDDER must deposit with his Bid, security in the amount, form and subject to the conditions provided in the Instructions to Bidders.

All Bidders must comply with OSHA (P.C. 91-596) and the Contract Work Hours and Safety Standards Act (P.E. 91-54).

The Successful Bidder and all Subcontractors will be required to conform to the labor standards set forth in the Contract Documents. This project falls under the provisions of KRS 337.505 to 337.550 for prevailing wage rates.

No BIDDER may withdraw his Bid within ninety (90) consecutive calendar days after the actual date of the opening thereof.

Name Daniel Clifford

Title HCWD No. 1 Engineering Manager

END OF SECTION

SECTION 00200
INSTRUCTIONS TO BIDDERS

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ARTICLE 1 - DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. Issuing Office--The office from which the Bidding Documents are to be issued.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Issuing Office.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder's qualifications to perform the Work, Bidders shall complete and submit with their Bid, the Bidder's Qualification Statement included in Section 00440 Attachments to Bid.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions:

- A. The Supplementary Conditions identify:
1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.
 2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.
- B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.
1. Copy of the "Report of Geotechnical Engineering Exploration" prepared by Vector Engineers, Inc. dated January 27, 2015 is included in the appendix.

4.02 Underground Facilities:

- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition:

- A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.
- B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
1. Copies of reports will be provided on request for the fee stated in the Advertisement or Invitation to Bid. Copies of Drawings will be provided at the cost of reproduction

- 4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs

4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

- 4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.
- 4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.
- 4.07 It is the responsibility of each Bidder before submitting a Bid to:
- A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;
 - B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
 - C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;
 - D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions;
 - E. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
 - F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
 - G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
 - H. Correlate the information known to Bidder, information and observations obtained from visits to the

Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

- I. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and
 - J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

- 5.01 A **Mandatory pre-Bid conference** will be held at 10:00 a.m. local time on December 4th, 2015 at the West Point Fire Department, 602 Elm Street, West Point, KY 40177. Representatives of the Owner and Engineer will be present to discuss the Project. Bidders not in attendance at the conference will be considered non-responsive. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

- 6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. Temporary construction easements for access thereto, construction equipment, or storage of materials and equipment to be incorporated in the Work have been obtained by the Owner and designated on the drawings. Any easements required by the Contractor outside of these areas shall be obtained by the Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing at the following address: HDR Engineering, Inc., 401 West Main Street, Louisville, KY 40202, Attn: Kevin Brian, P.E., Project Manager or sent via e-mail to the following: kevin.brian@hdrinc.com. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the Issuing Office as having received the Bidding Documents. Questions received less than seven (7) days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 - BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of ten (10%) of Bidder's maximum Bid price and in the form of a certified check or bank money order or a Bid bond (on the form

attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

- 8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 91 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
- 8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned following the Bid evaluation.

ARTICLE 9 - CONTRACT TIMES

- 9.01 The number of calendar days within which, or the dates by which, the Work (both Transmission Main and Pump Station Contracts) is to be substantially completed and ready for final payment are set forth in the Agreement. They are:
- | | |
|---------------------------|-------------------|
| 1. Substantial Completion | 240 days from NTP |
| 2. Final Completion | 270 days from NTP |

ARTICLE 10 - LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

- 11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.
- 12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 6.06.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each contract [Section, Bid item, Alternative, Unit Price Item] listed therein, or the words "No Bid", "No Change", or "Not Applicable" entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.10 The address and telephone number for communications regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 Transmission Main Contract - Unit Price Basis:

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule, including additive alternatives.
- B. The total of all estimated prices will be the sum of the products of estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

14.02 Pump Station Contract - Lump Sum Basis:

- A. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Schedule, including additive alternatives. The Bid price shall be shown in both words and figures. In case of discrepancy, the price shown in words shall govern.
- B. The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.

14.03 Bidder may submit a Bid for the Transmission Main Contract or Pump Station Contract or for both contracts.

ARTICLE 15 - SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form and the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the following data:

- A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);
- B. Statement of Bidder's Qualifications (Section 00440, Part 1)
- C. Project References (Section 00440, Part 2)
- D. Proposed Subcontractors (Section 00440, Part 3)
- E. List of Proposed Manufacturers/Suppliers (Section 00440, Part 4)
- F. Non-collusion Affidavit of Prime Bidder (Section 00440, Part 5)

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to the Owner at the address shown in the Advertisement for bids: **Hardin County Water District No. 1, 1400 Rogersville Road, Radcliff, Kentucky 40160.**

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.
- 16.02 If within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 - OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.
- 17.02 Any Bid from a Bidder not recorded by the Issuing Office as having received the Bidding Documents will not be considered and will be returned unopened.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 18.01 All Bids will remain subject to acceptance for 90 days.

ARTICLE 19 - EVALUATION OF BIDS AND AWARD OF CONTRACT

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
- 19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.
- 19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents. **The Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. Should apparent low Bidder decline to furnish to the Owner the information requested during the bid evaluation period, the Owner may include the provision of the information in the Notice of Award and consider the failure to furnish the requested information as a default on the Bid. Such default will result in annulment of the Notice of Award and forfeiture of the Bidder's Bid Security.**

19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price and other factors considered. Alternate manufacturers' equipment and the associated cost thereof will only be considered after determination of the low base bidder.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

END OF SECTION

SECTION 00410
BID FORM

Project Identification: LWC Interconnect – Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky

TABLE OF ARTICLES

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ARTICLE 1 – BID RECIPIENT

- 1.01 This Bid is submitted to: Hardin County Water District No. 1
1400 Rogersville Road
Radcliff, Kentucky 40160

- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

- 2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

- A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.
- D. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
- E. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- F. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- G. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- J. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 – FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

TRANSMISSION MAIN CONTRACT

BASE BID PACKAGE – SECTIONS A, B, C and D

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total Item Amount
<i>Section A - 24" TM from Katherine Station to MM Vault (LWC Section)</i>					
1	Mobilization	1	LS		
2	General Requirements	1	LS		
3	Bonds and Insurance	1	LS		
4	Utility and Tie-In Field Verification	1	LS		
5	Clearing and Grubbing	1	LS		
6	Connect to 16" WM	1	EA		
7	24" DI Pipe (Class 250)	1000	LF		
8	24"DI Pipe (Class 250) Restrained Joint	1100	LF		
9	24" Gate Valve	2	EA		
10	Horizontal Directional Drill 30" HDPE (DR 11)/24" fusible PVC (DR 18)	750	LF		
11	Air Release Valve	1	EA		
12	Leak Detection Assembly	1	EA		
13	30" PVC/HDPE Casing Pipe, Open Cut	40	LF		
14	Master Meter Vault	1	LS		
15	Flowable Fill Backfill	900	LF		
16	Bituminous Pavement Replacement	1000	SY		
17	Concrete Pavement Replacement	500	SY		
18	Traffic Control	1	LS		
19	Erosion Prevention and Sediment Control	1	LS		
20	Demobilization	1	LS		

ESTIMATED TOTAL SECTION A (Items 1 through 20): _____

_____ Dollars (\$ _____).

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total Item Amount
<i>Section B - 16" TM from MM Vault to PS to Tie-in Ex 14"</i>					
1	Mobilization	1	LS		
2	General Requirements	1	LS		
3	Bonds and Insurance	1	LS		
4	Utility and Tie-In Field Verification	1	LS		
5	Clearing and Grubbing	1	LS		
6	Connect to 14" WM	1	EA		
7	16" DI Pipe (Class 250)	2750	LF		
8	16" DI Pipe (Class 250) Restrained Joint	4460	LF		
9	16" DI Pipe (Class 350)	5400	LF		
10	16" DI Pipe (Class 350) Restrained Joint	1920	LF		
11	24" DI Pipe (Class 250) Restrained Joint	700	LF		
12	24" DI Pipe (Class 350) Restrained Joint	20	LF		
13	30" HDPE Pipe (DR 11)	890	LF		
14	8" Steel Casing Pipe, Bore and Jack	110	LF		
15	36" Steel Casing Pipe, Bore and Jack	430	LF		
16	24" PVC/HDPE Casing Pipe, Open Cut	310	LF		
17	36" PVC Casing Pipe, Open Cut	140	EA		
18	16" Gate Valve	5	EA		
19	24" Gate Valve	6	EA		
20	Air Release Valve	3	EA		
21	Drain Assembly	2	EA		
22	Concrete Encasement	90	LF		
23	Concrete Cap	10	LF		
24	Flowable Fill Backfill	3560	LF		
25	Bituminous Pavement Replacement	4740	SY		
26	Concrete Pavement Replacement	10	SY		
27	Turf Reinforcement Mat	420	SY		
28	Traffic Control	1	LS		
29	Erosion Prevention and Sediment Control	1	LS		
30	Demobilization	1	LS		

ESTIMATED TOTAL SECTION B (Items 1 through 30): _____

_____ Dollars (\$_____).

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total Item Amount
<i>Section C - 16" TM Pritchard</i>					
1	Mobilization	1	LS		
2	General Requirements	1	LS		
3	Bonds and Insurance	1	LS		
4	Utility and Tie-In Field Verification	1	LS		
5	Clearing and Grubbing	1	LS		
6	Connect to 12" WM	1	EA		
7	Connect to 14" WM	1	EA		
8	16" DI Pipe (Class 250)	3785	LF		
9	16" DI Pipe (Class 250) Restrained Joint	400	LF		
10	12" Gate Valve	1	EA		
11	16" Swing Check Valve and Vault	1	EA		
12	Air Release Valve	4	EA		
13	Drain Assembly	1	EA		
14	Concrete Encasement	10	LF		
15	Concrete Cap	10	LF		
16	Erosion Prevention and Sediment Control	1	LS		
17	Demobilization	1	LS		

ESTIMATED TOTAL SECTION C (Items 1 through 17): _____

_____ Dollars (\$_____).

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total Item Amount
<i>Section D - 14" Raw Water Conversion</i>					
1	Mobilization	1	LS		
2	General Requirements	1	LS		
3	Bonds and Insurance	1	LS		
4	Utility and Tie-In Field Verification	1	LS		
5	Clearing and Grubbing	1	LS		
6	14" DI (Class 250 DI Pipe)	425	LF		
7	14" DI (Class 250 DI Pipe) Restrained Joint	20	LF		
8	14" Gate Valve	1	EA		
9	Replace Exist. 14" Gate Valve	1	EA		
10	Remove Exist. 14" Gate Valve	1	EA		
11	Air Release Valve	12	EA		
12	Replace Exist. Air Release Valve	2	EA		
13	Drain Assembly	7	EA		
14	Gate Valve and Drain Assembly	4	EA		
15	Flushing and Testing 14" Main	1	LS		
16	Erosion Prevention and Sediment Control	1	LS		
17	Demobilization	1	LS		

ESTIMATED TOTAL SECTION D (Items 1 through 17): _____
 _____ Dollars (\$_____).

ESTIMATED TOTAL BASE BID PACKAGE

SECTION A - 24" TM from Katherine Station to MM Vault \$ _____
 SECTION B - 16" TM from MM Vault to PS to Tie-In to Ex. 14" \$ _____
 SECTION C - 16" TM Pritchard \$ _____
 SECTION D - 14" Raw Water Conversion \$ _____
TOTAL ESTIMATED BASE BID \$ _____

ALTERNATIVES

All BIDDERS for the Transmission Main Contract are required to submit amounts for the additive alternatives described below.

ALTERNATIVE NO. 1

For Section B , from Station 37+70 (10 feet outside MM Vault) to Station 199+00 (@ 24" Tee) , where the plans call for 16-Inch DI Pipe, provide 20-Inch DI Pipe. All remaining pipe sizes and materials in this section stay the same. In the table below provide the INCREASE from the base bid unit price for the following bid items:

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total Item Amount
<i>Unit Price Increase from Base Bid (16" to 20")</i>					
1	20"DI Pipe (Class 250)	2750	LF		
2	20" DI Pipe (Class 250) Restrained Joint	4460	LF		
3	20" DI Pipe (Class 350)	5400	LF		
4	20" DI Pipe (Class 350) Restrained Joint	880	LF		
5	30" PVC/HDPE Casing Pipe, Open Cut (24" to 30")	310	LF		
6	20" Gate Valve (16" to 20")	5	EA		
7	Flowable Fill Backfill (Wider Trench)	3560	LF		

ESTIMATED TOTAL ALTERNATIVE NO. 1 (Items 1 through 7): _____ Dollars (\$_____).

ALTERNATIVE NO. 2

For Section B , from Station 37+70 (10 feet outside MM Vault) to Station 199+00 (@ 24" Tee) , where the plans call for 16-Inch DI Pipe, provide 24-Inch DI Pipe. All remaining pipe sizes and materials in this section stay the same. In the table below provide the INCREASE from the base bid unit price for the following bid items:

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total Item Amount
<i>Unit Price Increase from Base Bid (16" to 24")</i>					
1	24"DI Pipe (Class 250)	2750	LF		
2	24" DI Pipe (Class 250) Restrained Joint	4460	LF		
3	24" DI Pipe (Class 350)	5400	LF		
4	24" DI Pipe (Class 350) Restrained Joint	880	LF		
5	36" PVC/HDPE Casing Pipe, Open Cut (24" to 36")	310	LF		
6	24" Gate Valve (16" to 24")	5	EA		
7	Flowable Fill Backfill (Wider Trench)	3560	LF		

ESTIMATED TOTAL ALTERNATIVE NO. 2 (Items 1 through 7): _____ Dollars (\$_____).

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

PUMP STATION CONTRACT

BASE BID - INITIAL CONDITIONS

- 5.02 The base bid shall include a packaged above ground booster pump station furnished by Flo-Pak/Patterson Pump Company. Bidder will furnish and complete all Work including sitework, yard piping, concrete foundation, above ground packaged booster pump station (three (3) 250 HP pumps rated at 1,700 gpm at 425' TH each), generator and automatic transfer switch, and electrical service, Complete, in accordance with the Contract Documents for the following price:

Lump Sum Base Bid Price _____

Dollars (\$_____).

The Bidder may include an alternate booster pump station manufacturer. Pre-bid approval must be obtained to submit an alternate. For requirements see Section 11213, Article 1.3B. Provide pre-bid approved alternate below:

Alternate Booster Pump Station Manufacturer _____
Adjustment to Lump Sum Base Bid \$ _____
(Increase/Decrease)

All BIDDERS for the Pump Contract are required to submit amount for the additive alternative described below.

ALTERNATIVE BID - ULTIMATE CONDITIONS

The alternative bid replaces the base bid pumps with three (3) Patterson 350 HP pumps rated at 2,800 gpm at 265' TDH each and related pump inlet and outlet adjustment for the larger pumps. The remainder of the base bid equipment items have been sized for the larger pumps (bid suction and discharge headers, size of VFDs, electrical service, generator) and remain unchanged. Provide the INCREASE below:

ALTERNATIVE BID (Increase to Base Bid Only) \$ _____

The Bidder may include an alternate booster pump station manufacturer. Pre-bid approval must be obtained to submit an alternate. For requirements see Section 11213, Article 1.3B. Provide pre-bid approved alternate below:

Alternate Booster Pump Station Manufacturer _____
Adjustment to Alternative Bid \$ _____
(Increase/Decrease)

ARTICLE 6 - Time of Completion

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times.

ARTICLE 7 - Attachments To This Bid

- 7.01 The following documents are attached to and made a condition of this Bid:
 - A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided) (Section 00430)
 - B. Statement of Bidder's Qualifications (Section 00440, Part 1)
 - C. Project References (Section 00440, Part 2)
 - D. Proposed Subcontractors (Section 00440, Part 3)
 - E. List of Proposed Manufacturers/Suppliers (Section 00440, Part 4)
 - F. Non-collusion Affidavit of Prime Bidder (Section 00440, Part 5)

ARTICLE 8 - DEFINED TERMS

- 8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 - BID SUBMITTAL

- 9.01 This Bid submitted by:

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

Bidder's Business address: _____

Business Phone No. () _____

Business FAX No. () _____

Business	E-Mail	Address

State Contractor License No. _____ (If applicable)

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

5.03 Bid Submitted on _____, 20_____.

(SEAL, if required)

END OF SECTION

SECTION 00430

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

Hardin County Water District No. 1
1400 Rogersville Road
Radcliff, Kentucky 40160

BID

Bid Due Date: December 18th, 2015

Project (Brief Description Including Location): LWC Interconnect – Transmission Main and Pump Station
Improvements – Hardin and Jefferson County, Kentucky

BOND

Bond Number:

Date (Not later than Bid due date):

Penal sum

_____ (Words)

_____ (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

Bidder's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature and Title

By: _____
Signature and Title
(Attach Power of Attorney)

Attest By: _____
Signature and Title

Attest: _____
Signature and Title

Note: Above addresses are to be used for giving required notice.

PENAL SUM FORM

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

END OF SECTION

SECTION 00440
ATTACHMENTS TO BID

PART 1 - STATEMENT OF BIDDER'S QUALIFICATIONS

All questions shall be answered or the bid document will be incomplete. All data given shall be clear and comprehensive. This statement shall be notarized. If necessary, questions may be answered on separate sheets. The bidder may submit any additional information he desires.

1. Name of Bidder:
2. Permanent main office address:
3. When organized:
4. If a corporation, where incorporated:
5. How many years have you been engaged in operation of your business under your present firm or trade name?
6. Contracts on hand. (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.)
7. General character of work performed by your company (general contractor, electrical contractor, etc.).
8. Have you ever failed to complete any job awarded to you? If so, where and why?
9. Have you ever defaulted on a contract? If so, where and why?
10. List the more important projects completed by your firm, stating the approximate cost for each, and the month and year completed.
11. List your major equipment available for this work.
12. Experience in work similar in complexity, size and/or dollar value to this project. List and describe at least four on the table AProject References.@
13. Background and experience of the principal members of your organization, including the officers in this type work. (Attach.)
14. Credit available: \$ _____.
15. Give bank reference: _____.
16. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by Owner? Yes No
17. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information required by the Owner in verification of the statements made comprising this Statement of Bidder's Qualifications. Dated at _____ this _____ day of _____, of this year _____.

NAME OF BIDDER

BY _____

TITLE _____

STATE OF _____)

) ss.

COUNTY OF _____)

_____ being duly sworn deposes and says that he is

_____ of _____
(NAME OF ORGANIZATION)

and that the answers to the foregoing questions and all statements contained therein

are true and correct.

Subscribed and sworn to before me this _____ day of _____, of this year _____.

(NOTARY PUBLIC)

My Commission expires _____, _____.

PART 2 - PROJECT REFERENCES

Project Name, Owner, Address, Telephone #	Architect/Engineer, Contact Name, Telephone #	Project Type, Year of Completion	Size of Project (Capacity, Contract Duration)	Contract Value	Change Order Value

PART 3 - PROPOSED SUBCONTRACTORS

The BIDDER'S proposed subcontractors shall be listed below for the various branches of work included in the proposed contract. All subcontractors are subject to the approval of the OWNER. **Unless rejected by the OWNER, no substitutions or changes to the listing of the entities proposed to perform that branch of the work will be allowed following opening of the Bids.**

Where the BIDDER proposes to perform the work with its own forces, the phrase APrime Contractor shall be entered in the box provided.

Failure to submit a completed list shall be cause for rejection of the Bid.

Branch of Work	Name and Address of Subcontractor
1. Traffic Control	
2. Clearing and Tree Removal	
3. Ductile Iron Pipe Installation (Open Cut)	
4. HDPE Pipe Installation (Open Cut)	
5. Horizontal Directional Drill	
6. Bore and Jack	
7. Foundation Work (Master Meter Vault and Packaged Water Booster Pump Station)	
8. Electrical Work	
9. Bituminous Pavement	
10. Concrete Pavement	
11. Security Fencing	
12. Site Restoration/Seeding	

(Add supplemental pages if necessary)

PART 4 - LIST OF PROPOSED MANUFACTURERS/SUPPLIERS

The BIDDER'S proposed manufacturers/suppliers shall be listed for various items shown below. The OWNER reserves the right to reject any proposed manufacturer/supplier that is not listed in the Bid Documents. **Unless rejected by the OWNER, no substitutions or changes to the listing of the manufacturers/suppliers proposed will be allowed following opening of the Bids.**

Failure to submit a completed list shall be cause for rejection of the Bid.

Material (Equipment)	Name and Address of Material Manufacturer/Supplier
1. Ductile Iron Pipe	
2. HDPE Pipe	
3. Horizontal Gate Valves	
4. Vertical Gate Valves	
5. Packaged Master Meter Vault	
6. Packaged Booster Pump Station/Pump Mfr	Base Bid – Flo-Pak/Patterson Pump Company Pre-Bid Approval Alternate:
7. Generator	
8. Air Release Valve	
9. Friction Type Mechanical Joint Restraint	
10. Concrete Ready Mix	

PART 5 - NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

STATE OF _____)

COUNTY OF _____)

_____, being first duly sworn, deposes and says that: (1) He/She is

(OWNER, PARTNER, REPRESENTATIVE OR AGENT)

of _____, the Bidder that has submitted the attached bid;

(2) He/She is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents or representatives, employees or parties in interest, including the affinity has in any way colluded, conspired, connived or agree, directly or indirectly with any other bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the _Owner of the Project or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties, including this affiant.

SIGNED _____

TITLE _____

Subscribed and sworn to before me this _____ day of _____, of this year _____.

(NAME) _____ (TITLE)

MY COMMISSION EXPIRES: _____.

SECTION 00510
NOTICE OF AWARD

Dated _____

Project: LWC Interconnect – Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky

Owner: Hardin County Water District No. 1

Bidder: _____

Bidder's Address: (send Certified Mail, Return Receipt Requested)

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for

(Indicate total Work, alternates or sections or Work awarded.)

The Contract Price of your Contract is _____ Dollars (\$_____).

2 copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

2 sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner 3 fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]
3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Hardin County Water District No. 1

Owner

By: _____
Authorized Signature

Jim Bruce, General Manager

Title

Copy to Engineer

END OF SECTION

SECTION 00521
FORM OF AGREEMENT

THIS AGREEMENT is by and between Hardin County Water District No. 1 (“Owner”) and _____ (“Contractor”).
Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Transmission Main Contract

Pump Station Contract

LWC Interconnect – Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by HDR Engineering, Inc. (Engineer), who is to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion (and Final Payment)*

The Work will be substantially completed within days after the date when the Contract Time commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment at a date determined by Owner, Contractor, and Engineer after Substantial Completion, based on remaining work, weather, and market conditions.

4.03 *Liquidated Damages*

Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$500 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$200 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, 5.01.B, and 5.01.C below:

- A. Transmission Main Contract - For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.B:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

- B. Pump Station Contract – Lump Sum Amount

Bid Forms for Each Contract and Selected Alternative(s) to be inserted with preparation of Contract Documents

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the ____ day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:
 - a. 90 percent of Work completed (with the balance being retainage); and
 - b. 90 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage); but
2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, plus any reduction in retainage that has been agreed upon by Owner, Contractor, and Engineer. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the _____ day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

6.03 *Final Payment*

- A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

ARTICLE 7 – INTEREST

- 7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the short term lending rate or state law, where applicable.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:
- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
 - B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

- D. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Biding Documents, and safety precautions and programs incident thereto.
- E. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- F. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- G. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

- A. The Contract Documents consist of the following:
- B. This Agreement (pages 1 to (inclusive).
 - 1. Performance bond (pages 1 to, inclusive).
 - 2. Payment bond (pages 1 to, inclusive).
 - 3. Bid bonds (pages ____ to ____, inclusive).
 - 4. General Conditions (pages ____ to ____, inclusive).
 - 5. Supplementary Conditions (pages ____ to ____, inclusive).
 - 6. Specifications as listed in the table of contents of the Project Manual.
 - 7. Drawings consisting of ____ sheets with each sheet bearing the following general title: ____.
 - 8. Addenda (numbers ____ to ____, inclusive).
 - 9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor’s Bid (pages ____ to ____, inclusive).
 - b. Documentation submitted by Contractor prior to Notice of Award (pages ____ to ____, inclusive).
 - c. ____.

10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages _____ to _____, inclusive).
 - b. Work Change Directives.
 - c. Change Order(s).
- C. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- D. There are no Contract Documents other than those listed above in this Article 9.
- E. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Other Provisions*

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, and Engineer (and Agency). All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf.

This Agreement is dated _____. This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER:

CONTRACTOR

Hardin County Water District No. 1

By: Jim Bruce

By: _____

Title: General Manager

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

Agent for service of process:

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

END OF SECTION

SECTION 00550
NOTICE TO PROCEED

Dated _____

Project: LWC Interconnect – Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky

Owner: Hardin County Water District No. 1

Contractor:

Contractor's Address: (send certified mail, return receipt requested)

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____ [(or) the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before you may start any Work at the site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the site, you must [add other requirements]:

Contractor	Hardin County Water District No. 1
Received by	Owner Jim Bruce
Title	Given by General Manager
Date	Title
	Date

Copy to Engineer

END OF SECTION

SECTION 00610

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address): Hardin County Water District No. 1, 1400 Rogersville Road, Radcliff, Kentucky 40160

CONTRACT

Date:

Amount:

Description (Name and Location): LWC Interconnect – Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky

BOND

Bond Number:

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form: Delete subparagraph 3.3.2 in its entirety. Delete the wording of subparagraph 4.3 and replace it with the following wording: (NOT USED). Delete all additional references to subparagraph 4.3.

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL

Company:

Signature _____ (Seal)

:
Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.
2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.
3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
 - 3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
 - 3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and
 - 3.3. Owner has agreed to pay the Balance of the Contract Price to:
 1. Surety in accordance with the terms of the Contract;
 2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.
4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:
 - 4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
 - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
 - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:
 1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
 2. Deny liability in whole or in part and notify Owner citing reasons therefor.
5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.
6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:
 - 6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;
 - 6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and
 - 6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.
7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.
8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.
11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
12. Definitions.
 - 12.1. Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
 - 12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
 - 12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
 - 12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker
Owner's Representative (engineer or other party)

END OF SECTION

SECTION 00615
PAYMENT BOND

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address): Hardin County Water District No. 1, 1400 Rogersville Road, Radcliff, Kentucky 40160

CONTRACT

Date:

Amount:

Description (Name and Location): LWC Interconnect – Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky

BOND

Bond Number:

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form: (1) Delete the wording of Paragraph 6 in its entirety and replace it with the following: Reserved.

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____

Signature and Title

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

Attest: _____

Signature and Title:

EJCDC No. C-615 (2002 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

A. FOR INFORMATION ONLY – Name, Address and Telephone

Surety Agency or Broker:

Owner's Representative (engineer or other party):

END OF SECTION

PART 1 – CONTRACTOR’S APPLICATION FOR PAYMENT

No. _____

	Application Period:	Application Date:
To (Owner): Hardin County Water District No. 1	From (Contractor):	Via (Engineer)
Project: LWC Interconnect – Transmission Main and Pump Station Improvements		
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	\$	
2. Net change by Change Orders	\$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2)	\$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	\$	
5. RETAINAGE:		
a. ____ % x \$ _____ Work Completed	\$	
b. ____ % x \$ _____ Stored Material	\$	
c. Total Retainage (Line 5a + Line 5b)	\$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	\$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	\$	
8. AMOUNT DUE THIS APPLICATION	\$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above).....	\$	

CONTRACTOR’S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:
-----	-------

Payment of:	\$ _____	
	(Line 8 or other - attach explanation of other amount)	
is recommended by:	_____	_____
	(Engineer)	(Date)
Payment of:	\$ _____	
	(Line 8 or other - attach explanation of other amount)	
is approved by:	_____	_____
	(Owner)	(Date)
Approved by:	_____	_____
	Funding Agency (if applicable)	(Date)

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT FUNDING AGENCY EDITION

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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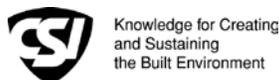
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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Funding Agency Edition No. C-521 (2002 Edition). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001, 2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800, 2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda* – Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agency* – The Federal or state agency named as such in the Agreement.
 3. *Agreement* – The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 4. *Application for Payment* – The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 5. *Asbestos* – Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 6. *Bid* – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 7. *Bidder* – The individual or entity who submits a Bid directly to Owner.
 8. *Bidding Documents* – The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 9. *Bidding Requirements* – The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.
 10. *Change Order* – A document recommended by Engineer which is signed by Contractor and Owner and Agency and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 11. *Claim* – A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 12. *Contract* – The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 13. *Contract Documents* – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

14. *Contract Price* – The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
15. *Contract Times* – The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
16. *Contractor* – The individual or entity with whom Owner has entered into the Agreement.
17. *Cost of the Work* – See Paragraph 11.01.A for definition.
18. *Drawings* – That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
19. *Effective Date of the Agreement* – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
20. *Engineer* – The individual or entity named as such in the Agreement.
21. *Field Order* – A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
22. *General Requirements* – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
23. *Hazardous Environmental Condition* – The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.
24. *Hazardous Waste* – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
25. *Laws and Regulations; Laws or Regulations* – Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens* – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
27. *Milestone* – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
28. *Notice of Award* – The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
29. *Notice to Proceed* – A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
30. *Owner* – The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
31. *PCBs* – Polychlorinated biphenyls.

32. *Petroleum* – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
33. *Progress Schedule* – A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
34. *Project* – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
35. *Project Manual* – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
36. *Radioactive Material* – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
37. *Related Entity* – An officer, director, partner, employee, agent, consultant, or subcontractor.
38. *Resident Project Representative* – The authorized representative of Engineer who may be assigned to the Site or any part thereof.
39. *Samples* – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
40. *Schedule of Submittals* – A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
41. *Schedule of Values* – A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
42. *Shop Drawings* – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
43. *Site* – Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
44. *Specifications* – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
45. *Subcontractor* – An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
46. *Substantial Completion* – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
47. *Successful Bidder* – The Bidder submitting a responsive Bid to whom Owner makes an award.

48. *Supplementary Conditions* – That part of the Contract Documents which amends or supplements these General Conditions.
49. *Supplier* – A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.
50. *Underground Facilities* – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
51. *Unit Price Work* – Work to be paid for on the basis of unit prices.
52. *Work* – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
53. *Work Change Directive* – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and Agency upon recommendation of the Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

- A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.
- B. *Intent of Certain Terms or Adjectives*
 1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.
- C. *Day*
 1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents, or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, Agency, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

- b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 - 1. A Field Order;
 - 2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3) or
 - 3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or
 - 2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.
- B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and
 - 2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

- A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:
 - 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
 - 2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

- A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data,
 - b. locating all Underground Facilities shown or indicated in the Contract Documents,
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:
1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner’s own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 Certificates of Insurance

- A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

- A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 3. include completed operations insurance;
 4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.
 - a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (Contractor shall be responsible for any deductible or self-insured retention.). This insurance shall:
 1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;
 2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.
- B. Contractor shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Contractor as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Contractor and made payable to Contractor as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Contractor shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof.
- B. Contractor as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Contractor's exercise of this power. If such objection be made, Contractor as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Contractor as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Contractor as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *“Or-Equal” Items:* If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service; and
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times, and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
2. *Substitute Items*
 - a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
 - b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
 - c. The procedure requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.
 - d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) will perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor’s achievement of Substantial Completion on time;

- b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified , and
 - b) available engineering, sales, maintenance, repair, and replacement services;
 - 4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor
 - 2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
 - D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.
 - 1. *Shop Drawings*
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
 - 2. *Samples*
 - a. Submit number of Samples specified in the Specifications.

- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
 - a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;
 - c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and
 - d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

- B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
 - C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

- A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 – ENGINEER’S STATUS DURING CONSTRUCTION

9.01 *Owner’s Representative*

- A. Engineer will be Owner’s representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner’s representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor’s executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer’s efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer’s visits and observations are subject to all the limitations on Engineer’s authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer’s visits or observations of Contractor’s Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer’s consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, subject to written approval by Agency at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
 - 1. deny the Claim in whole or in part,
 - 2. approve the Claim, or
 - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
 4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
 5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
 - g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressages, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.
- B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:
- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
 - 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 - 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. Cash Allowances
 - 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*
 - 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 - 1. the Bid price of a particular item of Unit Price Work amounts to more than 5 percent of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:
 1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.B.
 - 1. delays caused by or within the control of Contractor; or
- D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;

- b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
 3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
 4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. the Contractor's performance or furnishing of the Work is inconsistent with funding Agency requirements;
 - d. there are other items entitling Owner to a set-off against the amount recommended; or
 - e. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.
3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Agency, Contractor, and Engineer shall make a prefinal inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner, Agency, and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

- A. *Application for Payment*
 - 1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims. The remaining balance of any sum included in the final Application for Payment but held by OWNER for Work not fully completed and accepted will become due when the Work is fully completed and accepted.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and
 3. complete the Work as Owner may deem expedient.

- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Owner and Contractor may mutually request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process, or
 - 3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

ARTICLE 18 – FEDERAL REQUIREMENTS

18.01 *Agency Not a Party*

- A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

18.02 *Contract Approval*

- A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit GC-A) before Owner submits the executed Contract Documents to Agency for approval.
- B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

18.03 *Conflict of Interest*

- A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer.
- B. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

18.04 *Gratuities*

- A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.
- B. In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

18.05 *Audit and Access to Records*

- A. For all negotiated contracts and negotiated modifications (except those of \$10,000 or less), Owner, Agency, the Comptroller General, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor, which are pertinent to the Contract, for the purpose of making audits, examinations, excerpts and transcriptions. Contractor shall maintain all required records for three years after final payment is made and all other pending matters are closed.

18.06 *Small, Minority and Women's Businesses*

- A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

18.07 *Anti-Kickback*

- A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

18.08 *Clean Air and Pollution Control Acts*

- A. If this Contract exceeds \$100,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 USC 7401 *et seq.*) and the Federal Water Pollution Control Act as amended (33 USC 1251 *et seq.*). Contractor will report violations to the Agency and the Regional Office of the EPA.

18.09 *State Energy Policy*

- A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

18.10 *Equal Opportunity Requirements*

- A. If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."
- B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and 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 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.
- C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 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; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

18.11 *Restrictions on Lobbying*

- A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

18.12 *Environmental Requirements*

- A. When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:
 - 1. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

2. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.
3. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).
4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

EXHIBIT GC-A

Certificate of Owner's Attorney

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows:

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

Date: _____

SECTION 00800
SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract Funding Agency Edition (No. C710, 2002 Edition) and other provision of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

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SC-1.01.A.2. Delete Paragraph 1.01.A.2 in its entirety and insert the following in its place:

Not used

SC-1.01.A.21. Add the following language to the end of Paragraph 1.01.A.21:

A Field Order is not a Work Change Directive.

SC-2.02.A. Delete Paragraph 2.02.A in its entirety and insert the following in its place:

- A. Owner shall furnish to Contractor up to two (2) printed or hard copies of the Drawings and Project Manual and one set in electronic format. Additional printed or hard copies will be furnished upon request at the cost of production.

SC-2.03.A. Delete Paragraph 2.03.A in its entirety and insert the following in its place:

- A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 10 days after the Effective Date of the Agreement.

SC-5.03. Add the following new paragraph immediately after Paragraph 5.03.B:

- C. Failure of the Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of the Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

SC-5.04. Add the following new paragraph immediately after Paragraph 5.04.B:

- C. The limits of liability for insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

- 1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

- a. State: Statutory
- b. Applicable Federal (e.g., Longshoremen's) Statutory
- c. Employer's Liability \$500,000

- 2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:

- a. General Aggregate \$2,000,000
- b. Products – Completed Operations Aggregate \$1,000,000
- c. Personal and Advertising Injury \$1,000,000
- d. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
- e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where Applicable.
- f. Excess or Umbrella Liability
 - 1) General Aggregate \$5,000,000
 - 2) Each Occurrence \$5,000,000

- 3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

- a. Bodily Injury:
 - Each Person \$1,000,000
 - Each Accident \$1,000,000
- b. Property Damage: Each Accident \$1,000,000

- c. Combined Single Limit of \$1,000,000
- 4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
 - a. Bodily Injury:
 - Each Person \$2,000,000
 - Each Accident \$2,000,000
 - b. Property Damage:
 - Each Accident \$2,000,000
 - Annual Aggregate \$2,000,000
- 6. The following persons or entities are to be included on the required insurance policies as additional insureds:
 - a. HDR Engineering, Inc.
2517 Sir Barton Way
Lexington, KY 40509

SC-6.06.B Delete paragraph 6.06.B in its entirety and insert the following in its place:

- B. Contractor shall provide the identity of subcontractors and suppliers as indicated on the bid form and attachments. Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

SC-6.06.G Add a new paragraph immediately after Paragraph 6.06.G:

- H. The Contractor shall not award work valued at more than fifty (50%) percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC-6.08 Add the following new paragraphs immediately after Paragraph 6.08.A:

- B. See Special Conditions for permits obtained by the Owner, which are provided in the appendix.

SC-6.20.C.2 Amend the phrase 6.20.C.2 by striking out the following words:

, or failing to give them,

SC-9.03.A. Add the following language at the end of paragraph 9.03.A:

The Engineer will provide Resident Project Representative services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-510, 2002 Edition, as amended and executed for this specific Project.

SC-13.03.B. Delete Paragraph 13.03.B in its entirety and insert the following in its place:

- B. Contractor shall employ and pay for the services of an independent testing laboratory, acceptable to the Owner and Engineer, to perform all inspections, tests, or approvals required by the Contract Documents except as otherwise specifically provided in the Contract Documents.

SC-14.02.A.3. Add the following language at the end of paragraph 14.02.A.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-14.02.C.1. Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's Recommendations will be presented to the Owner for consideration. If the Owner finds the application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due forty-five (45) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-16.01. Delete Paragraph 16.01 in its entirety and insert the following in its place:

16.01 Methods and Procedures

- A. All claims, disputes and other matters in question between Owner and Contractor arising out of, or relating to the Project or the Contract Documents or their breach, except for claims which have been waived by the making or acceptance of final payment, shall be submitted to mediation. The mediation will be conducted in accordance with the Construction Industry Dispute Resolution Procedures of the American Arbitration Association in effect on the date when the parties submit the matter to mediation, subject to the limitations of this paragraph.
 1. A demand for mediation of any claim, dispute or other matter that must be referred to Engineer pursuant to Paragraph 10.05 shall not be made until the earlier of:
 - (a) the date on which Engineer has rendered a decision, or
 - (b) the date on which the claimed is deemed denied due to no action having been taken by Engineer before that date.
 2. Any demand for mediation of a claim, dispute or other matter referred to the ENGINEER for decision pursuant to paragraph 10.05 must be made within the time limits stipulated in Paragraph 10.05.E. If Engineer renders a decision after mediation proceedings have been initiated, such decision may be entered as evidence but shall not supersede the mediation proceedings, except where the decision is acceptable to the parties concerned.
 3. Notice of the demand for mediation shall be filed in writing with the other party and with the American Arbitration Association and a copy shall be sent to Engineer for information. The initial case set-up fees for both parties shall be borne in the entirety by the requesting party. When the adverse party has received notice of the demand for mediation, the expenses of the mediation from that point shall be distributed and borne by the parties in accordance with the Construction Industry Dispute Resolution Procedures.
 4. A demand for mediation shall be made within the period specified in Paragraph 10.05, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.
 5. No mediation arising out of or relating to the Project or the Contract Documents shall include by consolidation, joinder, or in any other manner, any other person or entity (including Engineer and Engineer's agents, employees or consultants) who is not a party to this Contract except by the written agreement of Owner, Contractor, and the other person(s), entity or entities to be included or joined.
 6. The Owner will select the location for any mediation conducted for this Project.
 7. The Contractor shall carry on the Work and maintain the progress schedule for the Project at all times during the resolution of any matters submitted to mediation.
 8. Any settlement agreement facilitated by the mediation will be final and binding, with documentation of the agreement being prepared by the mediator and executed by both parties at the close of the mediation. Any settlement agreement entered by the Owner and Contractor is subject to and may be enforced under the law of the jurisdiction where the Project is located.

- B. Should the Owner and Contractor be unable to agree to resolve a claim or dispute by mediation, both parties, by written agreement, may submit the claim, dispute or other matter to binding arbitration, which shall be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association in effect on the date when the parties submit the matter for arbitration, subject to the following limitations:
1. The location for the arbitration shall be the same political subdivision where the Project is located.
 2. The arbitration shall not include by consolidation, joinder, or in any other manner, any other person or entity (including Engineer and Engineer's agents, employees or consultants) who is not a party to this Contract except by the written agreement of the Owner, Contractor and the other person(s), entity or entities to be included or joined.
 3. The Contractor shall carry on the Work and maintain the progress schedule for the Project at all times during the resolution of the matters submitted to arbitration.
 4. The arbitration award will be written, final and binding, and signed by the majority of the arbitrators (if there are more than one), with certified copies to be delivered to each of the parties and to Engineer. Judgment may be rendered upon the award by the Federal Court or the highest State Court having appropriate jurisdiction over either of the parties.
- C. Should the Owner and Contractor be unable to agree to resolve a claim or dispute by mediation, and unable to agree to submit the claim or dispute to binding arbitration, both parties agree that the matter shall be litigated in the lowest level court of law of competent jurisdiction where the project is located and neither party will move for a change of venue to any other location. Should the project be incomplete at the onset of any litigation, the Contractor shall carry on the work and maintain the progress schedule during any court proceedings, unless otherwise mutually agreed in writing.

SC-18.01 Delete Paragraph 18.01 in its entirety and insert the following in its place:

- A. (Not Used)

SC-18.02 Delete Paragraph 18.02 in its entirety and insert the following in its place:

- A. (Not Used)

SC-18.03 Delete Paragraph 18.03 in its entirety and insert the following in its place:

- A. (Not Used)

SC-18.04 Delete Paragraph 18.04 in its entirety and insert the following in its place:

- A. (Not Used)

SC-18.05 Delete Paragraph 18.05 in its entirety and insert the following in its place:

- A. (Not Used)

SC-18.07.A. Amend the paragraph by striking out the final sentence:

- A. Owner shall report all suspect or reported violations to Agency.

SC-18.08.A. Delete paragraph 18.08.A in its entirety and insert the following in its place:

- A. If this Contract exceeds \$100,000, the Contractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC §1857(h)), Section 508 of the Clean Water Act (33 USC §1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

SC-18.10 Delete paragraph 18.10 in its entirety and insert the following in its place:

- A. (Not Used)

SC-18.11 Delete paragraph 18.11 in its entirety and insert the following in its place:

- A. (Not Used)

SC-18.12.A.1-4 Delete paragraph 18.12.A.1-4 in their entirety and insert the following in their place:

- A. Contractor shall comply with the stipulations of Section 01120, Environmental Protection, of the General Requirements and Corps of Engineers 404 Permit and Special Condition, which is provided in the appendix.

SC-EXHIBIT GC-A Delete Exhibit GC-A in its entirety and insert the following in its place:

- A. (Not Used)

END OF SECTION

SECTION 00810
SPECIAL CONDITIONS

PART 1 - GENERAL

1.1 GENERAL

- A. These specifications and the drawings accompanying them describe the work to be done and the materials to be furnished for the construction of LWC Interconnect – Transmission Main and Pump Station Improvements – Hardin and Jefferson County, Kentucky.
- B. The organization of the Project Specifications utilizes the 1988 Edition, CSI MasterFormat numbering system. No claims for increases in the Contract amount will be accepted which are based on specification numbering systems other than the 1988 Edition of CSI MasterFormat.
- C. The Contractor and each subcontractor shall be responsible for verification of all measurements at the site before ordering any materials or doing any work. No extra charge or compensation shall be allowed due to differences between actual dimensions and dimensions indicated on the drawings. Any such discrepancy in dimensions which may be found shall be submitted to the Engineer for his consideration before the Contractor proceeds with the work in the affected areas.

1.2 ORDERING MATERIALS

- A. Immediately following award of contract for this work, the Contractor shall determine length of time required for delivery of all materials, including materials of subcontractors and orders shall be placed for such materials promptly.
- B. If, for any reason, any item specified will not be available when needed and the Contractor can show that he has made a reasonably persistent effort to obtain the item(s) in question, the Engineer shall be notified in writing within thirty (30) days after the contract is signed. Otherwise, the Contractor will not be excused for delays in securing the material specified and will be held accountable if completion of the work is thereby delayed.

1.3 CONDUCT OF EMPLOYEES

- A. The Contractor shall post signs conspicuously on the site to prohibit the use or possession of alcoholic beverages or drugs by any of his employees while they are on the job-site. The Contractor is responsible for reporting violations of the provisions of KRS 244 to the proper authorities and for taking the necessary action to insure that the intent of this paragraph is carried out.

1.4 INTERRUPTION OF UTILITIES

- A. Utility services to other areas outside of those in the contract limits shall not be interrupted unless absolutely necessary.
- B. If damaged the Contractor shall notify the utility immediately. The Contractor is responsible for any cost associated with repairing the utilities, either by reimbursement to the utility directly or for providing the labor and materials to make the repair.

1.5 DELIVERY OF CONSTRUCTION MATERIALS

- A. The Contractor shall receive, accept and make provisions for the delivery and unloading of all construction materials. Under no circumstances will the Owner be responsible for accepting delivery of materials.

1.6 PERMITS

- A. HCWD1 has obtained the following permits/approvals:

1. KDOW Drinking Water Branch – Water Construction Approval
 2. KDOW Water Quality Branch – 401 WQ Certification/Nationwide Permit
 3. KDOW Surface Water Branch – Stream Construction
 4. KYTC District 4 (Elizabethtown) – Encroachment Permit
 5. KYTC District 5 (Louisville) – Encroachment Permit
 6. Army Corps of Engineers – 404 Permit with Special Conditions
- B. The Contractor shall adhere to the requirements, general and special notes and special provisions in these permits and approvals. Copies are provided in the appendix.

1.7 RAILROAD CROSSINGS

- A. HCWD1 has obtained approval and license agreements for pipeline encroachment/crossings from Paducah and Louisville and CSX Corporation.
- B. The Contractor is responsible for providing the required insurance and coverage limits as required in each agreement.
- C. The Contractor is responsible for obtaining a Railroad Protective Policy for each railway crossing as required in each agreement. This policy must be obtained by the Contractor or fee paid directly to each railway for the railway to provide the policy. This policy is required for full execution of license agreement between the railway and HCWD1 and before construction can begin.
- D. The Contractor is responsible for paying any flagging or inspections cost incurred by each railway.
- E. Contact information and procedures for notification to begin work is provided in each agreement.
- F. Contractor shall adhere to the provisions and term and conditions of each agreement. Copies of the approval letters and license/encroachment agreements are provided in the appendix.

1.8 WATER MAIN INSTALLATION (LWC SECTION)

- A. The LWC Section includes the water main installation from Katherine Station Road, Station 10+00, to and across the Salt River and to the Master Meter Vault, Station 37+50.
- B. In addition to these Contract Documents, the water main construction along this section shall in accordance with LWC Technical Specifications and Standard Drawings for Pipeline Construction, latest edition, hereby incorporated by reference.
- C. Contractors providing work along this section shall be prequalified by LWC in the following categories of work – DI Pipe 20” to 48”, Boring 20” to 36”, and Electrical.
- D. List of prequalified contractors are provided in the appendix.

1.9 STAGING AREAS

- A. The Contractor shall make provisions to secure his own staging areas. No areas have been provided by Owner due to the location of the work being performed. Contractor shall in no way store material and equipment, nor park personal vehicles within right-of-way. Any agreements/indentures made outside this contract for use of homeowners land as staging areas should be provided to Owner or Engineer.

1.10 CLEARING OF TREES AND VEGETATION

- A. The following pertains to clearing of trees and vegetation within permanent and temporary construction easements obtained by HCWD1 from individual property owners and the Department of Army and from within public road right-of-way.

- The Contractor shall stake the proposed water main centerline and limits of the permanent and temporary construction easements along the entire project corridor.
 - Within public road right-of-way the Contractor shall clear a width of 20 feet centered along the water main.
 - Within permanent easement the entire easement area shall be cleared of trees and vegetation.
 - Within temporary construction easement the clearing of trees shall be minimized and limited to what is necessary for Contractor staging and construction operations.
 - Within public road right-of-way outside the 20 feet cleared for the water main the clearing of trees shall be minimized and limited to what is necessary for Contractor staging and construction operations.
- B. Priority of work shall include clearing of trees, such that all trees to be removed are to be cleared between November 15th through March 31st. No trees will be allowed to be cleared outside this window.

1.11 RESTORATION WARRANTY

- A. Pavement and ground restoration shall be warranted for a period of 18 months after final acceptance of said work. Any defects, settlement and restoration issues shall be addressed in a timely manner.

1.12 WORK ON PRIVATE PROPERTY AND WITHIN RIGHT-OF-WAY

- A. Resident Quality Assurance Plan: The Owner has a real interest in making sure that residents and their customers experience the least amount of disturbance to their life and property. In addition, receive a high degree of communication and information from the Contractor on the state of construction, progress of their work, and corrections and repairs to be made to private property frontage along right-of-way as a result of work. The Contractor shall at a minimum, be required to provide these services and tasks when dealing with residents who will be impacted by the project:
- Whenever the Contractor will be working in front of a property, an information flyer containing Contractor names and contact phone numbers shall be attached to the front door of the property or in a newspaper mailbox or mailed to the resident explaining what is being done, the possible impact to their property and who they can contact if they have a problem. Phone numbers shall include either a mobile phone number of the construction superintendent or to the field office.
 - Anytime a commercial or resident's driveway, fence, mailbox or other improvement will be damaged, replaced or disturbed, the project superintendent shall attempt to make a personal contact with the resident to arrange special needs or timing of the disturbance.
 - If access to the commercial or resident's property will be blocked or interrupted, such as during cutting through a driveway, the Contractor shall not do so until coordinating the timing of the blockage with the commercial owner or resident.
 - At least one entrance shall be maintained across the Marathon Food Mart property, station 53+00 to 55+00.
 - For other residents where there is one access drive, the access shall not be blocked, even temporarily, until the resident has been contacted and arrangements are made so that access can be made when needed.

- B. Parking of equipment or storing of materials on private property shall not be allowed unless the Contractor receives written permission from the property owner or resident. Any agreements shall be copied to the Owner and/or Inspector. Any claims or fines due to unauthorized trespassing will be the responsibility of the Contractor and his/her subcontractor and the Owner will not be responsible in the event of said claim.
- C. Prior to any disturbance of a resident's property, documentation of existing conditions shall be completed in accordance with Section 01380 of these documents. A copy of these photographs and videos shall be turned over to the Owner prior to project close out in the event that they are needed to defend future claim by a resident.

1.13 RESIDENT AND CUSTOMER COMPLAINTS

- A. During the progress of work and within the warranty period of the project, the contractor shall resolve all resident/customer complaints related to work on this project within two weeks of notification. Complaint items may include but not be limited to ground and pavement restoration work. All life threatening or safety related issues shall be corrected immediately. A "Resident Complaint Form" will be provided to the Contractor at the pre-construction conference. This form shall be utilized to document and track the resolution of each complaint.
- B. The Contractor shall notify the OWNER or Engineer immediately if he claims the complaint is not warranted. The OWNER or Engineer shall either confirm or deny this complaint, and the Contractor shall act accordingly, all within the two week time period.
- C. Should the Contractor not resolve the complaint within the two week period, the OWNER has the right without advanced notification to the Contractor to step in and have the necessary work performed to remedy the complaint. Cost for this work shall be deducted from the Contractor from the line item restoration work or retainage being held back. If all retainage has been released from the Project, a formal claim shall be made against the Contractor and/or Surety Company.

1.14 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

- A. This requirement specifies the procedure for the determination of time extensions for unusually severe weather. The listing below defines the monthly anticipated adverse weather for the contract period.

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
17	11	9	8	8	7	7	6	5	5	8	9

- B. The above schedule of anticipated adverse weather will constitute the baseline for monthly (or portion thereof) weather time evaluations. Upon acknowledgment of the notice to proceed and continuing throughout the contract on a monthly basis, actual adverse weather days will be recorded on a calendar day basis (include weekends and holidays) and compared to the monthly anticipated adverse weather in the schedule above. For purposes of this paragraph, the term actual adverse weather days shall include days impacted by actual adverse weather days.

- C. The number of actual adverse weather days shall be calculated chronologically from the first to the last day in each month. Once the number of actual adverse weather days anticipated in the schedule above have been incurred, the Engineer will examine any subsequently occurring weather days to determine whether the Contractor is entitled to a time extension. These subsequently occurring adverse weather days must prevent work for 50 percent or more of the Contractor's work day and delay work critical to the timely completion of the project. Actual adverse weather days will be interpreted to be those days on which rainfall equal or exceed .10 inch and/or on which the daytime temperature was equal to or below 32 degrees F. The Engineer will convert any delays meeting the above requirements to calendar days and issue a change order in accordance with the Contract Documents. Time extensions will be calculated on the basis of 1.5 days for each Engineer approved subsequently occurring adverse weather day.
- D. The Contractor's schedule must reflect the above anticipated adverse weather delays on all weather dependent activities.

END OF SECTION

SECTION 00829
WAGE RATE REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Contractor shall conform to all provisions of Federal Labor Law and Federal Regulations, relative to wages and hours as they may apply to the work to be accomplished under these Specifications.
- B. In addition to the above, certain laws and regulations of the Kentucky Department of Labor shall govern the work and shall supplement or supplant Federal Labor Law and Regulations cited above. Should the Federal and Kentucky Labor Laws and Regulations conflict, the more stringent of the two shall apply.

1.2 WAGE RATES

- A. State wage rates **do** apply to this project. The General Contractor and all Subcontractors shall pay wages to all workmen not less than the wages and fringe benefits listed for the craft or trade and type of construction project in which they are employed, as shown in SECTION 00830 - WAGE DETERMINATION SCHEDULE. The requirements for determination of overtime pay shall be as required by the Kentucky Labor Cabinet.

END OF SECTION

SECTION 00830
WAGE DETERMINATION SCHEDULE

PART 1 - GENERAL

1.1 WAGE DETERMINATION DECISIONS

- A. A copy of the official wage determination decisions, and associated correspondence is reproduced on the following 8 pages.
- B. Building and Heavy Construction shall apply.

END OF SECTION

SECTION 00900

ADDENDA

PART 1 - GENERAL

1.1 ADDENDA

- A. All addenda issued during the bidding of the Project will be reproduced in the signed Contract Documents, on the pages following this heading sheet.

END OF SECTION

November 18, 2015

Jennifer Dieterlen
HDR Engineering, INC
401 W. Main St.
Louisville KY 40202

Re: Hardin County Water District # 1, LWC Interconnect - Transmission Main and Pump

Advertising Date as Shown on Notification: November 19, 2015

Dear Jennifer Dieterlen:

This office is in receipt of your written notification on the above project as required by KRS 337.510 (1).

I am enclosing a copy of the current prevailing wage determination number CR 1-010, dated August 4, 2015 for HARDIN County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based upon the advertising date contained in your notification. There may be modifications to this wage determination prior to the advertising date indicated. In addition, if the contract is not awarded within 90 days of this advertising date or if the advertising date is modified, a different set of prevailing rates of wages may be applicable. It will be the responsibility of the public authority to contact this office and verify the correct schedule of the prevailing rates of wages for use on the project. Your project number is as follows: 047-H-00359-15-1, Heavy/Highway

Sincerely,

A handwritten signature in black ink that reads "Anthony Russell". The signature is written in a cursive style with a large, prominent "A" and "R".

Anthony Russell
Commissioner

KENTUCKY LABOR CABINET
PREVAILING WAGE DETERMINATION
CURRENT REVISION
LOCALITY NO. 010

HARDIN COUNTY

Determination No. CR 1-010 2015

Project No. 047-H-00359-15-1

Date of Determination: August 4, 2015

Type: ___ Bldg ___X___ HH

This schedule of the prevailing rate of wages for Hardin County has been determined in accordance with the provisions of KRS 337.505 to 337.550. This determination shall be referred to as Prevailing Wage Determination No. CR 1-010 2015

Apprentices shall be permitted to work as such subject to Administrative Regulations 803 KAR 1:010. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, and/or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one calendar day, but not more than ten (10) hours worked in any one calendar day, if such written agreement is prior to the over eight (8) hours in a calendar day actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked. Fringe benefit amounts are applicable for all hours worked except when otherwise noted. Welders will receive rate for craft in which welding is incidental.

NOTE: The type of construction shall be determined by applying the following definitions:

BUILDING CONSTRUCTION

Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

HIGHWAY CONSTRUCTION

Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.



Anthony Russell, Commissioner
Department of Workplace Standards
Kentucky Labor Cabinet

Determination No. CR 1-010 2015
August 4, 2015

ASBESTOS / INSULATION WORKERS:

(Including duct (hot/cold), pipe insulator & pipe wrapping):

BASE RATE	\$25.11
FRINGE BENEFITS	13.16

Hazardous Material Handlers: (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems):

BASE RATE	\$19.35
FRINGE BENEFITS	10.35

BOILERMAKERS:

BASE RATE	\$35.79
FRINGE BENEFITS	16.71

BRICKLAYERS:

Bricklayers:

BASE RATE	\$25.37
FRINGE BENEFITS	10.50

Tile Setters: BUILDING

BASE RATE	\$22.64
FRINGE BENEFITS	6.05

Tile Finishers: BUILDING

BASE RATE	\$15.42
FRINGE BENEFITS	5.37

CARPENTERS:

Carpenters (Includes form work):

BUILDING

BASE RATE	\$23.55
FRINGE BENEFITS	16.46

Drywall Hanging Only: BUILDING

BASE RATE	\$28.17
FRINGE BENEFITS	0.00

Floor Laying including; Carpet, Hardwood & Vinyl:

BUILDING

BASE RATE	\$19.70
FRINGE BENEFITS	7.46

CARPENTERS/HEAVY:

Carpenters:

HEAVY

BASE RATE	\$27.50
FRINGE BENEFITS	14.96

Piledrivermen: HEAVY

BASE RATE	\$27.75
FRINGE BENEFITS	14.96

Divers: HEAVY

BASE RATE	\$41.63
FRINGE BENEFITS	14.96

Form Work Only: HEAVY

BASE RATE	\$27.50
FRINGE BENEFITS	16.06

CEMENT MASONS / CONCRETE FINISHERS:

BUILDING

BASE RATE	\$21.30
FRINGE BENEFITS	9.95

ELECTRICIANS:

Electricians:	BUILDING & HEAVY	BASE RATE	\$29.88
		FRINGE BENEFITS	14.78

ELECTRICIANS / LINE CONSTRUCTION:

Cable Splicer:		BASE RATE	\$32.19
		FRINGE BENEFITS	11.88

Equipment Operator A: John Henry Rock Drill, D6 (or equivalent) and above, Trackhoe Digger, Cranes (greater than 25 tons and less than 45 tons)		BASE RATE	\$28.81
		FRINGE BENEFITS	11.13

Equipment Operator B: Cranes (6-25 tons), Backhoes, Road Tractor, Dozer up to D5, Pressure Digger-Wheeled Or Tracked, all Tension Wire Stringing Equipment		BASE RATE	\$25.42
		FRINGE BENEFITS	10.38

Equipment Operator C: Trencher, Vibratory Compactor, Ground Rod Driver, Boom Truck (6 tons or below), Skid Steer Loaders		BASE RATE	\$20.33
		FRINGE BENEFITS	9.25

Groundmen:		BASE RATE	\$17.12
		FRINGE BENEFITS	8.55

Linemen and Technician		BASE RATE	\$29.36
		FRINGE BENEFITS	11.25

Cranes 45 tons or larger to be paid 100% of journeyman lineman's rate

ELEVATOR MECHANICS:		BASE RATE	\$36.94
		FRINGE BENEFITS	20.035

GLAZIERS:		BASE RATE	\$25.18
		FRINGE BENEFITS	10.30

IRONWORKERS:		BASE RATE	\$27.56
Structural, Ornamental, Reinforcing:		FRINGE BENEFITS	20.30

LABORERS / BUILDING:

GROUP 1: Landscape Laborer		BASE RATE	\$18.42
BUILDING		FRINGE BENEFITS	9.13

LABORERS / BUILDING: CONTINUED

GROUP 2: Grade checker, mason tender-cement/concrete, screw operator:

	BUILDING	BASE RATE	\$18.62
		FRINGE BENEFITS	9.13
LABORER	COMMON OR GENERAL	BASE RATE	\$14.67
		FRINGE BENEFITS	6.43
LABORER	MASON TENDER-BRICK	BASE RATE	\$14.42
		FRINGE BENEFITS	0.00
LABORER	MASON TENDER BRICK –HOD	BASE RATE	\$21.83
		FRINGE BENEFITS	0.00
LABORER	PIPELAYER	BASE RATE	\$16.87
		FRINGE BENEFITS	8.03

LABORERS / HEAVY

Concrete Saw (hand held/walk behind):	HEAVY	BASE RATE	\$28.89
		FRINGE BENEFITS	9.85
Flagger	HEAVY	BASE RATE	\$28.72
		FRINGE BENEFITS	9.85
Concrete Finishing	HEAVY	BASE RATE	\$24.21
		FRINGE BENEFITS	11.45
Concrete Worker	HEAVY	BASE RATE	\$23.31
		FRINGE BENEFITS	11.45
Common or General:	HEAVY	BASE RATE	\$16.18
		FRINGE BENEFITS	10.43
Pipelayer	HEAVY	BASE RATE	\$18.56
		FRINGE BENEFITS	4.50

MILLWRIGHTS:

	BASE RATE	\$24.18
	FRINGE BENEFITS	15.64

OPERATING ENGINEERS / BUILDING:

GROUP 1: Elevating grader and all types of loaders, forklift (regardless of lift height), bulldozer, mechanic, power blade, motor grader, forklift (regardless of lift height & except when used for masonry constructions), self contained core drill, rotary drill, kecal loader hydrocrane, subgrader, backhoe, backhoe track, excavator, trackhoe

BUILDING	*BASE RATE	\$27.70
	FRINGE BENEFITS	14.15

GROUP 2: Crane (including overhead, rough terrain, truck & tower), hoist (1 drum), hoisting engine (2 or more drums), hoist: BUILDING BASE RATE \$28.79
FRINGE BENEFITS 14.15

GROUP 3: Form grader, tractor (50 hp and over), farm tractor with attachments, except backhoe, highlift & endloader, elevator (when used for hoisting), hoisting engine (1 drum or buck hoist): BUILDING BASE RATE \$23.92
FRINGE BENEFITS 14.15

GROUP 4: Tractor (under 50 hp), crane oiler: BUILDING BASE RATE \$22.28
FRINGE BENEFITS 14.15

**CRANE WITH BOOM 150 FEET AND OVER, INCLUDING JIB, SHALL RECEIVE \$.75 ABOVE GROUP 1
ALL CRANES WITH PILING LEADS WILL RECEIVE \$.50 ABOVE GROUP 1 REGARDLESS OF BOOM LENGTH**

OPERATOR COMPACTOR BASE RATE \$24.53
FRINGE BENEFITS 0.00

OPERATOR HIGHLIFT BASE RATE 25.00
FRINGE BENEFITS 0.00

OPERATOR PAVER BASE RATE \$17.18
FRINGE BENEFITS 8.03

OPERATOR ROLLER BASE RATE \$18.42
FRINGE BENEFITS 9.15

OPERATING ENGINEERS / HEAVY:

GROUP 1: A-Frame Winch Truck; Auto Patrol; Backfiller; Batcher Plant; Bituminous Paver; Bituminous Transfer Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-all Scoop; Carry Deck Crane; Central Compressor Plant; Clamshell; Concrete Mixer (21 cu. ft. or Over); Concrete Paver; Truck-Mounted Concrete Pump; Core Drill; Crane; Crusher Plant; Derrick; Derrick Boat; Ditching & Trenching Machine; Dragline; Dredge Operator; Dredge Engineer; Elevating Grader & Loaders; Grade-All; Gurries; Heavy Equipment Robotics Operator/Mechanic; High Lift; Hoe-Type Machine; Hoist (Two or More Drums); Hoisting Engine (Two or More Drums); Horizontal Directional Drill Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau; Locomotive; Mechanic; Mechanically Operated Laser Screed; Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel Bucket; Piledriver; Power Blade; Pumpcrete; Push Dozer; Rock Spreader, attached to equipment; Rotary Drill; Roller (Bituminous); Scarifier; Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Telescoping Type Forklift; Tow or Push Boat; Tower Crane (French, German & other types); Tractor Shovel; Truck Crane; Tunnel Mining Machines, including Moles, Shields or similar types of Tunnel Mining Equipment:

HEAVY *BASE RATE \$28.85
FRINGE BENEFITS 14.15

OPERATING ENGINEERS / HEAVY (CONTINUED)

GROUP 2: Air Compressor (Over 900 cu. ft. per min.); Bituminous Mixer; Boom Type Tamping Machine; Bull Float; Concrete Mixer (Under 21 cu. ft); Dredge Engineer; Electric Vibrator; Compactor/Self-Propelled Compactor; Elevator (One Drum or Buck Hoist); Elevator (when used to Hoist Building Material); Finish Machine; Firemen & Hoist (One Drum); Flexplane; Forklift (Regardless of Lift Height); Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Concrete Pump; Switchman or Brakeman; Throttle Valve Person; Tractair & Road Widening Trencher; Tractor (50 HP or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler:

HEAVY	*BASE RATE	\$26.24
	FRINGE BENEFITS	14.15

GROUP 3: All Off Road Material Handling Equipment, including Articulating Dump Trucks; Greaser on Grease Facilities servicing Heavy Equipment:

HEAVY	*BASE RATE	\$26.65
	FRINGE BENEFITS	14.15

GROUP 4: Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steersman; Tamping Machine; Tractor (Under 50 HP); & Vibrator:

HEAVY	*BASE RATE	\$25.95
	FRINGE BENEFITS	14.15

***Cranes with booms 150 ft. & over (including jib) and where the length of the boom in combination with the length of the piling leads equals or exceeds 150 ft. - \$1.00 over Group 1. Employees assigned to work below ground level are to be paid 10% above basic wage rate. This does not apply to open cut work.**

PAINTERS:

Brush, Roller & Spray:	BASE RATE	\$18.50
	FRINGE BENEFITS	11.97

Sign Painter & Erector: BUILDING	BASE RATE	\$20.23
	FRINGE BENEFITS	3.25

Brush & Roller Only: HEAVY	BASE RATE	\$18.50
	FRINGE BENEFITS	12.02

Spray, Sandblast, Power Tools, Waterblast & Steam Cleaning: HEAVY	BASE RATE	\$19.00
	FRINGE BENEFITS	12.02

PLUMBERS & PIPEFITTERS: (Includes HVAC pipe installation)	BASE RATE	\$32.00
	FRINGE BENEFITS	17.17

ROOFERS (excluding metal roofs):

(Built up roof, modified bitumen roof, rubber roof and single ply roof):

	BASE RATE	\$21.53
	FRINGE BENEFITS	8.12

Shake & Shingle Roof:

	BASE RATE	\$19.31
	FRINGE BENEFITS	6.25

SHEETMETAL WORKERS (including metal roofs):

(Includes installation of HVAC duct & system)

	BASE RATE	\$29.45
	FRINGE BENEFITS	18.70

SPRINKLER FITTERS: (Fire Sprinklers)

	BASE RATE	\$31.35
	FRINGE BENEFITS	17.52

TRUCK DRIVERS / BUILDING:

10 Yard Truck: BUILDING

	BASE RATE	\$16.27
	FRINGE BENEFITS	1.50

Dump Truck: BUILDING

	BASE RATE	\$20.63
	FRINGE BENEFITS	18.20

TRUCK DRIVERS / HEAVY

Mobile Batch Truck Tender: HEAVY

	BASE RATE	\$16.57
	FRINGE BENEFITS	7.34

Greaser, Tire Changer, & Mechanic Tender:
HEAVY

	BASE RATE	\$16.68
	FRINGE BENEFITS	7.34

Single Axle Dump & Flatbed, Semi-Trailer or Pole Trailer when used to pull building materials & equipment; Tandem Axle Dump; Distributor; Mixer, & Truck Mechanic:
HEAVY

	BASE RATE	\$16.86
	FRINGE BENEFITS	7.34

Euclid, Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat Truck & 5 Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Fork Lift Truck when used to transport building materials; & Drivers on Pavement Breaker:
HEAVY

	BASE RATE	\$16.96
	FRINGE BENEFITS	7.34

**End of Document
CR 1-010 2015
August 4, 2015**

SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The following major Work items are included in the Contract:
1. Transmission Main Contract
 - a. Installation of 19,950 lf of 16" DI pipe and water main appurtenances
 - b. Installation of 2,510 lf of 24" DI pipe and water main appurtenances
 - c. Installation of 1,070 lf of 30" HDPE pipe and water main appurtenances
 - d. Directional drill of 750 lf of 24" fusible PVC/30" HDPE pipe
 - e. Bore and Jack 430 lf of 36" steel encasement pipe (Includes 4 crossings)
 - f. Installation of underground packaged meter vault (22'L x 8'W x 8'T)
 - g. Installation of water valves, drain assemblies, and air release valves along existing 14" water main
 - h. Flushing, pressure testing and disinfecting approximately 41,660 lf of existing 14" ductile iron main
 - i. Traffic control
 - j. Erosion and sediment control
 2. Pump Station Contract
 - a. Clearing and grubbing
 - b. Approximately 2,400 cy structural fill
 - c. Asphalt paved access road and turn around
 - d. Structural concrete foundation and slab
 - e. Installation of above ground packaged booster pump station rated (three(3) 250 HP pumps rated at 1,700 gpm at 425' TDH each)
 - f. 24" yard piping and valves and related sitework
 - g. 750 KW generator and automatic transfer switch
 - h. Electric service
 - i. Security fencing
- B. The Contractor shall provide all materials, labor and equipment necessary for completion of the Project, including installation and testing prior to transfer to the District. The Contract Documents are intended to provide the basis for proper completion of the work suitable for the intended use of HCWD1. Anything not expressly set forth but which is reasonably implied or necessary for proper performance of the Project shall be included.
- C. The Contractor shall maintain the existing system in continuous operations. The Contractor shall not operate District hydrants or valves, but shall coordinate with the District when this is required.

1.02 PERMITS

- A. The Contractor shall obtain any permits related to or required by, the Work in this Contract.
- B. HCWD1 has obtained the following permit(s) for this Project:
1. Kentucky Division of Water Construction Approval
 2. Kentucky Division of Water 401 Water Quality Certification
 3. Kentucky Division of Water Stream Crossing/Floodplain Approval
 4. Kentucky Transportation Cabinet Encroachment Permit
 5. CSX Railroad Encroachment Permit
 6. P&L Railroad Encroachment Permit
 7. COE Department of Army 404 Permit

1.03 CODES

- A. Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices, citations and similar communications, to the HCWD1.

1.04 EXISTING CONDITIONS AND DIMENSIONS

- A. The Work in this Contract will primarily be performed in or around existing facilities of which a portion must remain functional. The Contractor must maintain the required items and/or systems functional without additional effort by the HCWD1's personnel and at no extra costs to the HCWD1.
- B. The Contractor is responsible for verifying all existing conditions, elevations, benchmarks, and survey data, dimensions, etc., and providing his finished work to facilitate existing conditions.

END OF SECTION 01010

SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all necessary labor, machinery, tools, apparatus, equipment, materials, services and other necessary supplies and perform all work shown on the Drawings and/or described in the Specifications and Contract Documents at the unit or lump sum prices for the items enumerated in Part 2 of this Section.

PART 2 - PRODUCTS

2.01 MOBILIZATION

- A. Payment for the Contractor's mobilization will be made at the Contract lump sum price and shall include all costs incurred for moving equipment onto the Project area and any pertinent costs related thereto.

2.02 BONDS AND INSURANCE

- A. Payment for bonds and insurance will be made at the Contract lump sum price, and shall include the costs of the Performance and Payment Bonds provided under the Contract, and the premiums for insurance required under the Contract.

2.03 GENERAL REQUIREMENTS

- A. Payment for general requirements will be made at the Contract lump sum price distributed over the initial term of the Contract and shall include field supervision and support staff, office supervision and support staff, costs associated with maintaining the field operation, and other items required by the general requirements and conditions of the Contract.

2.04 UTILITY AND TIE-IN FIELD VERIFICATION

- A. Payment will be made at the Contract lump sum price, which shall include compensation for field locating all existing utilities along the transmission main route including tie-ins to existing water main. Field verification shall include both a horizontal and vertical locate on the existing utility to be crossed or within 10' horizontally of transmission main route. Method of locate shall be by vacuum excavate or backhoe.
- B. Contractor shall provide the latitude, longitude and top of pipe elevation to the Engineer for each crossing.
- C. Information obtained from the utility and tie-in field verification shall be utilized by the Contractor to prepare piping lay schedule and determine the location number of vertical fittings to go over or under the existing utility.

2.05 CLEARING AND GRUBBING

- A. Payment for clearing and grubbing will be made at the Contract lump sum price. Payment shall include clearing, grubbing, removing and disposing of off site all vegetation, brush and trees within designated limits of inside the right-of way and easement area. No mulching on brush and trees onsite will be allowed.

2.06 WATER LINE

- A. Payment for water line will be made at the Contract unit price per linear foot in place, which shall include compensation for furnishing pipe, trenching, crushed stone bedding, laying, jointing, shoring,

sheeting and bracing, initial backfill, and all other appurtenances required but not specifically delineated herein. Ductile iron fittings for both horizontal and vertical pipe alignment changes, friction type restraint glands, restrained joint pipe, and concrete thrust blocks are included in this pay item.

- B. The quantity of piping to be paid for shall be the length of pipe measured along the centerline of the completed pipe line without deducting the length of fittings.
- C. DGA and/or crushed stone paving required in the restoration of gravel roadways and drives shall be included in this pay item and will not be paid for separately.
- D. Payment for flowable fill, asphalt and concrete replacement or resurfacing in restoration of paved areas as defined in Sections 02510 and 02512 is not included in this pay item. Bituminous binder, concrete and flowable fill shall be included in the pay item "Bituminous Pavement Replacement", "Concrete Pavement Replacement", and "Pipeline Flowable Fill."
- E. All excavation is unclassified and is included in this pay item.
- F. Testing of the completed water line is included in this pay item. However, no payment for the labor portion of this unit item shall be made until the line has been tested and accepted by the Engineer. Testing shall include but not be limited to hydrostatic pressure, disinfecting and flushing and Bac-T.
- G. Testing of the existing 14-inch water line is not included in this pay item.
- H. Payment for seeding and final clean-up (including furnishing and placing topsoil, finish grading, seeding, mulching and erosion control, removal of construction materials and debris, cleaning, and site restoration) is included in this pay item. However, HCWD1 will not pay eight percent (8%) per foot of the line unit cost until final clean-up and seeding has been performed to the satisfaction of HCWD1. The eight percent (8%) per foot of the line unit cost shall be shown as a subsidiary line item on the payment request, which shall also be subject to retainage.
- I. Payment for furnishing and installing turf reinforcement mat along steep embankments, as called for on the Drawings is not included in this pay item.
- J. Guard rail, mailbox, fence, culvert and storm sewer, and concrete median curb removal, re-installation and replacement is incidental to water line construction is included in this pay item and will not be paid for separately.

2.07 GATE VALVES

- A. Payment for horizontal or vertical valves, geared and direct turn will be made at the Contract unit price each which shall include valves, friction type restraint glands, concrete thrust blocking, valve box, concrete pad, and all appurtenances necessary for a complete installation. Valves related to fire hydrants and drain assemblies are not included in this pay item.

2.08 SWING CHECK VALVE AND VUALT

- A. Payment for swing check valve and vault will be made at the Contract unit price each which includes excavation, backfill, swing check valve, sleeve, fittings, pre-cast manhole and cast-iron frame and lid, for a complete installation.

2.09 DRAIN ASSEMBLY

- A. Payment for drain assembly will be made at the Contract unit price each which shall include fittings, anchor tees, pipe, gate valve, friction type restraint glands, concrete base and thrust blocking, drainage pits, key tube pipe, frame and lid, plastic meter vault, and all appurtenances necessary for a complete installation.
- B. Where the drain assembly is installed along the existing 14-inch waterline, the connections to the existing line shall be included in this pay item.

2.10 GATE VALVE AND DRAIN ASSEMBLY

- A. Payment for gate valve and drain assembly installed at the same location will be made at the Contract unit price each which shall include fittings, anchor tees, pipe, gate valve, friction type restraint glands, concrete base and thrust blocking, reinforced concrete thrust collar, drainage pits, key tube pipe, frame and lid,

plastic meter vault, and all appurtenances necessary for a complete installation.

- B. Where the gate valve and drain assembly is installed along the existing 14-inch waterline, the connections to the existing line shall be included in this pay item.

2.11 FIRE HYDRANT ASSEMBLY

- A. Payment for fire hydrants will be made at the Contract unit price each which shall include fittings, anchor tees, pipe, hydrants, valve, friction type restraint glands, thrust blocking, drainage pits and all appurtenances necessary for a complete installation.

2.12 AIR RELEASE VALVE

- A. Payment for an air release valve will be made at the Contract unit price each, complete in place, including all excavation, material, valve box, saddles, fittings, backfilling, and labor necessary to complete the installation.

2.13 LEAK DETECTION ASSEMBLY

- A. Payment for leak detection assembly will be made at the Contract unit price each, complete in place, including all excavation, material, valve box, saddles, corporation stops, fittings, type K copper tubing, concrete or plastic meter box, cast iron frame and cover, backfilling, and labor necessary to complete the installation.

2.14 MASTER METER VAULT

- A. Payment for packaged master meter vault will be made at the Contract lump sum price. Payment shall include excavation and backfill, crushed stone pad and concrete foundation, anchors, furnishing and installing equipment chamber (steel piping, flanged gate valves, check valves, couplings, flow meters (3) and remote display, air release valves, pressure gauges and taps, cathodic protection anodes and test stations), 8" drain line from vault, electric service and disconnect, rough and final grading around the vault, ground restoration, together with all other appurtenances necessary for a complete and operating installation.
- B. Ten (10) feet of piping, upstream and downstream of vault including the 24" x 14" reducers and connection to the transmission piping shall be included in this pay item. All piping outside of ten feet will be paid for under pay item "Water Line".

2.15 BOOSTER PUMP STATION

- A. Payment for the above ground packaged booster pump station will be made at the Contract lump sum price. Payment shall include mobilization/demobilization, bonds and insurance, general requirements, clearing and grading, excavation, structural compacted fill, reinforced concrete foundation and pipe trench walls, setting station, yard piping and valves, surge relief and drain lines, concrete and asphalt paving for access road, electric service, generator and transfer switch, fencing and all related site work, together with all other appurtenances necessary for a complete and operation installation.

2.16 CASING PIPE, OPEN CUT

- A. Payment for water line crossings as shown on the Drawings shall include the respective casing pipe open cut across the roadway, creek or utility (gas) and will be paid for at the Contract unit price per linear foot of casing pipe for the size and type. This work shall include the casing pipe, complete in place with fittings, blocking, spacers, and all items necessary for its construction and installation. Carrier pipe is paid separately under Item 2.06.

2.17 CASING PIPE, BORE AND JACK

- A. Payment for water lines crossing under roadways or railroads as shown on the Drawings shall include the respective encasement pipe bored under the roadway or railroad and will be paid for at the Contract unit price per linear foot of encasement pipe for the size and type. This work shall include the encasement pipe, complete in place with fittings, blocking, spacers, and all items necessary for its construction and installation. Carrier pipe is paid separately under Item 2.06.

2.18 CONCRETE ENCASEMENT

- A. Payment for concrete encasement will be made at the Contract unit price per linear foot in place, which shall include compensation for excavation (including rock excavation), concrete and all items necessary to completely encase the water line in concrete the full trench width to 6-inches above the pipe.

2.19 CONCRETE CAP

- A. Payment for concrete cap will be made at the contract unit price per linear foot in place, which shall include compensation for excavation (including rock excavation), concrete and all items necessary to cover the water line in concrete the full trench width to 6-inches above the pipe.

2.20 HORIZONTAL DIRECTIONAL DRILLING

- A. Payment for horizontal directional drilling will be made at the Contract unit per linear foot, which shall include all labor, materials, machinery, and construction equipment to construct the entry and exit pits and associated shoring and sheeting and perform the HDD installation, and required testing, for a complete installation.
- B. Pipe material (HDPE/fusible PVC) and fusing of pipe and adapters for connecting the HDPE/fusible PVC pipe to DI pipe shall be included in this pay item.

2.21 BITUMINOUS PAVEMENT REPLACEMENT

- A. Payment for bituminous pavement replacement will be paid for at the Contract unit price per square yard which shall include saw cutting, milling, base, placement of bituminous material, sealing edges, compaction, re-establishing pavement striping, rumble strips and traffic signal loops, where applicable, and all appurtenances necessary for a complete installation.

2.22 CONCRETE PAVEMENT REPLACEMENT

- A. Payment for concrete pavement replacement will be made at the Contract unit price per square yard which shall include saw cutting, base, placing concrete, finishing and all appurtenances necessary for a complete installation.

2.23 FLOWABLE FILL BACKFILL

- A. Payment for flowable fill backfill will be made at the Contract unit price per lineal feet which shall include placing flowable fill trench width from point 6-inches above the pipe to the pavement subbase, for a complete installation.
- B. Bituminous and concrete pavement replacement will be paid for separately under Items 2.20 and 2.21.

2.24 FLUSHING AND TESTING 14-INCH MAIN

- A. Payment for testing the existing 14-inch main will be made at the Contract unit price per lineal feet which shall include all labor, pumps and piping, equipment and materials to flush (clean), hydrostatic pressure test, disinfect and flush, and Bac-T test.
- B. The Contractor shall include in this pay item any manual air release valves required to expel air from the existing main and connections for temporary blow-offs.
- C. The Contractor shall include in this pay item the construction of a sediment basin or screening box to collect scale and other solids flushed out of the existing 14-inch main, prior to discharging into the receiving stream. Also included is any erosion and sediment control measures necessary to prevent erosion and transport of sediment from the flushing operations.
- D. The Contractor shall anticipate and include in this pay item testing for up to four (4) isolated segments along for the existing 14-inch main.

2.25 CONNECTION TO EXISTING WATER MAIN (WM)

- A. Payment for connections of the new water line to the existing water system will be made at the Contract

unit price each which includes the excavation, backfill, cutting the existing pipe, and fittings required to complete the connections.

- B. Connections of the new drain assembly and gate valve along the existing 14-inch waterline are not a part of this pay item shall be included under Items 2.09 and 2.10.

2.26 TRAFFIC CONTROL

- A. Payment for traffic control will be made at the Contract lump sum price. Payment shall include all signs, traffic control devices and other materials, flaggers and other labor required, and all items necessary to provide traffic control for the duration of the project, in accordance with the local agency having jurisdiction over the roadway impacted, the specifications, and the Kentucky Department of Highways encroachment permit.

2.27 TURF REINFORCEMENT MAT

Payment for turf reinforcement mat (TRM) will be made at the Contract unit price per square yard which shall include all necessary labor, equipment and materials to install the TRM as shown on the Drawings including finish grading the area, seeding and anchoring the TRM, for a complete installation.

2.28 EROSION PREVENTION AND SEDIMENT CONTROL

- A. Payment for the erosion prevention and sediment control will be made at the contract lump sum price and shall include all necessary labor, equipment and materials to install and maintain erosion and sediment control measures including silt fences, stone bag check dams, stabilized construction entrances, and temporary seeding to prevent the erosion of exposed soil and transportation of sediment offsite.

2.29 DEMOBILIZATION

- A. Payment for the Contractor's demobilization upon completion of the Project will be made at the Contract lump sum price and shall include all costs incurred for removing equipment and materials from the Project area and any pertinent costs related thereto.

PART 3 - PART 3 - EXECUTION

3.01 PAY ITEMS

- A. The pay items listed hereinbefore refer to the items listed in the Bid Schedule and cover all of the pay items for this Contract.
- B. Any and all other items of Work listed in the Specifications or shown on the Drawings for this Contract shall be considered incidental to and included in those pay items.

3.02 ESTIMATED QUANTITIES OF WORK

- A. Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents, including the Bid Proposal, they are given for use in comparing bids and the right is specifically reserved, except as otherwise limited by the Contract Documents, to increase or diminish them as may be deemed reasonably necessary or desirable by HCWD1 to complete the Work contemplated by this Contract. Such increase or diminution shall be accompanied by an adjustment in the Contract Amount in accordance with the Contract Conditions, and shall not give cause for claims or liability for damages against HCWD1 or the Engineer, due to such increase or diminution.

END OF SECTION 01025

SECTION 01040
COORDINATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall coordinate the Work of all crafts, trades and subcontractors engaged on the Work, and he shall have final responsibility in regards to the schedule, workmanship and completeness of each and all parts of the Work.
- B. Contractors shall coordinate work between the Pump Contract and Transmission Main Contract.
- C. All crafts, trades and subcontractors shall be made to cooperate with each other and with others as they may be involved in the installation of work which adjoins, incorporates, precedes or follows the work of another. It shall be the Contractor's responsibility to point out areas of cooperation prior to execution of subcontract agreements and the assignment of the parts of the Work. Each craft, trade and subcontractor shall be made responsible to the Contractor, for furnishing embedded items, giving directions for doing all cutting and fitting, making all provisions for accommodating the Work, and for protecting, patching, repairing and cleaning as required to satisfactorily perform the Work.
- D. The Contractor shall be responsible for all cutting, digging and other actions of his subcontractors and workmen. Where such action impairs the safety or function of any structure or component of the Project, the Contractor shall make such repairs, alterations and additions as will, in the opinion of the Engineer, bring said structure or component back to its original design condition at no additional cost to HCWD1.
- E. Each subcontractor is expected to be familiar with the General Requirements and all Sections of the Detailed Specifications for all other trades and to study all Drawings applicable to his work to the end that complete coordination between the trades will be affected. Each subcontractor shall consult with the Contractor, who shall advise the Engineer if conflicts exist on the Drawings.
- F. Coordination shall include giving notice to HCWD1 and LWC. Forty-eight (48) hours notice is required to adjust work schedules.
- G. Coordination includes local EMS (traffic), KYTC , Fort Knox Public Works and local road department.

END OF SECTION 01040

SECTION 01090
REFERENCES AND ABBREVIATIONS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Where any of the following abbreviations are used in the Specifications, they shall have the meaning set forth as follows:

ACI	American Concrete Institute
ANS	American National Standard
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American or Brown and Sharpe Wire Gage
AWWA	American Water Works Association
IPS	Iron Pipe Size
MACP	Manhole Assessment and Certification Program
NBS	National Bureau of Standards
NEC	National Electrical Code; latest edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPT	National Pipe Thread
PACP	Pipeline Assessment and Certification Program
125-lb. ANS; 250-lb. ANS	American National Standard for Cast-Iron Pipe Flanges and Flanged Fittings, Designation B16.1-1975, for the appropriate class
UL	Underwriters' Laboratories

B. Reference Standards

1. For products or workmanship specified by association, trade or federal standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
2. The date of the standard is that in effect as of the Bid date, or the date of the Owner-Contractor Agreement when there are no bids, unless a certain date is indicated for the standard in the Contract Documents.
3. When required by an individual Specification section, the Prime Contractor shall obtain a copy of the standard. Maintain the copy at the job site, available for review by HCWD1, Engineer, Resident Representative and other appropriate parties until Substantial Completion.

END OF SECTION 01090

SECTION 01120
ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 SCOPE

- A. For the purpose of this Specification, environmental protection is defined as the retention of the environment in Project construction and to enhance the natural appearance in its final condition. Environmental protection requires consideration of air and land and involves noise as well as other pollutants. In order to prevent, and to provide for abatement and control of, any environmental pollution arising from the construction activities in the performance of this Contract, the Contractor and his subcontractors shall comply with all applicable federal, state and local laws and regulations concerning environmental pollution control and abatement. This Section covers the furnishings of all labor, materials, equipment and performing all work required for the protection of the environment during construction operations except for those measures set forth in other Sections of these specifications.

1.02 PRECONSTRUCTION VIDEO

- A. After the Contractor has staked or laid out the job and prior to the initiation of any construction activities, including the installation of erosion and sediment control BMPs, the entire project corridor shall be videoed in digital format on DVD. A copy of the DVD shall be provided to HCWD1.

1.03 PROTECTION OF LAND RESOURCES

- A. The land resources within the Project boundaries and outside the limits of work performed under this Contract shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project.

1.04 RECORDING AND PRESERVING HISTORICAL AND ARCHAEOLOGICAL FINDS

- A. In the event archaeological materials (arrowheads, stone tools, stone axes, prehistoric and historic pottery, bottles, foundations, Civil War artifacts, and other types of artifacts) are uncovered during the construction of this project, work is to immediately cease at the location and the Kentucky Heritage Council shall be contacted. The telephone number is (502) 564-7005. Construction shall not commence at this location until a written release is received from the Kentucky Heritage Council. Failure to report a find could result in legal action.

1.05 PROTECTION OF LAND AREAS

- A. Except for any work on storage areas and access routes specifically assigned for the use of the Contractor under this Contract, the land areas outside the limits of permanent work performed under this Contract shall be preserved in their present condition. Contractor shall confine his construction activities to areas defined for work on the plans or specifically assigned for his use. No other areas shall be used by the Contractor without written consent of the HCWD1.

1.06 PROTECTION OF TREES AND SHRUBS

- A. Reasonable care shall be taken during construction to avoid damage to vegetation.
- B. The Contractor shall not deface, injure or destroy trees or shrubs, nor remove or cut them without prior approval from HCWD1. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage.

1.07 TREE PROTECTIVE STRUCTURES

- A. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured or otherwise damaged by the Contractor's equipment or by his other operations, he may direct the Contractor to provide temporary protection of such trees by placing boards, plans, or poles around them. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage.

1.08 RESTORATION OF DAMAGED TREES

- A. Any tree scarred or damaged by the Contractor's equipment or operations outside established clearing limits shall be restored as nearly as possible to its original condition at the Contractor's expense. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. All scars made on trees shall be coated as soon as possible with an approved tree wound dressing.
- B. Trees that are to remain, either within or outside established clearing limits that are damaged by the Contractor so as to be beyond saving in the opinion of the Engineer shall be immediately removed, if so directed, and replaced with a nursery-grown tree of the same species and size.

1.09 PROTECTION OF WATER RESOURCES

- A. The Contractor shall control the disposal of fuels, oils, bitumens, calcium chloride, acids, or harmful materials, and shall comply with applicable Federal, State, County and Municipal laws concerning pollution of rivers and streams while performing work under this Contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides and insecticides from entering public waters. Water used in on-site material processing, concrete curing, foundation and concrete cleanup, and other waste waters shall not be allowed to reenter a stream if an increase in the turbidity of the stream could result therefrom.
- B. Contractor shall notify the appropriate Federal, State and County Agencies for any hazardous spills. When working on Fort Knox property the Fort Knox Environmental Management Division shall also be notified.

1.10 BURNING

- A. Air pollution restrictions applicable to this project are as follows: Materials shall not be burned on the premises. If the Contractor elects to dispose of waste materials off the premises, by burning, he shall make his own arrangements for such burning area and shall, as specified in the General Conditions, conform to all applicable regulations.

1.11 DUST CONTROL

- A. The Contractor shall maintain all excavations, stockpiles, access roads, waste areas, and all other work free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to others. Approved temporary methods consisting of sprinkling, chemical treatment, or similar methods will be permitted to control dust. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

1.12 EROSION CONTROL

- A. Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall be graded to control erosion within acceptable limits. Temporary control measures shall be provided and maintained until permanent drainage facilities are completed and operative. The area of bare soil exposed at any one time by construction operations, should be held to a minimum.
- B. Any erosion control measures shown on the plans are considered to be minimum requirements. It is the Contractor's responsibility to provide erosion control and prevent migration of silt.

1.13 CORRECTIVE ACTION

- A. The Contractor shall, upon receipt of a notice in writing of any noncompliance with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, HCWD1 may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs of damages by the Contractor unless it was later determined that the Contractor was in compliance.

1.14 POST-CONSTRUCTION CLEANUP, REMOVAL AND RESTORATION

- A. The Contractor shall, unless otherwise instructed in writing by the Engineer, remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed areas shall be graded and filled and the entire area seeded.

END OF SECTION 01120

SECTION 01340
SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mechanics and administration of the submittal process for:
 - a. Shop Drawings.
 - b. Samples.
 - c. Informational submittals.
 - 2. General content requirements for Shop Drawings.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 - General Requirements.
 - 3. Construction Progress Schedule submittal requirements are specified in Specification Section 01320.
 - 4. Operations and Maintenance Manual submittal requirements are specified in Specification Section 01342.
 - 5. Technical Specification Sections identifying required submittals.

1.2 DEFINITIONS

- A. Shop Drawings:
 - 1. See General Conditions.
 - 2. Product data and samples are Shop Drawing information.
- B. Informational Submittals:
 - 1. Submittals other than Shop Drawings and samples required by the Contract Documents that do not require review and/or approval by the Engineer.
 - 2. Representative types of informational submittal items include but are not limited to:
 - a. Installed equipment and systems performance test reports.
 - b. Manufacturer's installation certification letters.
 - c. Instrumentation and control commissioning reports.
 - d. Warranties.
 - e. Service agreements.
 - f. Construction photographs.
 - g. Survey data.
 - h. Health and safety plans.
 - i. Work plans.
 - j. Delegated designs per performance specification requirements
 - 3. For-Information-Only submittals upon which the Engineer is not expected to conduct review or take responsive action may be so identified in the Contract Documents.

1.3 SUBMITTAL SCHEDULE

- A. Schedule of Shop Drawings:
 - 1. Submitted and approved within 10 days of receipt of Notice to Proceed.
 - 2. Account for multiple transmittals under any Specification Section where partial submittals will be transmitted, e.g. rebar shop drawings.
 - 3. Submittal and approval prior to {50} percent completion.
- B. Informational Submittals:
 - 1. Reports and installation certifications submitted within {five (5)} working days of conducting testing or examination.
- C. The submittal schedule shall include the following columns as a minimum:

Submittal Section	Submittal Description	Planned Submittal Date	Submittal Need Date	Actual Submittal Date	Actual Return Date	Disposition

1.4 PREPARATION OF SUBMITTALS

- A. Legibility:
 - 1. All submittals and all pages of all copies of a submittal shall be completely legible.
 - 2. Submittals which, in the Engineer's sole opinion, are illegible will be returned without review.
- B. Shop Drawings, Product Data, and Samples:
 - 1. Scope of any submittal and letter of transmittal:
 - a. Limited to one (1) Specification Section.
 - b. Do not submit under any Specification Section entitled (in part) "Basic Requirements" unless the product or material submitted is specified, in total, in a "Basic Requirements" Specification Section.
 - 2. Numbering letter of transmittal:
 - a. Use the Specification Section number followed by a series number ("-xx" and beginning with "01"); increase the series number sequentially with each additional transmittal for that Specification Section.
 - 3. Describing transmittal contents:
 - a. Provide listing of each component or item in submittal capable of receiving an independent review action.
 - b. Identify for each item:
 - 1) Manufacturer and Manufacturer's Drawing or data number.
 - 2) Contract Document tag number(s).
 - 3) Unique page numbers for each page of each separate item.
 - c. When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.
 - 4. Contractor certification of review and approval:
 - a. Contractor's review and approval certification stamp shall be applied either to the letter of transmittal or a separate sheet preceding each independent item in the submittal.
 - 1) Stamp may be either a wet ink stamp or electronically embedded.
 - 2) Clearly identify the person who reviewed the submittal and the date it was reviewed.
 - 3) Shop Drawing submittal stamp shall read "(Contractor's Name) has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval as stipulated in the General Conditions."
 - b. Submittals containing multiple independent items shall be prepared with each item listed on the letter of transmittal or on an index sheet for all items listing the discrete page numbers for each page of each item, which shall be stamped with the Contractor's review and approval stamp.
 - 1) Each independent item shall have a cover sheet with the transmittal number and item number recorded.
 - a) Provide clear space of 3 IN SQ for Engineer stamping.
 - 2) Individual pages or sheets of independent items shall be numbered in a manner that permits the entire contents of a particular item to be readily recognized and associated with Contractor's certification.
 - 5. Resubmittals:
 - a. Number with original Specification Section and series number with a suffix letter starting with "A" on a (new) duplicate transmittal form.
 - b. Do not increase the scope of any prior transmittal.
 - c. Provide cover letter indicating how each "B", "C", or "D" Action from previous submittal was addressed and where the correction is found in the resubmittal.

- d. Account for all components of prior transmittal.
 - 1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate.
 - a) Do not include submittal information for items listed with prior "A" or "B" Action in resubmittal.
 - 2) Indicate "Outstanding-To Be Resubmitted At a Later Date" for any prior "C" or "D" Action item not included in resubmittal.
 - a) Obtain Engineer's approval to exclude items.
- 6. For 8-1/2 x 11 IN, 8-1/2 x 14 IN, and 11 x 17 IN size sheets, provide {five (5)} copies of each submittal for Engineer plus the number required by the Contractor.
 - a. The number of copies required by the Contractor will be defined at the Preconstruction Conference, but shall not exceed {three (3)}.
 - b. All other size sheets:
 - 1) Submit one (1) reproducible transparency or high resolution print and one (1) additional print of each Drawing until approval is obtained.
 - 2) Utilize mailing tube; do not fold.
 - 3) The Engineer will mark and return the reproducible to the Contractor for reproduction and distribution.
- 7. Contractor shall not use red color for marks on transmittals.
 - a. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible.
 - b. Engineer will use red marks or enclose marks in a cloud.
- 8. Transmittal contents:
 - a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the Engineer.
 - b. Provide submittal information or marks defining specific equipment or materials utilized on the Project.
 - 1) Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.
 - c. Identify equipment or material project application, tag number, Drawing detail reference, weight, and other Project specific information.
 - d. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.
 - e. Do not modify the manufacturer's documentation or data except as specified herein.
 - f. Submit items such as equipment brochures, cuts of fixtures, product data sheets or catalog sheets on 8-1/2 x 11 IN pages.
 - 1) Indicate exact item or model and all options proposed.
 - g. When a Shop Drawing submittal is called for in any Specification Section, include as appropriate, scaled details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout Drawings, rough-in diagrams, wiring diagrams, controls, weights and other pertinent data in addition to information specifically stipulated in the Specification Section.
 - 1) Arrange data and performance information in format similar to that provided in Contract Documents.
 - 2) Provide, at minimum, the detail specified in the Contract Documents.
 - h. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet. Any deviation from plans or specifications not depicted in the submittal or included but not clearly noted by the Contractor may not have been reviewed. Review by the Engineer shall not serve to relieve the Contractor of the contractual responsibility for any error or deviation from contract requirements.
- 9. Samples:
 - a. Identification:

- 1) Identify sample as to transmittal number, manufacturer, item, use, type, project designation, tag number, Specification Section or Drawing detail reference, color, range, texture, finish and other pertinent data.
 - 2) If identifying information cannot be marked directly on sample without defacing or adversely altering samples, provide a durable tag with identifying information securely attached to the sample.
- b. Include application specific brochures, and installation instructions.
 - c. Provide Contractor's review and approval certification stamp or Contractor's Submittal Certification form as indication of Contractor's checking and verification of dimensions and coordination with interrelated work.
 - d. Resubmit revised samples of rejected items.
- C. Informational Submittals:
1. Prepare in the format and detail specified in Specification requiring the informational submittal.

1.5 TRANSMITTAL OF SUBMITTALS

- A. Shop Drawings, Informational Submittals and Samples:
1. Transmit all submittals to:
HDR
401 West Main Street
Louisville, KY 40202
Attn: Mr. Kevin Brian, Project Manager
 2. Utilize two (2) copies of attached Exhibit A to transmit all Shop Drawings and samples.
 3. All submittals must be from Contractor.
 - a. Submittals will not be received from or returned to subcontractors.
- B. Electronic Transmission of Submittals:
1. Transmittals shall be made electronically.
 - a. Use HDR's Project Tracker Collaboration System (PTCS).
 - b. Protocols and processes will be determined at the Pre-Construction Conference.
 2. Scan all transmittals into Adobe Acrobat Portable Document Format (PDF), latest version, with printing enabled.
 - a. Do not password protect or lock the PDF document.
 - b. Rotate sheets that are normally viewed in landscape mode so that when the PDF file is opened the sheet is in the appropriate position for viewing.
 3. Required signatures may be applied prior to scanning for transmittal.

1.6 ENGINEER'S REVIEW ACTION

- A. Shop Drawings and Samples:
1. Items within transmittals will be reviewed for overall design intent and will receive one (1) of the following actions:
 - a. A - FURNISH AS SUBMITTED.
 - b. B - FURNISH AS NOTED (BY ENGINEER).
 - c. C - REVISE AND RESUBMIT.
 - d. D - REJECTED.
 - e. E - ENGINEER'S REVIEW NOT REQUIRED.
 2. Submittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp.
 - a. Submittals not stamped by the Contractor or stamped with a stamp containing language other than that specified herein will not be reviewed for technical content and will be returned rejected.
 3. In relying on the representation on the Contractor's review and approval stamp, Owner and Engineer reserve the right to review and process poorly organized and poorly described submittals as follows:
 - a. Submittals transmitted with a description identifying a single item and found to contain multiple independent items:

- 1) Review and approval will be limited to the single item described on the transmittal letter.
- 2) Other items identified in the submittal will:
 - a) Not be logged as received by the Engineer.
 - b) Be removed from the submittal package and returned without review and comment to the Contractor for coordination, description and stamping.
 - c) Be submitted by the Contractor as a new series number, not as a re-submittal number.
- b. Engineer, at Engineer's discretion, may revise the transmittal letter item list and descriptions, and conduct review.
 - 1) Unless Contractor notifies Engineer in writing that the Engineer's revision of the transmittal letter item list and descriptions was in error, Contractor's review and approval stamp will be deemed to have applied to the entire contents of the submittal package.
4. Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.
 - a. If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.
 - b. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
5. Submittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
 - a. The portion of the submittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference).
 - 1) One (1) copy or the one (1) transparency of the "C" or "D" Drawings will be marked up and returned to the Contractor.
 - a) Correct and resubmit items so marked.
 - b. Items marked "A" or "B" will be fully distributed.
 - c. If a portion of the items or system proposed are acceptable, however, the major part of the individual Drawings or documents are incomplete or require revision, the entire submittal may be given "C" or "D" Action.
 - 1) This is at the sole discretion of the Engineer.
 - 2) In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package."
 - 3) Distribution to the Owner and field will not be made (unless previously agreed to otherwise).
6. Failure to include any specific information specified under the submittal paragraphs of the Specifications will result in the submittal being returned to the Contractor with "C" or "D" Action.
7. Calculations required in individual Specification Sections will be received for information purposes only, as evidence calculations have been stamped by the professional as defined in the specifications and for limited purpose of checking conformance with given performance and design criteria. The Engineer is not responsible for checking the accuracy of the calculations and the calculations will be returned stamped "E. Engineer's Review Not Required" to acknowledge receipt.
8. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than {three} submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
9. Transmittals of submittals which the Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" action in a prior submittal, will be returned with action "E. Engineer's Review Not Required."

10. Samples may be retained for comparison purposes.
 - a. Remove samples when directed.
 - b. Include in bid all costs of furnishing and removing samples.
11. Approved samples submitted or constructed, constitute criteria for judging completed work.
 - a. Finished work or items not equal to samples will be rejected.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Work of all crafts and trades shall be laid out to lines and elevations as established by the Contractor from the Drawings or from instructions by the Engineer.
- B. Unless otherwise shown, all work shall be plumb and level, in straight lines and true planes, parallel or square to the established lines and levels. The Work shall be accurately measured and fitted to tolerance as established by the best practices of the crafts and trades involved, and shall be as required to fit all parts of the Work carefully and neatly together.
- C. All equipment, materials and articles incorporated into the Work shall be new and of comparable quality to that specified. All workmanship shall be first-class and shall be performed by mechanics skilled at, and regularly employed in, their respective trades.
- D. The Contractor shall determine that the equipment he proposes to furnish can be brought into the facility and installed in the space available. Equipment shall be installed so that all parts are readily accessible for inspection and maintenance.

1.02 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

1.03 MANUFACTURERS' INSTRUCTIONS

- A. Comply with manufacturers' instructions in full detail as to shipping, handling, storing, installing, start-up and operation.

1.04 TESTING SERVICES

- A. Tests, inspections and certifications of materials, of equipment, of subcontractors' work, or of completed work shall be provided by the Contractor, as required by the various sections of the Specifications and all costs for such tests, inspections and certifications shall be included in the Contract Price. Testing services are considered incidental to the installation of the Project. Tests shall include, but not be limited to, hydrostatic pressure, chlorine disinfecting, bacteriological, concrete compression strength, soil density, and compaction.
- B. The Contractor shall submit the name of testing laboratory proposed for use on the Project to HCWD1, for approval.
- C. The Contractor shall deliver written notice to the Engineer at least two (2) work days in advance of any inspections or tests to be made at the Project site. All inspections or tests to be conducted in the field shall be done in the presence of HCWD1 or his representative.
- D. Certifications by independent testing laboratories may be by properly attested copies of the data including scientific procedures and results of tests.

END OF SECTION 01400

SECTION 01450
SERVICES OF MANUFACTURER'S REPRESENTATIVE

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. General: The Contractor shall provide a qualified service representative from each company manufacturing or supplying certain equipment to perform the duties herein described and as required by the various sections of the Specifications. All costs shall be included in the Contract price.
 - 1. The service representative shall notify the Engineer each time he intends to be at the project site, and define the purpose of this visit. There will be no acknowledgment by the Owner of on-site visits by service representatives unless such visits are properly logged by the Engineer.
- B. Supervision of Installation: Where indicated in the Specifications, the manufacturer's representative shall provide supervision of the workers and advice to the Owner to insure that proper procedures are followed during equipment installation.
- C. Equipment Check-out:
 - 1. After installation of the listed equipment has been completed and the equipment is presumably ready for operation but before it is operated by others, the representative shall inspect, operate, test and adjust the equipment. The inspection shall include but shall not be limited to, the following points as applicable:
 - a. Soundness (without cracked or otherwise damaged parts).
 - b. Completeness in all details as specified.
 - c. Correctness of setting, alignment and relative arrangement of various parts.
 - d. Adequacy and correctness of packing, sealing and lubricants.
 - 2. The operation, testing and adjustment shall be as required to prove that the equipment has been installed properly and is capable of satisfactory operation under the conditions specified. On completion of his work, the manufacturer's or supplier's representative shall submit in triplicate to the Engineer a complete signed report of the result of his inspection, operation, adjustments and tests. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained, if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. The report also shall include a certificate that the equipment conforms to the requirements of the Contract and is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.
- D. Field Acceptance Tests: After the Engineer has reviewed the reports from the manufacturer's representatives, the Contractor shall make arrangements to have the manufacturer's representatives present when the field acceptance tests are made.
- E. Pre-startup Operator Training: Provision of classroom and hands-on training to maintenance personnel in the operation and maintenance of the equipment prior to placing the equipment in full operation.
- F. Post-startup Services: Provision of assistance to the Owner in the calibration, tuning and troubleshooting, plus any additional training which may be required during the year after the equipment is accepted by the Owner.
- G. The estimated number of on-site manhours required for pre-startup operator training and for post-startup services are listed in Table A.

Table A

SPECIFICATION SECTION	TASKS AND MANHOURS	
	PRE-STARTUP OPERATOR TRAINING	POST- STARTUP SERVICES
11213 – Packaged Booster Pump Station	8	16

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01535
PROTECTION OF INSTALLED WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Protection for products, including Owner-provided products, after installation.

1.02 RELATED REQUIREMENTS

- A. Division 1 - General Requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - PART 3 - EXECUTION

3.01 PROTECTION AFTER INSTALLATION

- A. Protect installed products and control traffic in immediate area to prevent damage from subsequent operations.
- B. Restrict traffic of any kind across planted lawn and landscape areas.

END OF SECTION 01535

SECTION 01550
ACCESS ROADS AND PARKING AREAS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Access roads.
- B. Temporary parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking areas.
- E. Maintenance.
- F. Removal and repair.

1.2 RELATED REQUIREMENTS

- A. Section 01560 - Temporary Controls and Utilities.

PART 2 - PART 2 - PRODUCTS

2.1 MATERIALS

- A. For temporary construction: Contractor's option but must be approved by the Owner.

PART 3 - PART 3 - EXECUTION

3.1 PREPARATION

- A. Clear areas, provide proper surface and storm drainage of premises and adjacent areas. Install erosion protection.

3.2 ACCESS ROADS

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of a width and load-bearing capacity to provide unimpeded traffic for construction purposes.
- B. Construct temporary bridges and/or culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate as work progress requires, and provide detours as necessary for unimpeded traffic flow.
- D. Locate temporary access roads as approved by the Owner and/or the Engineer.
- E. Provide and maintain access to all Owner facilities.

3.3 TEMPORARY PARKING

- A. Construct temporary parking areas to accommodate use of construction personnel in an area acceptable to the Owner and/or the Engineer. The Contractor shall enforce the requirement that all Project employees and subcontractors park only in the designated areas. Pay all costs relating to temporary parking.
- B. Parking in and near state right-of-way must be approved by KYTC.

3.4 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition, free of excavated material, construction equipment, products, mud, snow and ice. Use whatever dust control measures required to prevent airborne particles.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water and other deficiencies to maintain paving and drainage in original and/or specified condition.

3.5 REMOVAL AND REPAIR

- A. Remove temporary materials and construction when permanent facilities are usable as directed by the Engineer.
- B. Remove underground work and compacted materials to a depth of two (2) feet; fill and grade site as specified.
- C. Repair existing permanent facilities damaged by usage to original and/or specified condition.

END OF SECTION

SECTION 01560
TEMPORARY CONTROLS AND UTILITIES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Dust control.
- B. Erosion and sediment control.
- C. Temporary Electricity

PART 2 - PART 2 - PRODUCTS (NOT USED)

PART 3 - PART 3 - EXECUTION

3.01 DUST CONTROL

- A. Execute work by methods to minimize raising dust from construction operations.
- B. Provide positive means to minimize construction or traffic generated dust from dispersing into atmosphere.
- C. Provide spraying of construction traffic areas with water to hold dust leaving the construction site to the minimum amounts allowed by regulations.

3.02 EROSION AND SEDIMENT CONTROL

- A. Adhere to the requirements and provisions of KPDES General Permit (KYG20) for stormwater discharges to small Municipal Storm Sewer Systems (sMS4), where applicable.
- B. Adhere to the requirements and provisions of KPDES General Permit (KYR10) for stormwater discharges associated with small construction activities that disturb 1 acre or greater.
- C. At a minimum, provide the following:
 - 1. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 2. Minimize amount of bare soil exposed at one time.
 - 3. Provide temporary measures such as berms, dikes, drains, hay bales, gabions, etc., as directed by the Engineer so as to minimize siltation due to runoff.
 - 4. Construct fill and waste areas by selective placement to avoid erosive exposed surface of silts or clays.
 - 5. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

3.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Obtain and pay for all permits not provided by HCWD1 as required by governing authorities.
- B. Obtain and pay for temporary easements required across property other than that of HCWD1.
- C. Comply with applicable codes.

3.04 REMOVAL

- A. Completely remove temporary materials, equipment, and miscellaneous items upon completion of construction and approval of the Engineer.
- B. Repair damage caused by installation and restore to specified or original condition.

3.05 TEMPORARY ELECTRICITY

- A. Electrical services for construction needs and for lighting and heating the work area will be provided by the Contractor.

3.06 TEMPORARY WATER

- A. Water for testing water main will be provided by HCWD1.

END OF SECTION 01560

SECTION 01565
EROSION AND SEDIMENT CONTROL

PART 1 - PART 1 - GENERAL

1.1 WORK INCLUDED

- A. All Work shall adhere to the requirements and provisions of KPDES General Permit (KYG20) for stormwater discharges to small Municipal Storm Sewer Systems (SMS4), where applicable.
- B. All Work shall adhere to the requirements and provisions of KPDES General Permit (KYR10) for stormwater discharges associated with small construction activities that disturb 1 acre or greater.
- C. The Contractor shall do all Work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within his protected working area so as to prevent damage to the adjacent wetlands or water courses.
- D. The Contractor shall not employ any construction method that violates a rule, regulation, guideline or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction.
- E. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

PART 2 - PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stone bag check dames for inlet protection and across swales and ditches. Silt fence with filter fabric, lath, hardwood post.
- B. See standard details on Drawing EC-4.

PART 3 - PART 3 - EXECUTION

3.1 METHODS OF CONSTRUCTION

- A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of silt fences, construction entrances, rock check dams, water diversion structures, temporary revegetation, diversion ditches and settling basins.
- B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area which must be entered for the construction of temporary or permanent facilities. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.
- C. Excavated soil material shall not be placed adjacent to the wetlands or watercourses in a manner that will cause it to be washed away by high water or runoff. Earth berms or diversions shall be constructed to intercept and divert runoff water away from critical areas. Diversion outlets shall be stable or shall be stabilized by means acceptable to the Engineer. If for any reason construction materials are washed away during the course of construction, the Contractor shall remove those materials from the fouled areas as directed by the Engineer.

- D. For Work within easements or rights-of-way, all materials used in construction such as excavation, backfill, roadway, and pipe bedding and equipment shall be kept within the limits of these easements or rights-of-way.
- E. The Contractor shall not pump silt-laden water from trenches or other excavation into the wetlands, or adjacent watercourses. Instead, silt-laden water from his excavations shall be discharged within areas surrounded by baled hay or into sediment traps or ensure that only sediment-free water is returned to the watercourses. Damage to vegetation by excessive watering or silt accumulation in the discharge area shall be avoided.
- F. Prohibited construction procedures include, but are not limited to the following:
 - 1. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.
 - 3. Pumping of silt-laden water from trenches or excavations into surface waters, or wetlands.
 - 4. Damaging vegetation adjacent to or outside of the construction area limits.
 - 5. Disposal of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
 - 6. Permanent or unauthorized alteration of the flow line of any stream.
 - 7. Open burning of debris from the construction work.
- G. Any temporary working roadways required shall be clean fill approved by the Engineer. In the event fill is used, the Contractor shall take every precaution to prevent the fill from mixing with native materials of the site. All such foreign fill materials shall be removed from the site following construction.

3.2 EROSION CHECKS

- A. The Contractor shall furnish and install silt fences and stone bag check dams surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer. Checks located surrounding stored material shall be located approximately 6 feet from that material.
- B. The Contractor shall remove silt and sediment from the site as it accumulates at erosion checks and repair damaged checks during construction.

3.3 REMOVAL OF BMPS

- A. The Contractor shall remove all erosion control materials from the site as soon as the potential for erosion has been eliminated and when approved by the Engineer. Reseed area where silt fence has been removed.

END OF SECTION 01565

SECTION 01570
TRAFFIC REGULATION

PART 1 - PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Construction parking control.
- B. Flagmen.
- C. Flares and lights.
- D. Haul routes.
- E. Removal of controls.

PART 2 - PRODUCTS

2.01 SIGNS AND DEVICES

- A. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- B. Flagman Equipment: As required by local jurisdictions.

PART 3 - EXECUTION

3.01 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles and Owner's operations.
- B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.02 TRAFFIC CONTROL

- A. For work along Dixie Highway (US31W) the Contractor shall follow the Traffic Control Plan, shown on Drawings T-1 and T-2. The MOT shown for lane and shoulder closures and traffic control notes have been reviewed by KYTC and are part of the encroachment permit. Any proposed changes will need prior approval by KYTC.
- B. Traffic control devices and maintenance shall be provided by Safety Company, Flag-Pros or Highway Safety Systems. A qualified traffic control supervisor shall be on site during construction along or adjacent to Dixie Highway.
- C. Whenever and wherever, in the Engineer's opinion, traffic is sufficiently congested or public safety is endangered, Contractor shall furnish uniformed officers to direct traffic and to keep traffic off any highway area affected by construction operations.
- D. Contractor shall abide by city, county, state, and federal military regulations governing utility construction work.
- E. Traffic control shall be provided according to the Kentucky Department of Highways Manual on Uniform Traffic Control Devices for Streets and Highways.

3.03 FLAGMEN

- A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.04 FLARES AND LIGHTS

- A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.05 HAUL ROUTES

- A. Consult with authorities to establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.06 REMOVAL OF CONTROLS

- A. Remove equipment and devices when no longer required.

END OF SECTION 01570

SECTION 01580
PROJECT IDENTIFICATION SIGN

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Contractor shall provide signs near the site of the Work. The sign shall set forth the description of the Work and the names of the Owner, Engineer, Funding Source (if required), and Contractor.

1.2 RELATED REQUIREMENTS

- A. Section 00710 - General Conditions.

PART 2 - PRODUCTS

2.1 IDENTIFICATION SIGN (4-FEET X 8-FEET)

- A. Basic design shall be as required by the Engineer per the attached drawing.
- B. Colors shall be as selected by the Engineer.
- C. Number Required: Two (2)

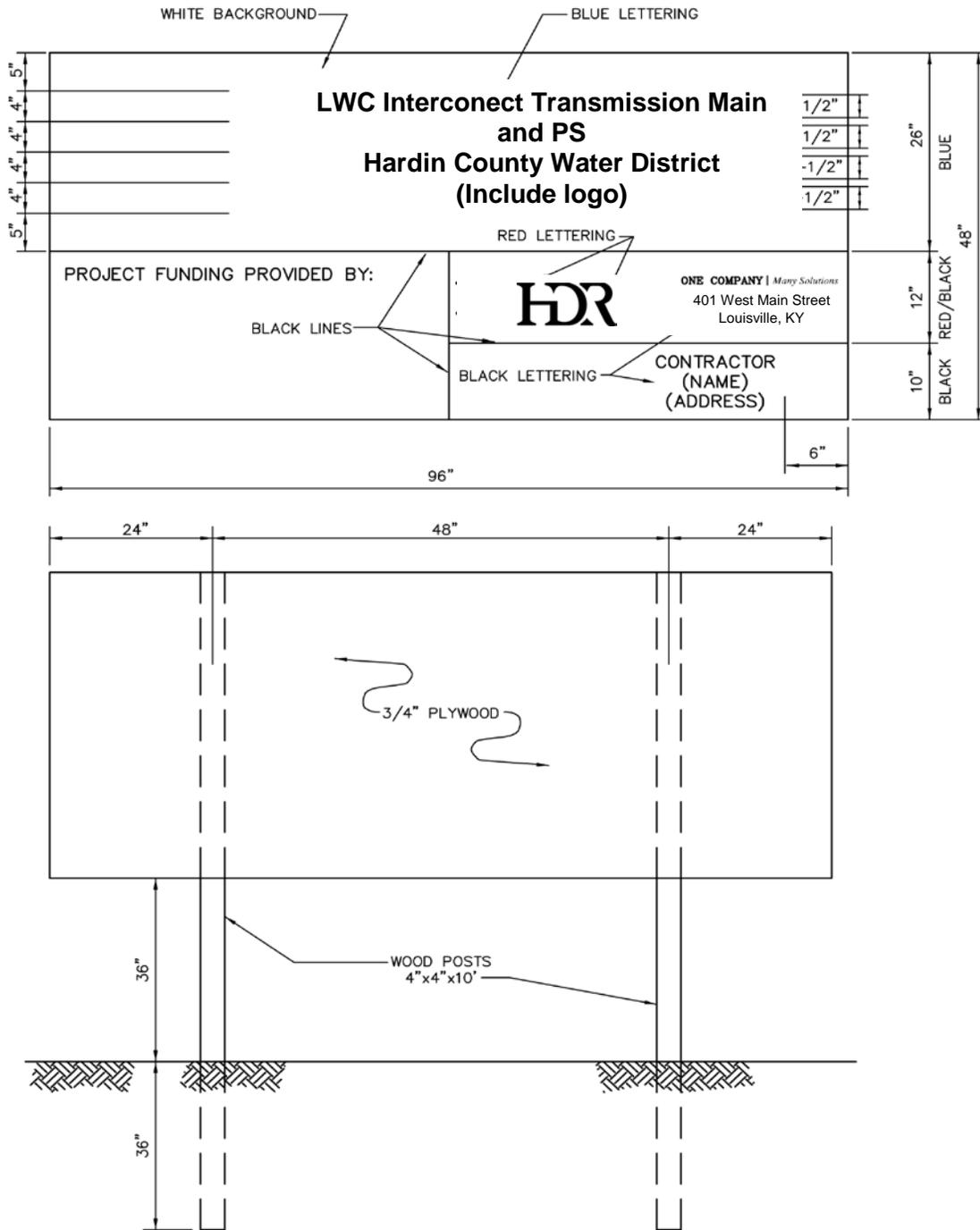
PART 3 - EXECUTION

3.1 INSTALLATIONS

- A. Signs shall be installed at locations specified by the Engineer.

3.2 MAINTENANCE

- A. The signs shall be maintained in good condition until the completion of the Project.



END OF SECTION

SECTION 01620
STORAGE AND PROTECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. General storage.
- B. Enclosed storage.
- C. Exterior storage.
- D. Maintenance of storage.

1.2 RELATED REQUIREMENTS

- A. Division 1 - General Requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL STORAGE

- A. Store products, immediately on delivery, in accordance with manufacturer's instructions, with seals and labels intact. Protect until installed.
- B. Arrange storage in a manner to provide access for maintenance of stored items and for inspection.

3.2 ENCLOSED STORAGE

- A. Store products, subject to damage by the elements, in substantial weathertight enclosures.
- B. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
- C. Provide humidity control and ventilation for sensitive products as required by manufacturer's instructions.
- D. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.

3.3 EXTERIOR STORAGE

- A. Provide substantial platforms, blocking, or skids, to support fabricated products above ground; slope to provide drainage. Protect products from soiling and staining.
- B. For products subject to discoloration or deterioration from exposure to the elements, cover with impervious sheet material. Provide ventilation to avoid condensation.
- C. Store loose granular materials on clean, solid surfaces such pavement, or on rigid sheet materials, to prevent mixing with foreign matter.
- D. Provide surface drainage to prevent erosion and ponding of water.
- E. Prevent mixing of refuse or chemically injurious materials.

3.4 MAINTENANCE OF STORAGE

- A. Periodically, inspect stored products on a scheduled basis. Maintain a log of inspections, make available to Engineer on request.
- B. Verify that storage facilities comply with manufacturer's product storage requirements.
- C. Verify that manufacturer required environmental conditions are maintained continually.
- D. Verify that surfaces of products exposed to the elements are not adversely affected; that any weathering of finishes is acceptable under requirements of Contract Documents.

3.5 MAINTENANCE OF EQUIPMENT STORAGE

- A. For mechanical and electrical equipment in long-term storage, provide manufacturer's service instructions to accompany each item, with notice of enclosed instructions shown on exterior of package.
- B. Service equipment on a regularly scheduled basis, in accordance with the manufacturer's recommendations, maintaining a log of services; submit as a record document.

END OF SECTION

SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01720 - Project Record Documents.

1.02 SUBSTANTIAL COMPLETION

- A. The Contractor shall submit written certification to Engineer that project is substantially complete and list of major items to be completed or corrected.
- B. Engineer will make an inspection within seven days after receipt of certification, together with HCWD1's representative.
- C. Should Engineer consider that work is substantially complete:
 - 1. Contractor shall prepare, and submit to Engineer, a list of the items to be completed or corrected, as determined by on-site observation.
 - 2. Engineer will prepare and issue a Certificate of Substantial Completion, containing:
 - a. Date of Substantial Completion.
 - b. Contractor's list of items ("Punch List") to be completed or corrected, verified and amended by Engineer.
 - c. The time within which Contractor shall complete or correct work of listed items.
 - d. Time and date Owner will assume possession of work or designated portion thereof.
 - 3. Contractor: Complete work listed for completion or correction, within designated time.
- D. Should Engineer consider that work is not substantially complete:
 - 1. He shall notify Contractor, in writing, stating reasons.
 - 2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project or designated portion of project is substantially complete.
 - 3. Engineer will review work again.

1.03 FINAL INSPECTION

- A. Contractor shall submit written certification that:
 - 1. Project has been inspected for compliance with Contract Documents.
 - 2. Work has been completed in accordance with Contract Documents.
 - 3. Equipment and systems have been tested in presence of Owner's representative and are operational.
 - 4. Project is completed and ready for final inspection.
- B. Engineer will make final on-site observation/review within seven (7) days after receipt of certification.
- C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.
- D. Should Engineer consider that work is not finally complete:
 - 1. He shall notify Contractor, in writing, stating reasons.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
 - 3. Engineer will review the work again.

1.04 FINAL CLEAN UP

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

1.05 CLOSEOUT SUBMITTALS

- A. Project Record Documents: to requirements of Section 01720.
- B. Warranties and Bonds: to requirements of particular technical specifications and Section 01740.

1.06 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit final applications in accordance with requirements of the Contract.

END OF SECTION 01700

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 - PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01300 - Submittals.

1.02 MAINTENANCE OF DOCUMENTS

- A. Maintain at job site, one copy of Contract Drawings, Specifications, Addenda, and Shop Drawings.
- B. Store documents in location, apart from documents used for construction.
- C. Maintain documents in clean, dry legible condition.
- D. Do not use record documents for construction purposes.
- E. Make documents available at all times for inspection by Engineer and HCWD1.

1.03 RECORDING

- A. Label each document "RECORD DRAWING" in 2-inch high printed letters.
- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Contract Drawings: Legibly mark to record actual construction:
 - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - 2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 3. Locations and elevations of vertical and horizontal fittings, gate valves, air release valves, drain assemblies and ends of casing pipes.
 - 4. GPS coordinates of the items located in Item No. 3 above.
 - 5. Field changes of dimension and detail.
 - 6. Changes made by Change Order or Field Order.
 - 7. Details not on original Contract Drawings.
- E. Specifications and Addenda: Legibly mark up each Section to record:
 - 1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed.
 - 2. Changes made by Change Order or Field Order.
 - 3. Other matters not originally specified.
- F. Shop Drawings: Maintain as record documents; legibly annotate Shop Drawings to record changes made after review.

1.04 SUBMITTAL

- A. At completion of project, deliver:
 - 1. Record drawings.
 - 2. Spare parts, if necessary.
 - 3. Operations and maintenance manuals.
 - 4. Start-up reports of vendors, suppliers, subcontractors.
 - 5. Release of Lien.
- B. Prior to final payment, Contractor should deliver:
 - 1. Request letter of certification and initiation of warranty period from Engineer.

- C. Accompany submittal with transmittal letter, in duplicate, containing:
1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. Title and number of each record document.
 5. Certification that each document as submitted is complete and accurate.
 6. Signature of Contractor or his authorized representative.

END OF SECTION 01720

SECTION 01730
OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Compile product data and related information appropriate for Owner's maintenance and operation of equipment furnished under the contract. Prepare operating and maintenance data as specified.
- B. Instruct Owner's personnel in the maintenance and operation of equipment and systems as outlined herein.
- C. In addition to maintenance and operations data, the manufacturer's printed recommended installation practice shall also be included. If not part of the operations and maintenance manual, separate written installation instructions shall be provided, serving to assist the Contractor in equipment installation.

1.2 RELATED REQUIREMENTS

- A. Section 00710 - General Conditions.
- B. Section 01340 - Submittals.
- C. Section 01720 - Project Record Documents.
- D. Section 01740 - Warranties and Bonds.

1.3 MAINTENANCE AND OPERATIONS MANUAL

- A. Every piece of equipment furnished and installed shall be provided with the following maintenance and operations manuals:
 - 1. One (1) copy in electronic format, on compact disk, furnished for the Engineer's review as to adequacy and completeness. Preferred electronic format is .pdf file. Following review, the Contractor shall cause any changes required to be made, and shall store all manuals until the completion of the project or until requested by the Engineer. The manuals will be stored and delivered to the Engineer, organized as described in this specification.
 - 2. Two (2) final copies, with all required changes, in print format, furnished to the Owner.
 - 3. Four (4) final copies, with all required changes, on compact disk. Two (2) copies furnished to Owner, two (2) copies furnished to Engineer. Format shall be .pdf file.
- B. The final form of the manuals shall be utilized in instructions of the Owner's personnel.

1.4 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by Owner's personnel.
- B. Format for hard copies:
 - 1. Size: 8-1/2 x 11 in.
 - 2. Paper: 20 pound minimum, white, for typed pages.
 - 3. Text: Manufacturer's printed data, or neatly typewritten.
 - 4. Drawings:
 - a. Provide reinforced punched binder tab, bind with text.
 - b. Fold large drawings to the size of the text pages where feasible.
 - c. For all drawings included within manuals, furnish a 8 mil mylar copy in standard size drawings 36" x 24", 8" x 16" or 8-1/2" x 11".
 - d. For flow or piping diagrams that cannot be detailed on the standard size drawings, a larger, appropriate size drawing may be submitted.

5. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide typed description of product, and major component parts of equipment.
 - b. Provide indexed tabs.
 6. Cover: Identify each volume with types or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
 - a. Title of Project.
 - b. Identity of separate structure as applicable.
 - c. Identity of general subject matter covered in the manual.
- C. Binders:
1. Commercial quality, durable and cleanable, 3-hole, 3" or 4" post type binders, with oil and moisture resistant hard covers.
 2. When multiple binders are used, correlate the data into related consistent grouping.
 3. Labeled on the front cover and side of each binder shall be the name of the Contract, the Contract Number and Volume Number.

1.5 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
1. Contractor, name of responsible principal, address and telephone number.
 2. A list of each product required to be included, indexed to the content of the volume.
 3. List, with each product, the name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Identify the area of responsibility of each.
 - d. Local source of supply for parts and replacement.
 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
1. Include only those sheets which are pertinent to the specific product. References to other sizes and types or models of similar equipment shall be deleted or lined out.
 2. Annotate each sheet to:
 - a. Clearly identify the specific product or part installed.
 - b. Clearly identify the data applicable to the installation.
 - c. Provide a parts list for all new equipment items, with catalog numbers and other data necessary for ordering replacement parts.
 - d. Delete references to inapplicable information.
 3. Clear and concise instructions for the operation, adjustment, lubrication, and other maintenance of the equipment including a lubrication chart.
- C. Drawings:
1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
 3. Do not use Project Record Documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation:
1. Organize in a consistent format under separate headings for different procedures.
 2. Provide a logical sequence of instructions for each procedure.
- E. Copy of each warranty, bond and service contract issued: Provide information sheet for Owner's personnel.
1. Proper procedures in the event of failure.
 2. Instances which might affect the validity of warranties or bonds.

- F. The electronic copies of the manuals shall be submitted to the Engineer for review at the same time that the equipment to which it pertains is delivered at the site. The manuals must be approved by the Engineer before final payment on the equipment is made.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01740
WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Compile specified warranties and bonds.
- B. Compile specified service and maintenance contracts.
- C. Co-execute submittals when required.
- D. Review submittals to verify compliance with Contract Documents.

1.2 RELATED REQUIREMENTS

- A. Performance and Payment Bonds.
- B. Guaranty.
- C. General Warranty of Construction.
- D. Warranties and Bonds required for specific products: As listed in other Specification sections.

1.3 WARRANTY BONDS OR CORPORATE GUARANTEES IN LIEU OF EXPERIENCE RECORD

- A. When specifically requested in the products and installation general provisions of a Specification section for a particular piece of equipment or product, a record of five (5) years of successful full-scale operation shall be required from the equipment manufacturer. This record of full-scale operation shall be from existing facilities utilizing the equipment or product specified, in an application similar to the application intended for this Project.
- B. The manufacturer shall certify in writing to the Contractor that it has the required record of successful full-scale operation. This certification shall be submitted by the Contractor with his construction materials and/or equipment data list. In the event the manufacturer cannot provide the five (5) year certification of experience to the Contractor, the Contractor shall furnish within thirty (30) days after the Notice of Award, a Warranty Bond or Corporation Guarantee from the equipment manufacturer written in the name of the Contractor and acceptable to the Owner. The Warranty Bond or Corporate Guarantee shall be kept in force for five (5) years from the Date of Substantial Completion of the Contract less the number of years of experience the manufacturer may be able to certify to the Engineer. As a minimum, the Bond or Guarantee shall be in force for one (1) year after the Date of Substantial Completion of the Contract. The Warranty Bond shall be written in an amount equivalent to the manufacturer's quotation, the Contractor's installation cost plus 100 percent (100%). The Warranty Bond or Corporate Guarantee will assure the Owner that, in the judgment of the Engineer, the equipment does not perform its specified function, the Contractor shall remove the equipment and install equipment that will perform the specified function and the work by the Contractor shall be paid for by the Warranty Bond or Corporate Guarantee.

1.4 SUBMITTALS REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.
- B. Furnish two (2) original signed copies.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product, equipment or work item.
2. Firm name, address and telephone number.
3. Scope.
4. Date of beginning of warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service and maintenance contract.
6. Provide information for Owner's personnel:
 - a. Proper procedure in case of failure.
 - b. Instances which might affect the validity of warranty or bond.
7. Contractor name, address and telephone number.

1.5 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
 1. Size 8 1/2-inch x 11 inches, punch sheets for 3-ring binder: Fold larger sheets to fit into binders.
 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS".
List:
 - a. Title of Project.
 - b. Name of Contractor.
- C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.6 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during progress of construction: Submit documents within ten (10) days after inspection and acceptance.
- B. Otherwise, make submittals within ten (10) days after date of substantial completion, prior to final request for payment.
- C. For items of work, where acceptance is delayed materially beyond the Date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing the date of acceptance as the start of the warranty period.

1.7 SUBMITTALS REQUIRED

- A. Submit warranties, bonds, service and maintenance contracts as specified in the respective sections of the Specifications. Additionally, the Contractor shall warrant the entire contract, including all concrete, paving, building, plumbing, HVAC, mechanical and electrical equipment to be free from defects in design and installation for one (1) year from the date of startup. In the event a component fails to perform as specified or is proven defective in service during the warranty period, the Contractor shall repair the defect without cost to the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02110 SITE CLEARING

PART 1 - PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Clear site within construction limits of trees and shrubs and other vegetation.
- B. Remove surface debris.

1.02 REGULATORY REQUIREMENTS

- A. Conform to applicable local codes and ordinances for disposal of debris.
- B. Conform to applicable requirements of the US Fish and Wildlife Service.
- C. The project area has several listed species including: Endangered – The Gray Bat and Indiana Bat; Threatened - Northern Long-Eared Bat. Refer to the COE 404 Permit and Special Conditions for specific clearing requirements. Trees 5 inches or above at breast height (DBH) can only be removed during the period November 15 and March 31st. Outside of this window, trees 5 inches or above DBH may not be disturbed or removed.

PART 2 - PART 2 - PRODUCTS (NOT USED)

PART 3 - PART 3 - EXECUTION

3.01 EXISTING TREES AND OTHER VEGETATION

- A. The Contractor shall not cut or injure any trees or other vegetation outside right-of-way or easement lines and outside areas to be cleared, as indicated on the Drawings, without written permission from HCWD1. The Contractor shall be responsible for all damage done outside these lines.
- B. Trees shall be removed within permanent and temporary easement lines or right-of-way lines for the construction of water main and appurtenances and pump station and access road.

3.02 CLEARING

- A. From areas to be cleared, the Contractor shall cut or otherwise remove all trees, brush, and other vegetable matter such as snags, bark and refuse. The ground shall be cleared to the width of the permanent easement or right-of-way unless otherwise directed by the Engineer.
- B. Except where clearing is done by uprooting with machinery, trees, stumps, and stubs to be cleared shall be cut as close to the ground surface as practicable, but no more than 6 inches above the ground surface for small trees and 12 inches for larger trees.
- C. Elm bark shall be either buried at least 1 foot deep or burned in suitable incinerators off site with satisfactory antipollution controls and fire prevention controls, to prevent the spread of Dutch Elm disease and as required by applicable laws.

3.03 GRUBBING

- A. From areas to be grubbed, the Contractor shall remove completely all stumps, remove to a depth of 12 inches all roots larger than 3-inch diameter, and remove to a depth of 6 inches all roots larger than 1/2-inch diameter. Such depths shall be measured from the existing ground surface or the proposed finished grade, whichever is lower.

3.04 STRIPPING OF TOPSOIL

- A. Prior to starting general excavation, strip topsoil to a depth of 6 inches or to depths required by the Engineer. Do not strip topsoil in a muddy condition and avoid mixture of subsoil. Stockpile the stripped topsoil within easement or right-of-way lines for use in finish grading and site restoration. Topsoil stockpiled shall be free from trash, brush, stones over 2 inches in diameter and other extraneous material.

3.05 PROTECTION

- A. Protect trees, shrubs and other plant growth if required by special provision of the easement as final landscaping.
- B. Protect bench marks and existing work from damage or displacement.
- C. Maintain designated site access for vehicle and pedestrian traffic.

3.06 REMOVAL

- A. All material resulting from clearing and grubbing and not scheduled for reuse shall become the property of the Contractor and shall be suitably disposed of off-site, unless otherwise directed by the Engineer, in accordance with all applicable laws, ordinances, rules and regulations.
- B. Such disposal shall be performed as soon as possible after removal of the material and shall not be left until the final period of cleaning up.

END OF SECTION 02110

SECTION 02150
SHORING AND BRACING

PART 1 - GENERAL

1.01 SUMMARY

- A. Shoring and bracing of excavations shall be performed by the Contractor in compliance with Occupational Safety and Health Administration (OSHA) requirements and other applicable codes.
- B. Shore and brace sidewalls in excavations with steel sheet piles with wale systems or soldier piles with timber lagging and tie back system as required to protect existing buildings, utilities, roadways, and improvements.
- C. Maintain shoring and bracing during construction activities, and remove shoring and bracing if practical when construction and filling is complete.

1.02 SUBMITTALS

- A. Provide copies of information on methods of the shoring and bracing system proposed for the work, design basis, calculations where applicable, and copies of shop drawings for inclusion in the project and job-site record files.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Shoring and bracing system design shall be prepared and sealed by a registered professional engineer or structural engineer. The system design shall provide the sequence and method of installation and removal. Shoring and bracing system design shall be in accordance with OSHA requirements 29 CFR Section 1926.652.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Trench Boxes.
- B. Steel Sheet Piles: Heavy-gauge steel sheet.
- C. Soldier Piles: Steel H-beams.
- D. Timber Lagging: Heavy timber. Pressure treated with wood preservative for use below water table for extended time period.

PART 3 - PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in proper relation with adjacent construction. Coordinate with work of other sections.
- B. Locate shoring and bracing to avoid permanent construction. Anchor and brace to prevent collapse.

END OF SECTION 02150

SECTION 02200 EARTHWORK

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. This section includes all excavating, filling, grading, and related items required to complete the booster pump station and master meter vault installation, as shown on the Drawings and specified herein.
- B. This section does not include the following related items:
 - 1. Clearing and grubbing.
 - 2. Storm drainage and utilities, including excavation and backfill.
 - 3. Lawns and planting work, including placement of topsoil and finish grading.

1.2 SUBSURFACE SOIL DATA

- A. Subsurface investigations were performed at the transmission main crossings of the Salt River, US 31W, Main Street, CSX railroad and P&L railroad crossings. The proposed pump station site, adjacent to the Main Street crossing, will require up to 6 feet of fill. A report of geotechnical exploration prepared by Vector Engineers is provided in the appendix.

1.3 BENCH MARKS AND MONUMENTS

- A. Maintain carefully all bench marks, monuments and other reference points. If disturbed or destroyed, replace as directed.

1.4 FINISHED GRADES AND REQUIRED SUBGRADES

- A. The words "Finished Grades" as used herein mean the required final grade elevations indicated on the Drawings. Any conflict in finish grade between spot elevation and cross sections shall be brought to the attention of the Engineer who will determine which elevations shall govern. Where not otherwise indicated, project site areas outside of pavements within the limits of grading shall be given uniform slopes between points for finished grades which are shown, or between such points and existing grade, except that vertical curves or roundings shall be provided at abrupt changes in slope.
- B. The words "Required Subgrades" as used herein mean the required subgrade elevations as fixed by the surface improvements to be placed thereon as shown on the Drawings. Required subgrades shall be true planes, parallel to finished grades, of depths as follows:
 - 1. Below lawn areas - 4 inches.
 - 2. Below other surfacing - as fixed by depth of surfacing shown or scheduled on the Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 STRIPPING OF TOPSOIL

- A. Prior to starting general excavation strip topsoil from areas within limits of grading to depth or depths specified hereunder, do not strip topsoil in a muddy condition, and avoid admixture of subsoil. Strip no soil from areas shown as not to be disturbed or from areas where only a slight change, if any, in existing grades is required. Stock the stripped topsoil within the site at

locations shown on the Drawings or as approved by the Engineer. Do not stockpile topsoil on steep slopes or on the uphill side of cut areas. Topsoil stockpiled shall be free from trash, brush, stones over 2 inches in diameter and other extraneous material. Stockpiled material in excess of that required for lawns may be used in general filling operations outside of paved areas, provided it is well mixed with other approved fill materials, and provided the specified degree of compaction for lawn areas (85 percent) can be achieved.

1. Strip topsoil to a depth not exceeding 6 inches, or to such depth or depths as the Engineer may require.
2. Remove all topsoil from areas to be occupied by drives, walks, or parking area paving.

3.2 EXCAVATING

- A. Grades - Dimensions. Excavate to elevations and dimensions indicated, plus ample space for construction operations. Fill any excess cut under pavements in accordance with Article 3.03 of this section.
- B. Obstructions. Within the project site, remove to a minimum depth of 2 feet below finish grade all existing walls, floors, curbs, drainage structures, pavements and other improvements, unless shown to be retained in the Project. Clean out any existing dug wells, cisterns, abandoned manholes, catch basins, septic tanks, sink holes and other similar structures and fill with granular material firmly compacted. Plug with concrete or masonry the open ends of abandoned sewers encountered in any excavation; plug in the same manner sewer openings in abandoned manholes and catch basins. Break up masonry or concrete bottoms of existing structures to permit drainage.
- C. Unclassified Excavation. Materials to be excavated shall be **unclassified**, and shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings.
 1. The term "rock" as used herein is defined to be hard material as found in nature, over 1/2 cubic yard in volume, that cannot be dislodged from its bed and removed therefrom without drilling or blasting; anything other is "earth" insofar as removal of the material to be excavated is concerned, including paving and paving foundations.
 2. Excavate rock encountered in grading to depth as follows: **under surfaced areas** - to 6 inches below the required subgrade for such areas; **under lawn areas** - 12 inches below finished grade, provided that boulders or rock outcrops shall be left undisturbed if the Drawings so indicate or the Engineer so directs. Such areas of rock excavation shall be backfilled to subgrade level with suitable earth (all topsoil in lawn areas) thoroughly compacted in place.
 3. Blasting will not be permitted.
- D. Shore, sheet and/or brace excavations as required to maintain them secure, remove shoring as the backfilling progresses, but only when banks are safe against caving. Such shoring shall not constitute a condition for which any increase may be made in the Contract sum, except that when sheeting is left in place on written order of the Engineer, the Contract sum will be adjusted.
- E. Drainage. Keep excavations free from water. Do not discharge water from excavations onto privately owned property, nor where harmful erosion will result. Presence of ground water in the soil shall not constitute a condition for which any increase may be made in the Contract sum.
- F. Frost Protection. Make no excavation to the full depth indicated when freezing temperatures may be expected unless the concrete slabs can be poured immediately after the excavation has been completed. Protect the bottom so excavated from frost if placing of concrete is delayed.
- G. Disposal. Remove from the site and dispose of all debris and all excavated material not suitable for fill. Excess excavated material suitable for fill may be disposed of on site with special permission and as directed by the Owner.
- H. Unsanitary conditions encountered shall be corrected or removed entirely.

3.3 BACKFILLING, FILLING, AND GRADING

- A. Grades. Do all cutting, filling, backfilling, and grading as required to bring areas within the limits of grading to require subgrades specified under Article 1.04, paragraph B of this section.
- B. Earth fills:
 - 1. Preparation of Fill Areas. Strip vegetation from areas to be filled not otherwise prepared, and remove all debris subject to termite attack, rot or corrosion. Fill holes and minor depressions and compact each filling thoroughly.
 - 2. Existing soils in areas to be filled, shall be reasonable dry, and shall be pre-compacted by making a minimum of three overlapping runs, one being in the cross direction with a ten-ton vibrating roller or other equipment approved by the Engineer. Drain any low site areas holding water and allow to dry out thoroughly before commencing fill operations hereunder. Any areas which deflect excessively shall be undercut to stable material or stabilized as directed by the Engineer.
 - 3. Fill material shall be free of all organic matter, debris and refuse and shall be of uniform character. Fill material shall include no stones larger than 3 inches maximum dimension.
 - 4. Compaction. Fill material at optimum moisture content shall be placed in uniform horizontal layers not more than 6 inches thick measured loose, over the fill areas involved. Compact each layer fully and uniformly at optimum moisture content to a minimum density in percentage of Standard Proctor Maximum as determined by ASTM D-698:
 - a. Fill under surfaced areas such as drives, walks, parking bays, curbs, etc., 95 percent.
 - b. Fill under future parking and building areas, 95 percent.
 - c. Fill under lawn areas 85 percent.
 - 5. Fill material shall be allowed to air dry to proper moisture content as each layer is placed, if necessary, prior to compaction.
 - 6. For the guidance of the Contractor, the following method is suggested as procedure for achieving the specified degree of compaction. Compact each layer of fill material fully and uniformly by making continuous runs over material with a sheeps foot roller containing teeth not less than 7 inches long and having an end area of not less than 5 square inches each. The sheeps foot roller weight should impose a load upon each tooth between 1,000 and 2,200 pounds. Sheeps foot rollers should be made of not less than two sections, operated side by side and mounted in such a manner that each section may oscillate, independently of the other. Continue rolling until the teeth of the roller penetrates a maximum of 3/4 inches over the entire surface of each lift. The moisture content of the fill material must be rigidly controlled during compaction by additional wetting to obtain a ratio to within 2 percent of the optimum as determined by field tests. Material containing excessive moisture must be permitted to dry to proper moisture content before being rolled. If soil classification is proper for its use, a 10 ton vibrating type roller may be used for compaction of fill to obtain required degree of compaction, subject to approval by the Engineer of such equipment.
 - 7. Tests. Fills shall be tested as directed by the Engineer by a testing laboratory selected by the Contractor and approved by the Owner. Cost of all tests to meet the specifications, additional corrective work and retesting shall be furnished and paid by the Contractor out of the geotechnical allowance. No construction shall be placed on fills until fills are approved by the Engineer. Field density tests on compacted fills shall be made in accordance with ASTM D-2167, ASTM D-1556, or ASTM D-2922 on each 6-inch layer after compaction, or more often as determined by the Engineer.
 - 8. No fill material shall be placed, spread, or rolled when it is frozen, thawing, or during excessively wet weather conditions. When work is interrupted by excessively wet weather, fill operations shall not be resumed until the moisture content and density of previously placed fill are as specified.

- C. Backfilling. Remove from spaces to be filled all unsuitable material, including all rubbish, trash, and other debris. Place no backfill until foundations are braced and have cured sufficiently to develop adequate strength to withstand pressures of backfilling operations. Trenches shall not remain open for extended periods of time during wet weather. Secure approval of the Engineer prior to commencing this work. Material for backfill shall be clean and unfrozen, free from substance subject to rot, corrosion, or termite attack and rock larger than 6 inches in dimension. If fill is required on both sides of a wall, it shall be brought up simultaneously and evenly on both sides. Backfilling around piping shall be by hand and for a depth of one foot above the pipe, taking care not to disturb the pipe or injure the pipe coating. Deposit backfill in horizontal layers not to exceed 6 inches depth, measured loose, compacting each layer thoroughly by approved mechanical devices. Work shall be at once discontinued if damage to waterproofing, piping, or other construction occurs, and such damage shall be satisfactorily repaired before work is resumed. Bring all backfill to required subgrades.
- D. Deficiency of Fill Material. Provide clean, suitable earth for required additional fill if a sufficient quantity is not available from the required excavation on the site.
- E. Correction of Subgrade. Bring to the required subgrades any areas where settlement, erosion or other grade changes occur.

3.4 DISPOSITION OF UTILITIES

- A. Rules and regulations governing the respective utilities shall be observed in executing all work under this heading.
- B. Active utilities shown on the Drawings shall be protected from damage and removed or relocated only as indicated or specified.
- C. Active utilities not shown on the Drawings shall be protected or relocated in accordance with written instructions of the Engineer.
- D. Inactive and abandoned utilities encountered in excavating and grading operations shall be removed, plugged, or capped. In absence of specified requirements, plug or cap such utility lines at least three feet outside of new ditch lines or as required by the local regulations.

3.5 BORROW AREAS

- A. Borrow earth shall be obtained from the locality at the Contractor's option, from off-site sources, provided such areas of borrow and soil composition are approved by the Engineer. The Contractor shall do all necessary cleaning, grubbing, grading, drainage and seeding of borrow areas to the satisfaction of the Owner, and any claims arising from this operation shall be borne by the Contractor.

3.6 COMPLETION

- A. Complete the grading operations after pavements have been installed, site improvements constructed, and all materials, rubbish, and debris removed from the site. Leave subgrades for lawn areas clean and at required grades.

END OF SECTION

SECTION 02221 BLASTING

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. In general, rock in pipe trenches shall be excavated so as to be not less than 18 inches from the pipe after it has been laid. The minimum trench width provided in rock excavation areas shall be the pipe OD plus 18 inches on each side.
- C. All excavation including rock removal is considered unclassified and is not a separate pay item.
- D. Blasting is not allowed for work performed on Fort Knox Property. Rock removal at Fort Knox shall be by mechanical means only.

1.02 REFERENCES

- A. NFPA 495 - Code for the Manufacture, Transportation, Storage and use of Explosive Materials.
- B. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

1.03 REGULATORY REQUIREMENTS

- A. Conform to 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.
- C. KRS 351.330
- D. 805 KAR Chapter 4

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Rock definition: Solid mineral material that cannot be removed with a power shovel.
- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- C. Delay devices: Type recommended by explosives firm and conforming to state regulations.
- D. Blasting mat materials: Type recommended by explosives firm and conforming to state regulations.

PART 3 - EXECUTION

3.01 EXPLOSIVES AT FORT KNOX

- A. Explosives are not permitted for use at Fort Knox.

3.02 BLASTING PRECAUTIONS

- A. No explosives shall be used within 20 feet of:
 - 1. Building and/or structures existing, constructed or under construction.
 - 2. Underground and/or overhead utilities whether existing or partially constructed.
- B. Permission for any deviation from the restriction set forth above shall be secured from the Engineer, 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.

- C. 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.
- D. The Contractor shall be solely responsible for his blasting operations. The Contractor shall not hold HCWD1 and/or the Engineer liable for any damages resulting from his blasting operations on this project.

3.03 EXPLOSIVES GENERAL

- A. 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. He shall notify the Engineer, in advance, of his intention to store and use explosives. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distance from the explosives. When the need for explosives has ended, all such materials remaining on the Work shall be promptly removed from the premises.
- B. The Contractor shall observe all state, federal and municipal laws, ordinances and regulations relating to the transportation, storage, handling and use of explosives. In the event that any of the above-mentioned laws, ordinances or regulations require a licensed blaster to perform or supervise the Work of blasting, said licensed blaster shall, at all times have his license on the Work and shall permit examination thereof by the Engineer or other officials having jurisdiction.

3.04 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.

3.05 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.

3.06 VIBRATION LIMITS

- A. General: Establish appropriate maximum limit for vibration 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 vibration, and federal, state, or local regulatory requirements, but not to exceed 1.25 in/sec.

3.07 AIR-BLAST LIMITS

- A. 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).

3.08 FLY ROCK CONTAINMENT

- A. 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.

3.09 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. Contractor shall provide two (2) seismographs during blasting operations capable of the following:
 - 1. Designed for monitoring blast-induced vibrations and air blast. Capable of recording particle velocity in three mutually perpendicular directions in range from 0 to 6 inches per second.
 - 2. Flat vibration frequency response between 4- and 200-Hz.
 - 3. Capable of recording air-blast overpressure up to 140 decibels.
 - 4. 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.
- F. The CONTRACTOR shall be solely responsible for his blasting operations. The CONTRACTOR shall not hold HCWD1 and/or the ENGINEER liable for any damages resulting from his blasting operations on this project.

3.10 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.

3.11 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.

3.12 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 18 inches from the pipe. A minimum trench width of the piped OD plus 18 inches on each side shall be provided.
- 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.

3.13 PAYMENT

- A. Rock excavation shall be bid as unclassified and will **not** be paid for separately.

END OF SECTION 02221

SECTION 02225

EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 - PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall make excavations in such widths and depths as will give suitable room for below grade vaults, pump stations, etc., laying pipe to the lines, grades and elevations, furnish, place and compact all backfill materials specified herein or denoted on the Drawings. The materials, equipment, labor, etc., required herein are to be considered as part of the requirements and costs for installing the various pipes, structures and other items they are incidental to.

1.02 RELATED WORK

- A. Section 02221 - Blasting.
- B. Section 02610 - Water Pipe and Fittings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Crushed stone material shall conform to the requirements of the applicable sections of the Kentucky Bureau of Highways Standard Specifications and shall consist of clean, hard, and durable particles or fragments, free from dirt, vegetation or objectionable materials.
- B. Two types of crushed stone material are used in this Section, No. 9 Aggregate and Dense Graded Aggregate (DGA).

PART 3 - EXECUTION

3.01 EXCAVATION OF TRENCHES

- A. Unless otherwise directed by the Engineer, trenches are to be excavated in open cuts.
 - 1. Where pipe is to be laid in gravel bedding or concrete cradle, the trench may be excavated by machinery to, or just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed and is suitable to support the installed pipe.
 - 2. Pipe shall never be laid directly on trench bottom.
- B. Trenches shall be sufficient width (minimum 36 inches) to provide working space on each side of the pipe and to permit proper backfilling around the pipe.
 - 1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the Work. The pavement shall be cut without extra compensation to the Contractor, to prevent damage to the remaining road surface. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
- C. All excavated materials shall be placed a safe distance back from the edge of the trench.
- D. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet of open ditch shall be left behind the pipe laying work of any one crew. Watchmen or barricades, lanterns and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions, shall be provided by and at the expense of the Contractor. Temporary fencing will be required around any excavation in a residential area left unmonitored.
- E. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the

improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.

- F. Trench excavation shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings.

3.02 WATER MAIN BEDDING

- A. Piping for water and force mains shall be supported as follows:
 - 1. The trench bottom for water main piping shall be excavated 6 inch below the pipe invert and bedded with No. 9 crushed stone , pea gravel or manufactured sand . When the trench is made through rock, the bottom shall be lowered to provide 6 to 9 inches of clearance around the pipe. No. 9 crushed stone, pea gravel or manufactured sand bedding shall be used to bring the trench bottom to grade.
- B. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective.
- C. Where an unstable (i.e., water, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be accomplished by undercutting the trench depth and replacing to grade with a foundation of crushed stone aggregate. It is the Contractor's responsibility to contact the Engineer when this is encountered.
- D. The depth of the foundation is dependent upon the severity of the trench bottom. The size of stone aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required No. 9 crushed stone bedding material can be placed.
- E. It should be noted that no pipe shall be laid on solid or blasted rock.
- F. Pipe bedding as required in Paragraphs A, B, and C of this Section is **not** considered a separate pay item.

3.03 WATER MAIN BACKFILLING

- A. Backfill:
 - 1. This backfill is defined as that material which is placed over the pipe from the spring line to a point 18 inches above the top of the pipe. The initial backfill material shall be No. 9 crushed stone, pea gravel or manufactured sand for all areas, including areas not subject to vehicular traffic. For water main piping in the paved shoulder along state right-of-way, the final backfill shall be flowable fill backfill. Granular backfill material shall be mechanically tamped in approximately 8-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein.
 - 2. Flowable fill backfill is a separate pay item, as described in the Section 01025 – Measurement and Payment.
 - 3. Crushed stone backfill material in the initial backfilling is **not** a separate pay item. Payment for the material is included in the unit price per linear foot of water main.
- B. Final Backfill:
 - 1. There are two cases where the method of final backfilling varies. The various cases and their trench situations are as follows:
 - a. Case I - Areas not subject to vehicular traffic.
 - b. Case II - Paved areas including streets, drives, parking areas, and sidewalks.
 - 2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 18 inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:
 - a. Case I - The trench shall be backfilled from a point 18 inches above the top of the pipe to a point 12 inches below the surface of the ground with earth material free from large rock (greater than 6 inches in the longest dimension), acceptable to the Engineer. The final backfill shall be mechanically tamped in approximately 18-inch layers to obtain maximum possible compaction as specified in Articles 3.08 and 3.09 herein. The remainder of the trench shall be backfilled with topsoil material free of any rocks.
 - b. Case II - The trench shall be backfilled from a point 18 inches above the top of the pipe to pavement replacement subgrade with flowable fill backfill in the paved shoulder along state right-of-way and with No. 9 crushed stone aggregate material along all other paved areas. The backfill

shall be mechanically tamped in approximately 18-inch layers to obtain the maximum possible compaction as specified in Articles 3.08 and 3.09 herein. The remaining backfill shall be as follows:

- 1) For gravel surfaces – DGA material mechanically tamped to maximum possible compaction. The trench may be left with a slight mound if permitted by the Engineer.
 - 2) For bituminous and concrete surfaces (outside state right-of-way) - Bituminous and concrete pavement sections as detailed on the Drawings and as specified for Bituminous Pavement Replacement and Concrete Pavement Replacement.
 3. Earth and crushed stone material, included DGA used in final backfill is not a separate pay item. Payment shall be included in the price of water main.
 4. Flowable fill backfill is a separate pay item, as described in the Section 01025 – Measurement and Payment.
 - 5.
- C. A sufficient amount of DGA material shall be stockpiled to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.
- D. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. It shall be the responsibility of the Contractor to obtain location or permits for its disposal, unless specific waste areas have been designated on the Drawings or noted in these Specifications. The cost of disposal of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.
- E. Spoil materials that are hauled off projects at Fort Knox MUST be disposed of at the Fort Knox landfill.

3.04 BEDDING AND BACKFILLING PROCEDURES

- A. Place all bedding in pipe trenches in horizontal layers not exceeding 8 inches in depth up to a point 6 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.
- B. Backfill shall be placed in horizontal loose lifts not exceeding 18 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 in Article 3.09, Compaction, up to 8 inches from existing ground level in non-paved areas or pavement subgrade level in paved areas.
- C. Perform compaction of bedding and backfill 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.
- D. Bedding and backfill 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.
- E. Test the effectiveness of the equipment selected by Contractor at the commencement of compaction by construction of a small section of trench bedding or backfill 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 thickness or obtain a different type of compactor. No additional cost to Owner shall be incurred.

3.05 COMPACTION

- A. Granular Material:
 1. 85% relative density (ASTM D-4253 and D-4254).
- B. Earth Material:
 1. 90% standard proctor maximum dry density (ASTM D-698).

3.06 PLACEMENT OF IDENTIFICATION TAPE

- A. Detectable underground marking tape shall be placed over all utility lines. Care shall be taken to insure that the buried marking tape is not broken when installed and shall be Lineguard brand encased aluminum foil, Type III, or approved equal.

- B. The identification tape shall bear the printed identification of the utility line below it, such as "Caution - Buried Below". Tape shall be reverse printed; surface printing will not be acceptable. The tape shall be visible in all types and colors of soil and provide maximum color contrast to the soil. The tape shall meet the APWA color code, and shall be 2 inches in width. Colors are: yellow - gas, green - sewer, red - electric, blue - water, orange - telephone, brown - force main.
- C. The identification tape shall be the last equipment installed in the trench so as to be first out. The tape shall be buried 4 to 6 inches below top of grade. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill. The tape may be plowed in after final settlement, installed with a tool during the trench backfilling process, unrolled before final restoration or installed in any other way acceptable to HCWD1 or Engineer.

3.07 PLACEMENT OF LOCATION WIRE

- A. Detectable underground location wire shall be placed above all non-metallic water mains. Care shall be taken to insure that the buried wire is not broken. The location wire shall be taped to the pipeline every 5 feet.
- B. The location wire shall be #12 AWG solid copper-coated steel wire.
- C. The location wire shall be continuous from valve box to valve box and shall be terminated (unconnected) with a wire nut and enough loose wire to extend 24 inches outside the valve box.

END OF SECTION 02225

SECTION 02400
TUNNELING, JACKING, BORING, AND MICROTUNNEL

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.
1. 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.
 2. 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 01565, Erosion and Sediment Control
 2. Section 02225, Excavating, Backfilling, and Compacting for Utilities.
 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 D.I.I, 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 A WW A 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 CONTRACTOR 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 tolerance 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.
 - 1. 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 02225 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 0.5 inches for 24-inch casing. Inside diameter shall be 4-inches minimum greater than outside diameter of Water 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. 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 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 02225 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.

3.3 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 the Water Main:
 - 1. After completion of the tunnel or steel casing pipe, the Water Main 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 water main 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 Water Main on a constant slope.
 - 4. The water main pipe shall be installed with casing spacers in a centered/restrained position.
 - 5. 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.
- E. End Seals:
- 1. 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.
 - 2. 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.
- F. 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.

END OF SECTION

SECTION 02444
CHAIN LINK FENCE AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chain link fencing and gates.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.
3. Section 02200 - Earthwork.
4. Section 03000 – Cast-In-Place Concrete.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
 - a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - b. A392, Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - c. A824, Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use with Chain-Link Fence.
 - d. F552, Standard Terminology Relating to Chain Link Fencing.
 - e. F567, Standard Practice for Installation of Chain-Link Fence.
 - f. F626, Standard Specification for Fence Fittings.
 - g. F900, Standard Specification for Industrial and Commercial Swing Gates.
 - h. F1043, Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework.
 - i. F1083, Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
2. American Welding Society (AWS).
3. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
4. Underwriters Laboratories, Inc. (UL).

B. Qualifications:

1. Installer shall have a minimum two (2) years experience installing similar fencing.
2. Utilize only AWS certified welders.

1.3 DEFINITIONS

A. See ASTM F552.

B. NPS: Nominal pipe size, in inches.

C. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.
2. Product technical data including:

- a. Acknowledgement that products submitted meet requirements of standards referenced.
- b. Manufacturer's installation instructions.
3. Scaled plan layout showing spacing of components, accessories, fittings, and post anchorage.
4. Mill certificates.
5. Source quality control test results.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The basis of design for the industrial coated chain link fence system is the Ameristar PermaCoat Color Chain Link Fence, the Master-Halco Spectra Series Chain Link Fence, or an approved equal. The color shall be black.

2.2 WARRANTY

A. Fencing shall come with a 15 year warranty against defects, cracks, peeling, blistering, and fading.

2.3 COMPONENTS

A. Chain Link Fabric:

1. 2-inch mesh fabricated from 0.148-inch- (9 gauge) core diameter galvanized steel wire complying with Chain Link Fence Manufacturers Institute's "Product Manual." The galvanized steel wire shall be PVC-coated (Class 2A) to meet the requirements of ASTM F 668. The finished size of the coated wire shall be 6 gauge. The fabric height shall be 7'-0" unless noted otherwise.
2. Selvage treatment:
 - a. Top edge shall be knuckled
 - b. Bottom edge shall be twisted

B. Framework: Polyester-coated Hot-dipped Galvanized Steel Pipe. Final coat shall be a "no mar" polyester coating. The framework shall endure a salt-spray resistance test in accordance with ASTM B117 without a loss of adhesion for a minimum exposure time of 3,500 hours. The color shall be black. Pipe sizes (minimum) are as follows:

1. Line or Intermediate Posts: 2.375-inch OD with a wall thickness of 0.130".
2. End, Corner, and Pull Posts: 2.875-inch OD with a wall thickness of 0.160".
3. Top Rails: 1.66-inch OD with a wall thickness of 0.111".
4. Swing-Gate Posts: 4-inch OD with a wall thickness of 0.160".
5. Swing-Gate Frames: 1.90-inch OD with a wall thickness of 0.120".

C. Fittings and Accessories: The coating for all fittings shall be same as required for the framework. The color shall be black. All fittings and accessories shall comply with ASTM F 626.

1. Post and Line Caps: Provide weathertight cap for each post. Provide line post caps with loop to receive tension wire or top rail.
2. Post Brace Assembly: Same material as top rail with 3/8-inch- diameter rod and adjustable tightener. Provide brace rail with truss rod assembly for each gate, end, corner, and pull post. Provide two brace rails extending in opposing directions, each with truss rod assembly, for each corner and pull post. Provide rail ends and clamps for attaching to posts.
3. Bottom and Center Rail: Same material as top rail with cap on each end.
4. Tension or Stretcher Bars: Galvanized steel bar, 2 inches shorter than fabric height, 3/16 inch thick by 3/4 inch wide.
5. Tension Bands: 3/4-inch- wide galvanized steel bands, 0.074 inch thick.
6. Brace Bands: 3/4-inch-wide galvanized steel bands, 0.105 inch thick.
7. Tension Wire: 0.177-inch- diameter, metallic-coated-steel marcelled wire with finish to match fabric.
8. Tie Wires: 0.106-inch- diameter, galvanized steel or 0.148-inch-diameter, aluminum alloy wire with finish to match fabric wire.

9. Barbwire: Provide three (3) strands of 12-1/2 gauge 4-point barbwire secured to 12” arms at top of fence. Barb arms shall be angled at 45-degrees away from the secured area. All barbwire items shall be finished to match fabric, except actual barbs.

D. Swing Gates: Comply with ASTM F 900. All framework, fittings, and accessories to be coated same as fencing framework and black in color. Fabric to be the same as described in section 2.1B and black in color. Provide coated galvanized hardware and accessories for each gate as follows:

1. Hinges: Non-liftoff type, offset to permit 180-degree gate opening.
2. Latch: Forked type or plunger-bar type, compatible with chain carrier.
3. Chain: Hot-dipped galvanized, then PVC-coated (black). Chain shall be a minimum of five feet (5') long and capable of receiving BEST padlock through any of the chain links.
4. Keeper: Provide a keeper for gates that automatically engages gate leaf and holds it in open position until manually released.
 - a. Gate Stops: For double gates, provide gate stops set in concrete, designed to engage a center drop rod or plunger bar. Include a chain carrier cutout permitting both gate leaves to be locked with a chain. Also include 4 lineal feet of hot-dipped galvanized, then painted with black enamel, chain.

E. Pedestrian Gate Assembly:

1. Material same as fence material
2. Latching mechanism shall include 'chain carrier' detail.

F. Pipe Gate Assembly:

1. Shall be schedule-40 steel, shop primed or hot-dipped galvanized, then painted with two coats of flat black enamel or epoxy in the field.
2. Chain shall be hot-dipped galvanized, then PVC-coated (black). Chain shall be a minimum of five feet (5') long and capable of receiving BEST padlock through any of the chain links.
3. Welds shall be continuous and ground relatively smooth to receive coatings.
4. End caps and seal welds shall be included to provide weather-tight assembly.
5. All field welds shall receive a coat of zinc-rich primer and an additional coat (3 total) of paint.
6. For single gates over 12 feet long, hinge post shall be upsized to 6-inch diameter with mated upsizing of any internal posts or attachments as necessary.
7. Include chain carrier detail.
8. Include gate stop(s) with automatic latch/keeper.
9. Comply with detail in construction drawings. Match actual site dimensions.
10. Include attachment provisions for signage as necessary.

G. Bollards

1. Bollards shall be made of a 6-inch, Schedule 40 hot-dipped galvanized steel pipe.
2. Infill bollard with concrete.
3. Cap bollard with non-shrink grout with smooth dome top.

2.4 SOURCE QUALITY CONTROL

A. Test related fence construction materials to meet the following standards:

1. Posts and rails: ASTM F1043, Heavy Industrial.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with:

1. Manufacturer's instructions.
2. Lines and grades shown on Drawings.
3. ASTM F567.

- B. Where fencing abuts property or easement lines, prior to installing fence, Contractor shall survey, stake and verify each property/boundary corner. Include a property/boundary line stake every 50 LF.
- C. Install fence to comply with ASTM F 567 to be plumb, level and adjusted for fit and finish. Gate hardware shall be adjusted for proper closure.
- D. Excavation: Drill post holes 9 inches in diameter and 36 inches in depth, equally spaced, but not more than 10 feet apart. Gate posts shall be spaced according to openings specified on the plans. Grading: Minor grading shall be performed to ensure a consistent gap between grade and the bottom of the fence fabric. Any holes or voids shall be filled with good quality topsoil and seeded in accordance with Section 2930.
- E. Setting Posts: Set posts in holes approximately 4 inches (102 mm) above bottom of excavation. Align posts vertically and align tops. Pour concrete footings 2 inches (50.8 mm) above grade and trowel to a crown to shed water – no exceptions.
- F. Cleaning: The contractor shall clean the jobsite of excess materials. Post hole excavation spoils shall be disposed of off site.
- G. Fabric: Install fabric on security side and attach with wire ties or clip to line posts at 15 inches on center, and to rails, braces and tension wire at 24 inches on center. Provide tension on fabric and barbwire that complies with Chain Link Fence Manufacturer's Institute's recommendations. The fabric shall be installed 2" above ground level.
- H. Repair and touch-up any marred or scratched coating and finish with matching coating or two coats of color-matched epoxy paint. If damaged area is larger than 10 square inches, the fence piece shall be rejected or sent back to the factory for repair.

END OF SECTION

SECTION 02446
HORIZONTAL DIRECTIONAL DRILLING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Labor, materials, machinery, and construction equipment required to construct entry and exit pits and associated shoring and sheeting (actual size and depth to be determined by the Contractor) and perform in a good workmanlike manner all horizontally-controlled directional drilling for the installation of approximately 750 lineal feet of transmission water mains (30-inch HDPE or 24-inch fusible PVC) under the Salt River as indicated on the Drawings.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 02610 - Water Pipe and Fittings.
 - 2. Section 15065 - Pipe: Polyvinyl Chloride (Fusible PVC)
 - 3. Section 15067 - Pipe: Polyethylene (HDPE)

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Society for Testing and Materials (ASTM):
 - a. F1962, Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings.
- B. Qualifications:
 - 1. Directional drilling and pipe installation shall be done only by an experienced Contractor specializing in directional drilling and whose key personnel have at least 5 years experience in this work. Furthermore, the Contractor shall have the following minimum experience:
 - a. Successfully completed a minimum of five (5) HDD installations in the last 5 years that were 36-IN or greater in diameter and 1,000 feet or longer.
 - b. At least three (3) of the projects shall have utilized HDPE/Fusible PVC.
 - c. At least three (3) of the projects shall have been a water (river) crossing.
 - d. At least two (2) of the projects shall have been for conveyance of finished water.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.
 - 2. Product technical data including:
 - a. Certification from the pipe and fitting manufacturer that all of the materials used to manufacture the pipe and fittings meet the requirements of this specification and the referenced standards.
 - b. Products information, material specifications, material composition, and handling procedures.
 - c. Material safety data sheets and special precautions required.
 - d. Method of mixing and application.
 - 3. The Contractor shall prepare and submit a detailed schedule for the work. The schedule shall include all major tasks including, but not limited to, the following:
 - a. Manufacture of HDPE/Fusible PVC pipe and fittings.
 - b. Pipe delivery to the project site.
 - c. Drill rig mobilization and setup.
 - d. Pipe stringout and assembly.
 - e. Beginning and completing the pilot hole drilling.
 - f. Beginning and completing the pre-reaming.

- g. Beginning and completing the pipe pull-back.
 - h. Hydrostatic pressure testing.
 - i. Disposal of drilling fluids.
 - j. Cleanup, site restoration and demobilization.
4. At least 15 days prior to mobilizing drilling equipment, the Contractor shall submit a detailed plan to the Engineer for review. The plan shall include the following:
 - a. Pilot hole drilling procedure, reaming operation, pullback procedure, ballasting, internal gauging, hydrostatic testing, and dewatering procedures.
 - b. Equipment, solids control plant, and pipe string layout plan.
 - c. Calculations showing anticipated maximum pipe stresses during pull-back, required and maximum drilling fluid pressures, and safety factors for potential inadvertent return of drilling fluid due to soil hydrofracture.
 - 1) The calculations shall be sealed by a Professional Engineer.
 - d. Emergency response plan for inadvertent return of drilling fluid.
 5. It is anticipated that the pipeline will be installed in one continuous length; therefore no pipe joining during pull-back is anticipated. If proposed by the Contractor, such pipe joining must be submitted with full details of methods and performance for approval by the Engineer at least ten (10) days in advanced of proposed operations. Contractor bears sole risk and responsibility for proving the acceptability of such pipe joining and associated work.
 6. Following completion of the pilot hole drilling, the Contractor shall submit a detailed plan and profile of the bore plotted at a scale no smaller than 1 IN equals 20 FT horizontally and 1 IN equals 10 FT vertically. (The Contractor may make changes to the proposed vertical and horizontal alignment of the installation and the location of the entry and exit points, provided these changes are first submitted in writing and agreed to by the Owner and Engineer.)

1.4 COMPLETION OF DIRECTIONAL DRILLING

- A. If a directional drilled pipeline is not successfully installed or the Contractor abandons the effort, he will forfeit all payments for that HDD crossing under this Contract.
- B. Completion and successful testing of the approved pipeline will entitle the Contractor to full payment for the Contract unit price for the HDD crossing, less retainage for site restoration, which sum shall be determined by the Owner, but in no case greater than ten (10) percent of the Contract lump sum price.
- C. In the event of his failure to install the directional drilled pipeline, the Contractor shall retain possession of the HDPE/Fusible PVC pipe and remove it from the site. The bore hole beneath land shall be completely filled with grout or sand to prevent future settlement. If the HDPE/Fusible PVC pipe cannot be withdrawn, it shall be cut off at least 3 feet below the ground and capped with a blind flange. The annular space shall be grouted at the Contractor's expense.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The Contractor shall provide all materials, equipment, and labor for completing the subaqueous crossings and for adequate protection of the Work.

2.2 MATERIALS

- A. Refer to Specification Section 15067 for HDPE pipe and tracer wire.
- B. Refer to Specification Section 15065 for Fusible PVC pipe and tracer wire.
- C. Drilling Materials:

1. The drilling materials used by the Contractor to aid in the horizontal drilling operations shall be of the Contractor's choosing. Products shall comply with environmental regulations applicable to this project.
- D. Drilling Fluids:
1. Drilling fluids used in the drilling operation shall be a mixture of bentonite and water or such other fluids of the Contractor's choosing.
 2. Any modification to the basic drilling fluid involving additives must describe the type of material to be used and be included in Contractor's drilling plan presented to the Owner.
 3. The Owner retains the right to sample and monitor the waste drilling mud, cuttings and water.

PART 3 - EXECUTION

3.1 COORDINATION OF WORK

- A. The Work to be performed under the terms of this Contract will be done on land not owned by HCWD1 or LWC. HCWD1 has obtained permits, temporary construction easements, and permanent easements which will be made available to the Contractor. The Contractor shall abide by the terms and special provisions of these permits and easements.
- B. The Contractor shall coordinate his work with the agencies, corporations, and individuals owning or having jurisdiction of land in the project vicinity including, but not necessarily limited to:
 1. Corps of Engineers.
 2. KYTC.
- C. The Contractor shall be required to construct test pits to locate existing underground utilities and/or structures in advance of construction. Test pits shall be excavated and backfilled by the Contractor so as not to create a hazardous area. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Owner.
- D. The Contractor shall have the option of securing additional construction easements in different locations if desired to accommodate his construction method. In this case, the Contractor shall notify the Engineer of his intention to secure additional easements. The cost of negotiating and obtaining these easements shall be borne by the Contractor.
- E. Drilling water required for drilling may be purchased from HCWD1, LWC or City of West Point subject to the conditions below. Contractor is responsible for purchasing, transporting and storing any water required. River or pond water shall not be used for any purpose in the construction. Securing permission to use water from any other source is the responsibility of the Contractor.
 1. The Contractor shall coordinate with HCWD1 to identify available source points for water. Any source point is subject to the approval of HCWD1.
 2. The Contractor shall furnish and install any required backflow preventers, valves and adapters.
 3. The quantity of water that the Contractor may use for construction purposes may be limited by flow rate (gallons per minute), time of day, and/or the needs of the water utility (HCWD1, LWC, City of West Point), including firefighting.
 4. All water for drilling shall be paid for by the Contractor at the water utility's prevailing rates.

3.2 CONSTRUCTION LAYOUT

- A. The Contractor shall employ Kentucky licensed land surveyors to locate the positions of the entry and exit points, established elevation and horizontal datum for the borehead control, and layout for the pipe assembly area.

3.3 INSTALLATION

A. General:

1. The Contractor shall install the pipeline under the river and its adjacent banks by the horizontally drilled, directionally controlled method of construction. The horizontally drilled, directionally controlled method shall consist of the drilling of a small diameter pilot hole in a vertical arc from one side of the river to the other followed by an enlarged diameter hole for the HDPE/Fusible PVC pipeline insertion. The exact method and techniques for completing the directionally drilled crossing shall be determined by the Contractor, subject to the requirements of these Specifications.
2. The Contractor shall comply with the applicable portions of ASTM F1962.

B. Pipe Stringout:

1. The Contractor shall elevate the pipe stringout if required, to provide access to private property.
2. The Contractor shall comply with any and all additional restrictions of affected property owners.
3. Utilities may be present in the stringout area, and adequate precautions must be taken by the Contractor to prevent damage to the utilities, as required by each utility owner.

C. Instrumentation:

1. The Contractor will provide and maintain instrumentation which will accurately locate the pilot hole at all times. The Contractor shall provide and use a separate steering system employing a ground survey grid system, such as "TRU-TRACKER" or equal wherever possible.
2. The Contractor will provide and maintain instrumentation which will accurately measure drilling fluid flow discharge rate and pressure.
3. The Contractor shall provide continuous access to these instruments and their readings to the Owner and Engineer at all times.

D. Tolerances:

1. HDPE/FUSIBLE PVC pipe installed by the horizontally drilled directionally controlled method must be located in plan as shown on the Drawings, and must be within the elevation limits shown on the Drawings. The Contractor shall plot the actual horizontal and vertical alignment of the pilot bore at intervals not exceeding 50 feet. This "as-built" plan and profile shall be updated continuously as the pilot bore is advanced. The Contractor shall employ experienced personnel to operate the directional drilling equipment and, in particular, the position monitoring and steering equipment. No information pertaining to the position or inclination of the pilot bore shall be withheld from the Owner or Engineer. At the completion of the pilot hole, the Contractor shall provide the Engineer with the coordinates of the pilot hole. The entry point location of the pilot hole shall initially penetrate the ground surface at the location shown on the Plan and Profile Drawings. The Contractor will stake this location in the field.
2. The Contractor shall make every effort to have the exit point located where shown on the Plans. In no case shall the actual exit point be located farther than 10 feet (along the length of the pipe) from the intended exit point or more than 5 feet on either side perpendicular to the pipe at the exit point location shown. The entire pipe must be within the permanent easement and/or permitted location.
3. The alignment of the pilot boring must be such that the pipe can be strung out in a straight line. If the pilot bore fails to conform to the above tolerances, the Engineer may, at his option, require a new pilot boring be made, at no additional cost the Owner. The Contractor will stake this location in the field.

4. The Contractor shall at all times handle the high density polyethylene pipe in a manner that does not overstress the pipe. If the pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced by the Contractor at his expense. The maximum allowable tensile load imposed on the HDPE/FUSIBLE PVC pipe shall be within the limits of the pipe grade and wall section strengths. The Contractor shall be responsible for determining pulling loads required for his method of installation. Such loads shall be minimized as required to prevent failure of the pipeline during installation. Protect interior and exterior surfaces at all times.
- E. Entry and Exit Pits:
1. Approximate locations of entry and exit pits are shown on the Drawings, subject to the restrictions of the landowners and applicable provisions below:
 - a. Erosion protection and sediment control BMPs shall be installed in accordance with LMSD and Hardin County Fiscal Court requirements. The BMPs shown on these Drawings are minimum requirements. The Contractor shall implement BMPs to accommodate his sequence and method of construction.
 - b. Trenching and Earthwork shall be performed in accordance with Specification Sections 02200 and 02225.

3.4 REAM AND PULL BACK

- A. Prereaming: Prereaming operation shall be conducted at the discretion of the horizontal drilling Contractor. All provisions of this specification relating to simultaneous reaming and pulling back operations shall also pertain to prereaming operations.
- B. Pulling Loads: The Contractor shall be responsible for determining pulling loads required for this method of installation. Such loads shall be minimized as required to prevent failure of the pipeline during installation.
- C. Torsional Stress: A swivel shall be used to connect the pipeline pull section to the reaming assembly to minimize torsional stress imposed on the section.
- D. Buckling Stress: Contractor shall fill the pipe with clean water, as installation proceeds, as required to prevent buckling and reduce buoyancy.
- E. Pull Section Support: The pull section shall be supported as it proceeds during pull back so that it moves freely and the pipe exterior is not damaged.
- F. Pull Section Length: If space allows, the pull section shall be installed in one continuous length with no tie-in joints. If space is not available, tie-in joints shall be minimized and fully inspected prior to installation.

3.5 OVERPULLING

- A. After the high density polyethylene pipeline has been pulled into the reamed pilot hole, the pipe shall be pulled so that at least 3% of the HDD pipeline length is exposed on the end of the bore. The pulling force shall be relieved, and the pipe allowed to “relax” while the pipe is still connected to the pulling head. The Contractor shall allow a time period equal to the total pullback time for the pipe to recover from its elastic strain and visco-elastic stretch, but in no case shall this time be less than 24 hours.

3.6 HANDLING OF DRILLING MUD AND CUTTINGS

- A. The HDD operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to nearby waterways. The Contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy duty plastic sheeting with sealed joints to prevent the migration of drilling fluids and/or ground water.
- B. The general work areas on the entry and exit sides of the crossings shall be enclosed by a berm to contain unplanned spills or discharge.

- C. Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desilter/desander, centrifuges, material handlers, and haulers, all in a quantity sufficient to perform the cleaning/separating operations without interference with the drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by Contractor to the extent necessary for legal disposal in off-site landfills. Water from the dewatering process shall be treated by Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal are subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.
- D. Equipment (graders, shovels, etc.) and materials (such as groundsheets, hay bales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps or spills.
- E. Disposal of drilling fluids and cuttings shall be the responsibility of the Contractor and shall be conducted in compliance with all relevant environmental regulations, right-of-way and work space agreements and permit requirements. Bentonite slurry used during the horizontal drilling process shall not be disposed of on-site, but shall be hauled away in watertight trucks to a legal disposal facility. All costs related to disposal shall be borne by the Contractor.
- F. Inadvertent drilling fluid returns at locations other than the entry and exit points shall be minimized. Contractor shall immediately clean-up any inadvertent returns.

3.7 TESTING

- A. Leakage Testing:
 - 1. Pre-Test: After all fusing on the strung-out pipeline is completed but prior to installation of the pipe, the Contractor shall conduct a hydrostatic pressure test using the procedure in Specification Section 02610 or a low pressure air test at 3 psi to assure there are no holes or gouges in the pipe.
 - 2. Acceptance Test: After installation, the pipe and fittings shall be hydrostatic pressure tested in place using the procedure in Specification Section 02610.
- B. Pipe Gauging:
 - 1. The Contractor shall provide and run a sizing pig to check for anomalies in the form of buckles, dents, excessive out-of-roundness, and any other deformations.
 - 2. The sizing pig run shall be considered acceptable if the survey results indicate that there are no sharp anomalies (e.g., dents, buckles, gouges, and internal obstructions) greater than 2% of the nominal pipe diameter, or excessive ovality greater than 5% of the nominal pipe diameter.
 - a. For gauging purposes, dent locations are those defined above which occur within a span of five feet or less.
 - b. Pipe ovality shall be measured as the percent difference between the maximum and minimum pipe diameters. For gauging purposes, ovality locations are those defined above which exceed a span of five feet.

3.8 CLEANUP

- A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, existing pipe and appurtenances removed by the Contractor, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

END OF SECTION

SECTION 02505
CRUSHED STONE PAVEMENT

PART 1 - PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Crushed stone pavement, compacted.

1.02 REFERENCES

- A. ASTM C33 - Aggregate for Concrete.

1.03 TESTS

- A. Gradation of stone materials shall be performed in accordance with ASTM C33.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Crushed stone shall conform to ASTM C33, Type No. 57, Type No. 2, and No. 610.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Subgrade soils shall be compacted to at least 95 percent of standard Proctor maximum dry density. Verify compacted subgrade.
- B. Minimum slope of subgrade and pavement surface shall be one-quarter inch per foot to promote surface drainage. Verify that gradients and elevations of base are correct.

3.02 PAVEMENT THICKNESS

- A. Pavement thickness shall be provided as called for on the Drawings from the Engineer.
- B. The minimum pavement thickness provided shall be: 6 inches No. 3 stone and 6 inches DGA.
- C. Place stone in 6-inch layers and compact and level surfaces to elevations and gradients indicated.
- D. Add small quantities of sand to stone mix as appropriate to assist compaction.
- E. Add water to assist compaction. With an excess water condition, rework topping and aerate to reduce moisture content.

END OF SECTION 02505

SECTION 02510
BITUMINOUS PAVEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide bituminous pavement for following applications, with prepared subbase and compacted base.
 - 1. Roads.
 - 2. Parking areas.
 - 3. Driveways.
 - 4. Walkways.
 - 5. Curbs.
- B. Provide striping for parking, roadway, and handicapped markings.

1.02 SUBMITTALS

- A. Submit for approval product data, test reports.

1.03 REGULATORY AGENCIES

- A. Comply with encroachment or road cut permits, governing codes and regulations of the agency having jurisdiction over the roadways impacted by the Project. Agencies may include:
 - 1. Hardin County Roads Department
 - 2. City of Radcliff Public Works Department
 - 3. Kentucky Transportation Cabinet - Department of Highways, D4 (Elizabethtown) and D5 (Louisville) Districts
 - 4. Fort Knox Directorate of Public Works
 - 5. P&L Railroad
 - 6. CSX Railroad
 - 7. Jefferson County Roads Department

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Prime coat: Cut-back asphalt.
- B. Tack coat: Emulsified asphalt.
- C. Asphaltic cement: AASHTO M226 and as required by local authorities.
- D. Aggregate: Crushed stone or crushed gravel.
- E. Traffic paint: Quick-drying chlorinated-rubber alkyd type, color as approved.
- F. Wheel-stops: Precast concrete of uniform color and texture with steel stakes.

PART 3 - EXECUTION

3.01 TRENCH WIDTH PAVEMENT REPLACEMENT AND FULL WIDTH PAVEMENT OVERLAY:

- A. Asphalt/aggregate Mixture: Comply with local agency Standard Specifications. Class as required by loading and use.
- B. Remove loose material from compacted subbase or existing pavement. Proof roll and check for areas requiring additional compaction. Beginning of work means acceptance of compacted subbase or

condition of existing pavement and subbase.

- C. Apply prime coat to prepared surface. Apply tack coat to previous laid work and adjacent in-place concrete surfaces.
- D. Place bituminous concrete at minimum temperature of 225 degrees F in strips not less than 10' wide overlapping joints in previous courses. Complete entire base course thickness before beginning surface course.
- E. Construct curbs, where required, to dimensions indicated or if not indicated to standard shapes. Provide tack coat between curb and pavement.
- F. Begin rolling when pavement can withstand weight of roller. Roll while still hot to obtain maximum density and to eliminate roller marks.
- G. Provide 4" lane and striping paint in uniform, straight lines. Provide wheelstops where indicated and securely dowel into pavement. Protect work from traffic and damage.
- H. Test in-place asphalt work for thickness and smoothness. Remove and replace defective work and patch to eliminate evidence of patching. Provide the following minimum thickness and smoothness unless otherwise greater thickness is required on the Drawings:
 - 1. Trench Width Replacement – match existing subbase, base and surface course.
 - 2. For Full Width Pavement Overlay – Mill existing course and replace with 2" surface course.

3.02 TRENCH WIDTH PAVEMENT REPLACEMENT

- A. Sections of pavement shall be replaced as required to install the pipelines. Disturbed pavement shall be reconstructed to original lines and grades with bituminous binder as detailed on the Drawings and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to these operations.
- B. Prior to trenching, the pavement shall be scored or cut to straight edges along each side of the proposed trench to avoid unnecessary damage to the remainder of the paving. Edges of the existing pavement shall be recut and trimmed as necessary to square, straight edges after the pipe has been installed and prior to placement of the binder course or concrete.
- C. Backfilling of trenches shall be in accordance with the applicable portions of Section 02225.
- D. Bituminous base or bituminous surface shall be one course construction of an appropriate base or surface JMF prepared and installed in accordance with the requirements of the Kentucky Department of Highways.
 - 1. Placement and compaction of binder course shall be in accordance with Section 403 of the Kentucky Department of Highways Standard Specifications. Minimum thickness after compaction shall be as detailed on the Drawings.
- E. Concrete base, as detailed on the Drawings, shall be 4,000 psi conforming to the applicable requirements of Division 3.
- F. Bituminous pavement replacement is a separate pay item.

END OF SECTION 02510

SECTION 02512
PAVEMENTS, WALKS, AND CURBS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This Section includes all labor, materials, equipment and related items required to complete the work of pavements, walks, and curbs shown on the Drawings and specified herein.
- B. This Section does not include the following related items:
 - 1. Clearing and grubbing.
 - 2. Earthwork, including establishing of subgrades for pavements, walks, and curbs.
 - 3. Storm drainage and utilities.
 - 4. Concrete work in connection with storm drainage.

1.02 COORDINATION

- A. Coordinate carefully the Work specified in this Section with storm drainage and utility installations specified under other Sections of these Specifications. Notify the Engineer promptly of any conflict between work of this Section and that of other trades.

1.03 STATE SPECIFICATIONS

- A. Where the words "State Specifications" are used herein, they shall be understood to refer to the Standard Specifications of the Kentucky Department of Highways. Reference to State Specifications is solely for the purpose of specifying kind and quality of materials and methods of construction. Where, in such specifications, the word "Engineer" or the title of any other State Official or employee appears, it shall for the purpose just stated and be understood to mean the duly authorized representative of HCWD1.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SUBGRADES FOR PAVEMENTS, WALKS, AND CURBS

- A. Grading. Do any necessary grading in addition to that performed in accordance with Section 02225 to bring subgrades after final compaction to the required grades and sections for pavements and curbs.
- B. Preparation of Subgrades. Loosen exceptionally hard spots and recompact. Remove spongy and otherwise unsuitable material and replace it with stable material. Fill and tamp traces of storm drain trenches.
- C. Compaction of Subgrade. Compact the subgrades of all surface areas with appropriate compacting equipment or by other means to such degree as will ensure against settlement of the superimposed work.
- D. Checking Subgrade. Maintain all subgrade in satisfactory condition, protected against traffic and properly drained until the surface improvements are placed. Immediately in advance of concreting, check subgrade levels with templates riding the forms, correct irregularities and compact thoroughly any added fill material. On areas to receive concrete pavement, place grade stakes spaced sufficiently to afford facility for checking subgrade levels. Correct irregularities, compacting thoroughly any fill material.
- E. Drainage Structures. Check for correct elevation and position all manhole covers, grates, and similar structures located within areas to be paved and make, or have made, any necessary adjustments in such structures.

3.02 CONCRETE WORK

- A. General. Concrete and concrete materials for work of this Section shall conform to applicable requirements of Section 03300, and, in addition the following:

1. Concrete used in all work of this Section shall be Class A and shall have a minimum 28-day allowable compressive strength of 4,000 pounds per square inch, shall contain not less than six (6) sacks of cement per cubic yard, and shall be an air entrained type, with 4 percent to 6 percent total air content, by use of an approved air entraining agent as specified under Section 03300.
- B. Requirements for forms, reinforcement, mixing, placing, finishing and curing shall be generally as specified for other concrete work under Section 03300, as modified hereinafter under particular item specification.

3.03 CONCRETE CURBS

- A. General. Concrete curb and gutter and header curb shall be constructed in accordance with State Specifications at locations shown and to details shown on the Drawings. Curved forms shall be used where curbs are curved to a radius of 100 feet or less.
 1. The Contractor may, at his option, install extruded section curb and gutter and header curb. If used, the section, equipment, jointing provisions, etc., shall be reviewed by the Engineer and approved prior to installation.
- B. Contraction Joints. Construct concrete curbs in sections 6 to 10 feet long by use of 1/8-inch steel division plates. Such plates shall be of size and shape conforming to cross sections of the concrete and shall not be bent or otherwise deformed.
- C. Expansion Joints. Provide expansion joints with premolded filler cut to shape of cross section as follows: (1) at ends of all the returns, (2) at not more than 50 feet intervals. Expansion joints shall be at least 2-inch wide, and if adjoining pavement is concrete, of the same width and at same locations as expansion joints in the pavement.
- D. Finish. Tamp and screed concrete as soon as placed. Remove division plates and face forms as soon as practicable; fill any honeycombed places with 1:2 mortar and give exposed surfaces a smooth, wood-float finish without plastering. Finish square corners to 1/4-inch radius and other corners to radius shown.
- E. Height. Curb height shall be as detailed on the Drawings. Transition height at handicap ramp locations to meet level of drive and walk pavement.
- F. Protection. Remove no forms (except face forms) for 24 hours after placing concrete. Barricade against vehicular traffic 14 days and against pedestrian for 3 days. Compact thoroughly the backfill behind the curb.

3.04 CONCRETE WALKS AND PAVING

- A. General. Walks in City streets or in streets to be dedicated shall be constructed in accordance with the local agency having jurisdiction over the roadway impacted or in the absence of same, in accordance with the following specifications for all other concrete walks.
- B. Concrete walks shall be one course construction, reinforced concrete nominally 5-inches thick, but in no case less than 4-inches actual thickness, of widths shown on the Drawings. Edges of walks shall be formed adequately and braced to maintain alignment. Use flexible or curved forms for all curves in walks.
 1. Provide integral turn-down at walk edges where abutting bituminous paving as detailed.
 2. Slopes. Provide grade stakes not more than 25 feet apart for all walk construction. Check tops of forms for grade before placing concrete. Introduce short vertical curves in all walks as shown on the Drawings, or at points where change in walk grade exceeds 2%. For a distance of 2 feet from top and bottom of steps, walk slopes shall not exceed 2 inch per foot. Provide 1/4 inch per foot cross slope in the direction of natural drainage, and make slight adjustments in slopes at walk intersections as necessary or directed to provide proper drainage.
 3. Finish. Tamp and screed the concrete true to grade and section bringing sufficient mortar to the surface for finishing and give a wood or carpet-float finish, providing that where the walk grade exceeds 5%, the surface shall be given a belted or broomed finish as directed by the Engineer. Round all edges, including those along expansion joints and scored joints to a 1/4 inch radius. Where walks terminate at curbs, finish the walk 1/4 inch above the curb providing a neat bevel.

4. Expansion Joints. Provide 2 inch transverse expansion joints with premolded filler not more than 50 feet apart, also at walk junctions and intersections, at top and bottom of steps and where walks abut curb returns, buildings, platforms, or other fixed structures, or terminate at curbs. Such expansion joints are not required (except for curb returns) between walks and contiguous parallel curbs. At walk junctions and intersections, the required expansion joints shall be located at the end of each rounding or fillet. Expansion joints shall be at right angles to the slab and extend the full depth thereof; the premolded filler shall extend to within 1/4 inch of the walk surface. Locate expansion joints in all walks as nearly as practicable opposite those in abutting curbs.
 5. Scored Joints. Between expansion joints, cut grooves 1/8 inch to 1/4 inch wide, at least 3/4 inch deep, and with a spacing approximately equal to the walk width but not greater than 6 feet on centers.
- C. Handicap Ramp. Provide ramped sections for handicapped access where shown and as detailed. Ramp surface shall be given a uniform medium broomed finish at right angles to ramp pitch. Install tactile warning strip of width shown in Cobble II pattern as manufactured by Paverlock, Inc., of Cincinnati, Ohio.
 - D. Other concrete paving at exterior areas shall conform to requirements shown on the Drawings.
 - E. Provide reinforced concrete entrance area paving at Auditorium Building where shown. Thickness and dimensions shall be as detailed. Surface shall match grade of adjacent existing paving and finish spot grades as shown on the Drawings. The pad shall be given a uniformly textured finish to match existing paving.
 - F. Protection. Remove no forms for 24 hours after pouring concrete. Protect concrete walks and paving form pedestrian traffic for a period of 3 days after pouring, and against vehicular traffic for a period of 14 days.

3.05 CONCRETE STEPS

- A. Concrete steps shall be constructed under work of this Section where shown and as detailed on the Drawings. Verify elevations at top and bottom landings prior to laying out formwork, excavation or preparation of subgrade.
- B. Excavation and Preparation of Subgrade. Excavate for corner posts to dimensions shown, and trim subgrade of concrete to required shape and slope. Footing excavations and subgrades shall be in a firm, moist condition, prior to placing any concrete, clean and free from loose material.
- C. Build forms to details shown on the Drawings, and so as to permit their removal without damage to the concrete. Place reinforcement as detailed, properly supported to maintain it in position during placing of concrete.
- D. Finish. Place concrete, and thoroughly compact it in the forms by means of spading, rodding, tamping or vibrating so as to thoroughly work into all corners and around reinforcement. All treads shall be pitched as detailed to drain, and shall be given a uniformly textured wood or carpet float finish. Exposed edges of treads shall be rounded smoothly to 2-inch radius. Remove face forms as soon as practicable, patch any surface voids with 1:2 mortar to match color of concrete, and rub with carborundum stone and water to a uniformly textured finish. Plastering of concrete surfaces will not be permitted.
- E. Protection. Do not open steps for use for seven days after concrete is placed.

3.06 BITUMINOUS PAVING

- A. General. All roadway and parking area pavement designated as bituminous shall consist of a crushed stone and dense graded aggregate base, and bituminous surface course. Refer to the Drawings for thickness of base, and surfacing, and total paving thickness.
- B. Subgrades shall be in accordance with applicable provisions of State Specifications. The subgrades shall be shaped to conform to the lines, grades, and cross sections indicated on the Drawings. All high areas shall be removed and all low areas shall be filled with approved material and compacted. Areas of yielding or unstable material shall be excavated and backfilled with approved material as directed by the Engineer. Compaction shall be to a uniform density throughout.
- C. Bituminous Surface

1. Surfacing shall be one-course bituminous concrete construction and in accordance with applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 402. The surface course shall contain no aggregate larger than 2-inch. The surface mixture shall contain natural sand in the proportions of no less than 25 percent of the total combined fine and coarse aggregates.
 2. Surface course shall be of minimum thickness after compaction as shown on the Drawings.
 3. Thickness of bituminous surface and base shall be determined by coring of the newly constructed pavement in accordance with Kentucky Method 64-420-04, Paragraphs 1.2, 1.3, 2, and 3, with the following exceptions:
 - a. Coring frequency shall be 500 feet.
 - b. Exploratory cores for a deficiency shall be spaced at 100 foot intervals.
 - c. Excess thickness will be considered as included in the Contract price per square yard.
 - d. Deficient thickness between 2-inch and $\frac{3}{4}$ -inch will require a deduction from the unit price per square yard in the proportion of the actual thickness to the design thickness for the area of the deficiency as determined in accordance with the stipulated method. Deficient thickness of greater than $\frac{3}{4}$ -inch will require an additional 1-inch layer of surface to be overlaid over the area of the deficiency.
- D. Dense Graded Aggregate Base
1. Dense graded aggregate base shall be one-course construction and shall conform to the applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 303. The base shall consist of graded aggregate no larger than 1 inch and water sufficient to provide the mixture with a satisfactory moisture content for compaction to a density of not less than 84 percent of the solid volume.
 2. Dense graded aggregate base shall be of minimum thickness after compaction as shown on the Drawings.
- E. Crushed Stone Base
1. Crushed stone base shall be one-course construction of No. 2 aggregate and shall conform to the applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 302 for Gravel Base Type 1. The crushed stone shall consist of graded aggregate no larger than 3 inches and compacted to a minimum thickness as shown on the Drawings.
- F. A cut-back asphalt emulsion primer shall be applied to the dense graded aggregate base course prior to placing the bituminous surface course. Primer-L shall conform to the applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 407 for materials and application.
- G. Compact the subgrade of all pavement areas and place and compact crushed stone base, dense graded aggregate base, and bituminous surface course in conformance with applicable sections of the Kentucky Department of Highways Standard Specifications to the lines, grades and cross-sections shown on the Drawings.
- H. Signing: Construct signs for traffic control in areas as shown on the Drawings in accordance with the MUTCD, latest edition.
- I. Striping: Lay off and stripe parking areas and service road as indicated on the Drawings and in accordance with the MUTCD, latest edition. Provide cross-hatching, stop bars, and centerline stripes for roadway to limits shown on the Drawings. Cross-hatching and stripes shall be approximately 4 inches wide, stop bars shall be 24-inches wide, of lengths indicated. Paint materials shall be as recommended in State Specifications. Color shall be white.
1. Provide painted lettering for "Stop" in location shown on the Drawings. Color shall be white and material shall be as specified above.
 2. Paint face and top of curbs in locations shown on the Drawings. Color shall be yellow and material shall be as specified above.

END OF SECTION 02512

SECTION 02610
WATER PIPE AND FITTINGS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Contractor shall furnish all labor, material, and equipment necessary to install water main piping together with all appurtenances as shown and detailed on the Drawings and specified herein.
- B. For the remaining water main construction, including the Pritchard Transmission Main and Raw Water Main appurtenances and water main replacement segments, the following specifications shall apply.

1.2 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02630 - Encasement Pipe.
- C. Section 02640 - Water Valves and Gates.
- D. Section 02675 - Disinfection of Potable Water Pipe.
- E. LWC Technical Specifications and Standard Drawings for Pipeline Construction, latest edition – Shall apply for the water main construction from Katherine Station Road (Station 10+00) to the Master Meter Vault (Station 37+50).

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE (DIP) AND FITTINGS

- A. Ductile iron pipe (DIP) shall conform to ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51 Standard. The pipe, fittings and joints shall be of accommodating the pressure and conform to the pressure class as indicated on the Drawings.
- B. Fittings shall be ductile iron 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 and shall conform to the details and dimensions shown therein. Fittings shall have rubber gasket joints meeting the requirements of AWWA C111. Fittings shall be cement-mortar lined and bituminous coated to conform to the latest revision of ANSI/AWWA standards.
- C. DIP pipe installed within 200 feet of fuel station or contaminated soils shall have joints installed with petroleum resistant gaskets, such as nitrile Buna-N or fluoroelastomer gaskets.
- D. All fittings and valves shall be restrained with a friction type retainer gland, as manufactured by Ford, Romac or approved equal.
- E. All ductile fittings shall be rated at 350 psi water working pressure plus water hammer. Ductile iron fittings shall be ductile cast-iron grade 70-50-05 per ASTM Specification A339-55.
- F. Cement mortar lining and seal coating for pipe and fittings, shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.
- G. All pipe and fittings shall be encased with polyethylene encasement in accordance with ANSI/AWWA C105/A21.5. Polyethylene encasement shall be V-Bio ® Enhanced (white in color), consisting of three layers of co-extruded linear low density polyethylene film fused into one with the inside surface fused with a blend of anti-microbial additive and a volatile corrosion inhibitor.
- H. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor, during the bidding phase, shall determine the number of fittings required on the job and include the cost of the fittings and installation in the unit price for pipe.
- I. All ductile iron pipe and fittings shall be cast, cleaned, lined, coated, tested, and certified at a single

manufacturing facility located in the United States of America – with all manufacturing units contiguous to one another. Acceptable manufacturers include, AMERICAN Ductile Iron Pipe, U.S. Pipe & Foundry Company, or approved equivalent.

2.2 POLYETHEYLENE (HDPE)

A. See Section 15067

2.3 FUSIBLE POLYVINYL CHLORIDE (FUSIBLE PVC)

A. See Section 15065

PART 3 - EXECUTION

3.1 LAYING DEPTHS

A. In general, water mains shall be laid with a minimum cover of 48 inches and a maximum depth of 60 inches, except as otherwise indicated on the Drawings.

3.2 SEWER/CONTAMINANT PIPE CROSSING

A. At locations shown on the Drawings, required by the Specifications, or as directed by the Engineer, encasement shall be used when the clearance between the proposed water pipe and any existing sewer or contaminant carrying pipe is 18 inches or less. Contaminant carrying pipe includes underground petroleum, slurry, food processing, and other pipe as determined by the Engineer. Encasement may be concrete or an encasement pipe.

B. Whether the proposed water pipe is above or below the existing sewer/contaminant pipe, the concrete shall fully encase the sewer/contaminant pipe and extend to the spring line of the water pipe. Encasement shall extend in each direction along the sewer/contaminant pipe until the encased sewer/contaminant pipe is 10 feet from the proposed water main, measured perpendicular to the water main.

C. The pipe segment of the water main shall be installed so that it centers at the crossing with the contaminant pipe.

D. Concrete shall be 3,000 psi and shall be mixed sufficiently wet to permit it to flow between and under the pipes to form a continuous bridge. In tamping the concrete, care shall be taken not to disturb the grade or line of either pipe or damage the joints. Sack concrete is not acceptable.

E. Concrete for this Work is not a separate pay item and will be considered incidental to water pipe installation.

3.3 PIPE LAYING

A. Slip Jointed Pipe:

1. All pipes shall be laid with ends abutting and true to the lines and grades indicated on the plans. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
2. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure it is clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
3. Joint deflection for slip joint or mechanical joint pipe shall be no more than 75% of the maximum deflection recommended by the manufacturer. No pipe bending is allowed. Joint deflection must be shown on shop drawing submittals.
4. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.

5. Anchorage of Bends:
 - a. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by both poured concrete thrust blocking and restrained joint pipe.
 - b. Thrust Blocking – Poured concrete thrust blocking shall be provided as shown on the Drawings, with sufficient volumes of poured concrete being provided; however, care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair. Polyethylene wrap shall be provided around all fittings. Sack concrete is not acceptable.
 - c. Restrained Joint Pipe – Shall be provided as called for on the Drawings and per the required restrained joint lengths in each direction per the schedule for the various fittings and bends. The type of restrained joint pipe provided shall be as follows:
 - 1) Water main construction from station 10+00 to 37+50 and from station 136+00 to 209+36 – Shall be restrained push-on boltless type joints consisting of shop applied weld bead or retainer weldment on the spigot end of the pipe and rubber backed ring, containing ductile iron locking segments, for joint restraint. AMERICAN Ductile Iron Pipe Flex-Ring, U.S. Pipe & Foundry Company TR Flex, or approved equivalent.
 - 2) Water main construction from station 37+50 to 136+00 – Shall be restrained push-on boltless type joints using a wedging type gasket consisting of high strength stainless steel elements around the gasket, for joint restraint. Wedging type gasket shall be provided as a different color than the regular gasket. AMERICAN Ductile Iron Pipe Amarillo Fast-Grip, U.S. Pipe & Foundry Company Field LOK 350, or approved equivalent.
 - 3) Pritchard Water main construction from station 10+00 to 52+85 - Shall be restrained push-on boltless type joints using a wedging type gasket consisting of high strength stainless steel elements around the gasket, for joint restraint. AMERICAN Ductile Iron Pipe Amarillo Fast-Grip, U.S. Pipe & Foundry Company Field LOK 350, or approved equivalent.
 - 4) Pipe and Fittings for Drain Assembly and Gate Valve cut-ins along 14” Raw WM - Shall be restrained push-on boltless type joints consisting of shop applied weld bead or retainer weldment on the spigot end of the pipe and rubber backed ring, containing ductile iron locking segments, for joint restraint. AMERICAN Ductile Iron Pipe Flex-Ring or Field Flex Ring, U.S. Pipe & Foundry Company TR Flex or Field TR Flex, or approved equivalent. For mechanical joints, see Item d below.
 - d. Mechanical Joints – Provide friction type retainer glands with gripping type wedges. EBAA Megalug or approved equivalent.
 - e. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other
6. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has the opportunity to make an inspection of the joints, alignment and grade in the section laid, but such inspection shall not relieve the Contractor of further liability in case of defective joints, misalignment caused by backfilling and other such deficiencies that are noted later.
7. All joint surfaces shall be cleaned immediately before jointing the pipe. The joint shall be lubricated in accordance with the pipe manufacturer's recommendations. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. All pipe shall be provided with home marks to insure proper gasket seating. Details of gasket installation and joint assembly shall follow the manufacturer's direction for the joint type and material of the pipe. The resulting joints shall be watertight and flexible.

3.4 TESTING OF WATER PIPE (NEW CONSTRUCTION)

- A. The completed work shall comply with the provisions listed herein, or similar requirements which will insure equal or better results. Suitable test plugs, water pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to HCWD1.
- B. Only HCWD1 and LWC (section in Jefferson County) personnel are permitted to operate active hydrants and valves. There will be no charge to the Contractor for water or labor for contracts with HCWD1.
- C. Water main piping shall be pressure tested to 250 percent of the normal system operating pressure or to 100 percent of the rated working pressure of the pipe, whichever is less. At no time shall the test pressure

exceed 100 percent of the pipe's rated working pressure. A chart recorder provided by HCWD1 shall be installed on the pump discharge connection to the new water main to record pressure and time. A pipe section shall be accepted if the test pressure does not fall more than 5 psi during the minimum 2-hour test period. The pipe shall be tested for allowable leakage according to AWWA C-600 or C-605, as applicable, concurrently with the pressure test.

- D. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 6,000 feet. Testing shall proceed from the source of water toward the termination of the line. The line shall be tested upon the completion of the first 6,000 feet. After the completion of two (2) consecutive tests without failure, the Contractor, at his option and with the Engineer's approval, may discontinue testing until the system is complete.
- E. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.
- F. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and hydrants. If permanent air vents are not located at high points within the test section, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water.
- G. All piping shall be tested for leakage at a pressure no less than that specified for the pressure test. The leakage shall be defined as the quantity of water that must be supplied to the tested section to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The leakage shall be less than an allowable amount determined by the following equation:

$$L = \frac{SD (P)^{1/2}}{133,200}$$

- Where:
- L = allowable leakage (gallons/hour)
 - S = length of pipe tested, in feet
 - D = nominal diameter of pipe (inches)
 - P = test pressure (psig)

- H. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing the leaks and retesting as the Engineer may require without additional compensation. All visible leaks are to be repaired regardless of the amount of leakage.
- I. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

3.5 CLEANING AND TESTING OF WATER PIPE (EXISTING 14-INCH MAIN)

- A. The existing main shall be flushed at a minimum rate of 1,600 gpm to remove loose and cohesive deposits and hard scale from the main. The flushing shall continue until such time the discharged water is clear of deposits.
- B. Flushing shall be unidirectional and shall continue until such time the discharge water is clear of deposits.
- C. Suitable test plugs, water pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to HCWD1.
- D. Only HCWD1 personnel are permitted to operate active hydrants and valves. There will be no charge to the Contractor for water or labor for contracts with HCWD1.
- E. Water main piping shall be pressure tested to 250 percent of the normal system operating pressure or to 100 percent of the rated working pressure of the pipe, whichever is less. At no time shall the test pressure exceed 100 percent of the pipe's rated working pressure. A chart recorder provided by HCWD1 shall be installed on the pump discharge connection to the new water main to record pressure and time. A pipe section shall be accepted if the test pressure does not fall more than 5 psi during the minimum 2-hour test period. The pipe shall be tested for allowable leakage according to AWWA C-600 or C-605, as applicable, concurrently with the pressure test.

- F. The existing pipeline shall be tested between the newly installed line valves and drain assemblies in lengths of not more than 8,000 feet. Testing shall proceed from the source of water toward the termination of the line.
- G. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and drain assemblies. If permanent air release valves are not located at high points within the test section, the Contractor shall install corporation cocks at such points so that the air can be expelled from the line.
- H. Should the existing pipe fail the pressure test the Engineer shall be notified immediately.
- I. The existing piping shall be tested for leakage at a pressure no less than that specified for the pressure test. The leakage shall be defined as the quantity of water that must be supplied to the tested section to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The leakage shall be less than an allowable amount determined by the following equation:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

- Where:
- L = allowable leakage (gallons/hour)
 - S = length of pipe tested, in feet
 - D = nominal diameter of pipe (inches)
 - P = test pressure (psig)

- J. Should the sections under test fail to meet the requirements, the Contractor shall notify the Engineer immediately.
- K. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer and Owner.

3.6 PLACEMENT OF IDENTIFICATION TAPE

- A. Detectable underground marking tape shall be placed over all water mains as specified in Section 02225.

3.7 PLACEMENT OF LOCATION WIRE

- A. Detectable underground location wire shall be placed above all non-metallic water main as specified in Section 02225.

3.8 DISINFECTION

- A. Newly Installed Mains - Granular HTH shall be placed in appropriately measured quantities of each new pipe segment to facilitate disinfection, see Section 02675.
- B. Raw Water Main Conversion – Continuous-feed or slug method per AWWA 651-14 and Section 02675.

END OF SECTION 02610

SECTION 02630
ENCASEMENT PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor, material, and equipment necessary to install encasement pipe together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.

PART 2 - PRODUCTS

2.01 STEEL PIPE

- A. Steel seamless pipe shall be new Grade B steel material, with a minimum yield of 35,000 psi and a wall thickness as shown below unless otherwise required by a permitting authority. The material shall conform to the chemical and mechanical requirements of the latest revision of ASTM A139 "Electric-Fusion (ARC) - Welded Steel Pipe (NPS 4 and Over)," unless otherwise stated herein.
- B. The minimum wall thickness shall be in accordance with the following table:

Steel Casing Pipe Wall Thickness

Casing Diameter (inches)	(Minimum Wall Thickness Under Railroads (inches)	Minimum Wall Thickness All Other Uses (inches)
16 and under	0.250	0.250
18	0.281	0.250
20 and 22	0.312	0.281
24	0.344	0.312
26	0.375	0.344
28	0.406	0.375
30	0.438	0.406
32	0.469	0.438
34 and 36	0.500	0.469

- C. Welds of the steel casing pipe shall be solid butt-welds with a smooth non-obstructing joint inside and conform to all specifications as required by American Welding Society (AWS). The casing pipe shall be installed without bends. All welders and welding operators shall be qualified as prescribed by AWS requirements.
- D. Hydrostatic testing shall not be necessary.
- E. A protective coating shall be applied to each length of pipe. Following an SSPC SP-7 "Brush-Off Blast Cleaning" surface preparation, 3 (dry) mils of Tnemec-Primer 10-99 (red), or Porter International Primer 260FD (red), or an equivalent thickness of an approved equivalent paint shall be applied in the manner recommended by the respective paint manufacturer.
- F. Each length of pipe shall be legibly marked, stating: manufacturer, diameter, wall thickness and primer.

G. Precaution shall be taken to avoid deforming the pipe and damaging the primer during shipping.

2.02 CARRIER PIPE SPACERS

- A. Carrier pipes installed inside encasement pipes shall be centered throughout the length of encasement pipe. Centering shall be accomplished by the installation of polyethylene pipeline spacers attached to the carrier pipe in such manner as to prevent the dislodgement of the spacers as the carrier pipe is pulled or pushed through the encasement pipe. Spacers shall be of such dimensions to provide: full supportive load capacity of the pipe and contents; of such thickness to allow installation and/or removal of the pipe; and to allow no greater than 2 inch movement of the carrier pipe within the cover pipe after carrier pipe is installed.
- B. Spacers shall be located immediately behind each bell and at a maximum spacing distance as follows:

Carrier Pipe Diameter (inches)	Maximum Spacing (feet)
2 - 2-1/2	4
3 - 8	7
10 - 26	10
28	9
30	8
32	7
34	6
36 - 38	5.5

The materials and spacing to be used shall be accepted by the Engineer prior to installation. The polyethylene pipeline spacers shall be manufactured by Pipeline Seal and Insulator, Inc. (PSI), Raci Spacers, Inc., or equivalent. Installation shall be in accordance with manufacturer=s recommendations.

2.03 ENCASEMENT PIPE END SEALS

- A. After installation of the carrier pipe within the encasement pipe, the ends of the casing shall be sealed with either a wraparound or a pull-on casing end seals fabricated of minimum 1/8-inch thick neoprene rubber. The seals shall be attached to the encasement pipe and the carrier pipe by 304 stainless steel band clamps not less than 1/2-inch wide. The casing end seals shall be as manufactured by Advance Products & Systems, Inc., or approved equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where shown on the Drawings, the Contractor shall install encasement pipe. Install encasement pipe to maintain alignment, grade and the circular shape of the encasement pipe. The encasement pipe shall be straight and true in alignment; and any significant deviation from line or grade, in the opinion of the Engineer or permitting authority, shall be sufficient cause for disapproving or rejecting the installation.
- B. Two methods of installation are designated, the open-cut method and the boring method.
1. The open-cut method shall consist of placing the encasement pipe in the excavated trench, then installing the carrier pipe inside the encasement pipe. Excavation, bedding and backfilling shall be in accordance with Section 02225.
 2. The boring and jacking method consists of pushing or jacking the encasement pipe into the subsurface material as an auger cuts out the material or after the auger has completed the bore. Where designated on the drawings, crossings beneath state maintained roads, railroads, or other surfaces not to be disturbed, shall be installed by boring and jacking of steel casing pipe followed by installation of the carrier pipe within the casing pipe. The Contractor shall provide a jacking pit, bore through the earth, and/or rock, jack the casing pipe into proper line and grade and then install the carrier pipe within the casing pipe. The approach trench shall be large enough to accommodate one

section of casing pipe, the jacks and blocking. The Contractor shall furnish and use adequate equipment to maintain the line and grade.

- C. The carrier pipe shall be ductile iron, polyvinyl chloride, or polyethylene pipe as designated on the Drawings. The carrier pipe shall be installed using pipe spacers as described in this Section. Carrier pipe shall be restrained through the encasement with harness type restraints for PVC pipe and field locking style gasket for DI pipe. Carrier pipe will not be permitted to rest on bells or couplings.
- D. Following installation of the carrier pipe, the ends of the encasement pipe shall be sealed with products of the type described in this Section.

3.02 DAMAGE

- A. The cost of repairing damage to the highway or railroad which is caused by a boring and jacking installation shall be borne by the Contractor.

END OF SECTION 02630

SECTION 02640
WATER VALVES AND GATES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor, material, and equipment necessary to install valves together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.
- C. Section 02645 - Hydrants.
- D. Section 11213 – Packaged Water Booster Pump Station.

1.03 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer in accordance with the requirements of Section 01300.
- B. The manufacturer shall furnish the Engineer an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of the latest revision of the applicable AWWA Standard, and that all tests specified therein have been performed and that all test requirements have been met.

PART 2 - PRODUCTS

2.01 GATE VALVES

- A. All gate valves shall be of the resilient seat type in accordance with the latest revision of AWWA C515 Standard. Rating working pressure of valves shall be: Sizes 2- through 12-inch 350 psi and sizes 14- and greater 250 psi. The valve body, bonnet and gate castings shall be ductile iron. The valve shall have a non-rising stem (NRS), fully bronze mounted or stainless steel with o-ring seals. Valve body and bonnet, inside and out, shall be fully coated with fusion bonded epoxy coating in accordance with AWWA C550 Standard.
- B. Bolts and nuts shall be 316 stainless steel.
- C. Gate Valves for Buried Service
 - 1. Shall be furnished with mechanical joint end connections, unless otherwise shown on the Drawings or specified herein. The end connection shall be suitable to receive ductile iron pipe.
 - 2. Installed along the Jefferson County section from station 10+00 to 37+50 shall have the open direction to the right (clockwise). All other buried gate valves shall have the open direction to the left (counter clockwise).
 - 3. Shall be provided with a 2-inch square operating nut.
 - 4. Installed on the new transmission main shall be installed in the vertical position and shall have spur gearing for valves greater than 12-inch in size.
 - 5. Installed on the existing 14-inch main shall be installed in the horizontal position and shall have bevel gearing.
 - 6. Installed as part of the drain assembly shall be installed in the vertical position and be direct turn.
 - 7. Shall be installed with valve box (key tube) as detailed on the Drawings.
- D. Gate valves for the master meter vault shall be furnished with flanged joint and connections, non rising stem and handwheel operator. The gate valve shall have the direction of opening cast on the rim of the handwheel and provided with chain and lock.
- E. Valves internal to the pump station shall be meet the specifications under Section 11213.

- F. Valves shall be those manufactured by M&H, American Flow Control or approved equivalent.

2.02 TAPPING VALVES

- A. All tapping valves shall be of the resilient seat, gate valve type in accordance with the latest revision of AWWA C509 Standard. The valve body, bonnet and gate castings shall be cast iron. The valve shall have a non-rising stem (NRS), fully bronze mounted with o-ring seals. Valve body and bonnet, inside and out, shall be fully coated with fusion bonded epoxy coating in accordance with AWWA C550 Standard. Valves shall have a rated working pressure of 250 psi.
- B. Valve shall be furnished with ANSI B16.1 mechanical joint end with centering ring on tapping side. Outlet side shall be mechanical joint. All valves through 12 inches shall mate all sleeves through 12-inch outlet regardless of manufacturer.
- C. All cast iron shall conform to ASTM A126, Class B. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed. Bolts shall be stainless steel with hex heads and hex nuts in accordance with ASTM A-307 and A-563.
- D. Stems shall be manganese bronze having a minimum tensile strength of 60,000 psi, a minimum yield of 20,000 psi. NRS stem collars shall be cast integral with them and machined to size. The housing for the valve stem collar shall be machined. All thrust bearing shall be incorporated as required, to optimize operating torques. NRS valves shall be furnished with two (2) o-ring stem seals located above the thrust collar and one (1) below. O-rings shall be set in grooves in the stem. The o-ring grooves shall not be less than the root diameter of the stem threads.
- E. Gates for valve shall be totally encapsulated in rubber, be field replaceable, and provide a dual seal on the mating body seat. Valve shall be capable of installation in any position with rated sealing in both directions. Rubber sets of specially compounded SBR materials shall be utilized and be capable of sealing even under conditions of normal wear. The valve body shall have integral guide engaging lugs in the gate in a tongue-and-groove manner, supporting the gate throughout the entire open/close travel.
- F. Tapping valves shall be capable of making taps by using a cutter not less than 1/4-inch smaller than nominal pipe size.
- G. Tapping valves shall be provided with a 2-inch square operating nut and shall be opened by turning to the left counterclockwise).
- H. Tapping valves shall be installed in a vertical position with valve box as detailed on the Drawings. They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street.
- I. Valves shall be those manufactured by M&H, American Flow Control or approved equivalent.

2.03 TAPPING SLEEVES

- A. Tapping sleeves shall be stainless steel and capable of containing pressure within the full volume of the sleeve. Sleeve shall be mechanical joint suitable for use with ductile iron or PVC pipe.
- B. Sleeve shall be rated at 200 psi working pressure through 12-inch size and 150 psi for sleeves 14-inch through 24-inch.
- C. Mechanical joint throat section of mechanical joint sleeves through 12-inch size shall conform to MSS SP60 Standard. For throat sections larger than 12 inches, flanged section shall mate valves of same manufacture as sleeves.
- D. Tapping sleeves shall be capable of withstanding their rated pressure without leakage past the side gaskets and end gaskets of the sleeve. Tapping sleeves shall be fast-tap stainless steel with mechanical joint outlet.
- E. Tapping sleeve shall be manufactured by M&H, American Flow Control or approved equivalent.

2.04 AIR RELEASE AND AIR/VACUUM VALVES

- A. Air release valves shall be installed at high points along the water main as shown on the Drawings and directed by the Engineer. Size shall be determined by main size and operating pressure. Valve shall be

manufactured by Valve and Primer Corp, APCO Series 200A or approved equivalent. The valves shall be in accordance with ANSI/AWWA C512.

- B. At air release valve locations the water line shall be installed at 48-inch cover. The increase in depth shall be gradual toward and away from the valve installation.
- C. Valves shall be constructed of cast iron body and cover, stainless trim and float with a Buna-N seat for positive seating. The baffle shall be ductile iron and shall protect float from direct impact of air and water. The seat shall slip fit into the baffle or cover and lock in place without any distortion. The float and baffle assembly shall be shrouded with a water diffuser. The float shall be stainless steel center guided for positive seating and be rated at 1,000 psi non-shock service.
- D. The discharge orifice shall be fitted with a double-acting throttle device to regulate and restrict air venting.
- E. All parts of the valves and the operating mechanisms shall be made of non-corrodible materials.

2.05 VALVE BOXES

- A. Each buried stop and valve shall be provided with a suitable valve box. Boxes shall be of the screw type, adjustable, telescoping, heavy-pattern type with the lower part of cast iron and the upper part of steel or cast iron. They shall be so designed and constructed as to prevent the direct transmission of traffic loads to the pipe or valve.
- B. The upper or screw section of the box shall be provided with a flange having sufficient bearing area to prevent undue settlement. The lower section of the box shall be designed to enclose the operating nut and stuffing box of the valve and rest on the valve bonnet.
- C. The boxes shall be adjustable through at least 6 inches vertically without reduction of the lap between sections to less than 4 inches.
- D. The inside diameter of boxes for valves shall be at least 4-1/2 inches, and the lengths shall be as necessary for the depths of the valves or stops with which the boxes are to be used.
- E. Covers for valves shall be close fitting and substantially dirt-tight. The top of the cover shall be flush with the top of the box rim. An arrow and the word OPEN to indicate the direction of turning to open the valve shall be cast in the top of the valve covers with "WATER" cast into lid.
- F. A 24-inch square concrete collar, 4-inches thick shall be installed around the cover in earth areas. Provide non-shrink grout between the box and collar.

2.06 COUPLING ADAPTER

- A. The pipe couplings shall be of a gasketed, sleeve-type with diameter to properly fit the pipe. Each coupling shall consist of one (1) steel middle ring, of thickness and length specified, two (2) steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets. Field joints shall be made with this type of coupling. The middle ring and followers of the coupling shall be true circular sections free from irregularities, flat spots, or surface defects. They shall be formed from mill sections with the follower-ring section of such design as to provide confinement of the gasket. After welding, they shall be tested by cold expanding a minimum of 1 percent beyond the yield point. The coupling bolts shall be of the elliptic-neck, track-head design with rolled threads. The manufacturer shall supply information as to the recommended torque to which the bolts shall be tightened. All bolt holes in the followers shall be oval for greater strength. The gaskets of the coupling shall be composed of a crude or synthetic rubber base compounded with other products to produce a material which will not deteriorate from age, from heat, or exposure to air under normal storage conditions. It shall also possess the quality of resilience and ability to resist cold flow of the material so that the joint will remain sealed and tight indefinitely when subjected to shock, vibration, pulsation and temperature or other adjustments of the pipe line. 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.
- B. Nuts and bolts shall be in accordance with AWWA C111.
- C. Couplings shall be shop primed and field painted in accordance with Division 9 (or one coat of coal tar

epoxy if not specified in Division 9).

- D. Compression couplings shall be equivalent to Style 38 manufactured by Dresser. Flanged couplings shall have flanges in accordance with AWWA C207 and be equivalent to Style 128 manufactured by Dresser.

2.07 FIBERGLASS LINE MARKER FOR BURIED VALVES

A. General:

- 1. Design: The continuous fiberglass reinforced composite line marker shall be a single piece marker capable of simple, permanent installation by one person using a manual driving tool. The marker, upon proper installation, shall resist displacement from wind and vehicle impact forces. The marker shall be of a constant flat "T" cross-sectional design with reinforcing support ribs incorporated longitudinally along each edge to provide sheeting protection and structural rigidity. The bottom end of the marker shall be pointed for ease of ground penetration.
- 2. Material: The marker shall be constructed of a durable, UV resistant, continuous glass fiber and marble reinforced, thermosetting composite material which is resistant to impact, ozone, and hydrocarbons within a service temperature range of -400 F to +1400 F.
- 3. Marking: Each marker shall be permanently marked "Water Line Below." The letters shall be a minimum of 2 inches in height. A black line shall be stamped horizontally across the front of the marker near the bottom to indicate proper burial depth as shown in the standard detail. The marker shall be a CRM-375 as manufactured by Carsonite International, or approved equivalent.

B. Physical and Mechanical Requirements:

- 1. Dimensions: The marker shall conform to the shape and overall dimensions shown in the standard detail.
- 2. Mechanical Properties: The marker shall have the minimum mechanical properties as follows:

Property	ASTM Test Method	Minimum Value
Ultimate Tensile Strength	D-638	50,000 psi
Ultimate Compressive Strength	D-638	45,000 psi
Specific Gravity	D-792	1.7
Weight % Glass Reinforcement	D-2584	50%
Barcol Hardness	D-2583	47

- 3. Color Fastness: The marker shall be pigmented throughout the entire cross-section so as to produce a uniform color which is an integral part of the material. Ultraviolet resistant materials shall be incorporated in the construction to inhibit fading or cracking of the delineator upon field exposure.

C. Reflectors:

- 1. The reflector shall be of impact resistant, pressure sensitive retro-reflective sheeting which shall be subject to approval by the Engineer. The sheeting shall be of appropriate color to meet MUTCD requirements.
- 2. Mounting: The retro-reflective sheeting shall consist of a minimum of a 3-inch wide strip placed a maximum of 2 inches from the top of the post unless otherwise specified.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Valves shall be installed as nearly as possible in the positions indicated on the Drawings consistent with conveniences of operating the handwheel or wrench. All valves shall be carefully erected and supported in their respective positions free from all distortion and strain on appurtenances during handling and installation.
- B. All material shall be carefully inspected for defects in workmanship and material, all debris and foreign

material cleaned out of valve openings and seats, all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness.

- C. Valves and other equipment which do not operate easily or are otherwise defective shall be repaired or replaced at the Contractor's expense. Valves shall not be installed with stems below the horizontal.
- D. Valves shall be provided with extension stems where required for convenience of operation. Extension stems shall be provided for valves installed underground and elsewhere so that the operating wrench does not exceed 6 feet in length.

3.02 PAINTING

- A. Valves shall be factory primed and fully coated, inside and out, with fusion bonded epoxy in accordance with the latest revision of AWWA C550 Standard.

END OF SECTION 02640

SECTION 02645

HYDRANTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor, materials, and equipment required to complete the work of installing fire hydrants with all appurtenances as shown on the Drawings and specified herein.

PART 2 - PRODUCTS

2.01 FIRE HYDRANTS

- A. Fire hydrants shall be improved AWWA compression model with 5-1/4 inch hydrant valve, two (2) 2-1/2 inch hose outlets, one (1) 4-1/2 inch pumper nozzle, national standard threads, national standard pentagon operating nut opening left. Fire hydrant shall be equipped with safety flanges designed to prevent barrel breakage when struck by a vehicle, flanged inlets and auxiliary gate valves. Fire hydrants shall be installed off mains 6-inches and larger and have 6-inch inlets. Provide Mueller Super Centurion 200 as manufactured by Mueller Company, or approved equivalent.
- B. Each fire hydrant shall be installed with an auxiliary gate valve and valve box. Valve box cover shall be marked "WATER".
- C. Inlet cover depth shall be minimum of 36 inches and the minimum dimension from ground to centerline of lowest opening shall be 18 to 24 inches. Fire hydrants shall be supported on a poured-in-place concrete thrust block and provided with a drainage pit.
- D. All fire hydrants shall be fully coated, inside and out, with fusion bonded epoxy coating in accordance with AWWA C550 Standard and color shall be as selected by the Owner.

2.02 SPARE PARTS

- A. The Owner shall be furnished with two (2) hydrant barrel wrenches, four (4) spanner wrenches and two (2) operating nut wrenches at Owner's request.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Fire hydrants shall be installed in accordance with the manufacturer's directions and as detailed on the Drawings.
- B. Fire hydrants shall be fully restrained from the barrel through the shut-off valve to the main line with an anchor tee, friction type restraint glands and poured concrete thrust blocking.
- C. Temporary out of service tags shall be placed on all newly installed fire hydrants until such time the water line is put into service.
- D. No bollards are allowed on state roads.

3.02

- A. During pressure testing of the main line, the hydrant isolation valve shall be open and pressure tested to the hydrant valve.

END OF SECTION 02645

SECTION 02675
DISINFECTION OF POTABLE WATER PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor and material necessary to disinfect and flush the newly installed or repaired potable water mains as shown on the Drawings and specified herein. Included are materials for temporary blowoff and sampling taps. Only HCWD1 and LWC personnel shall operate active hydrants and valves on their respective systems. For contracts with HCWD1, there will be no charge for water or labor.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.
- C. Section 02640 - Water Valves and Gates

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 DISINFECTION AND FLUSHING OF NEW WATER LINES

- A. Reference Standard AWWA C651.
- B. Sterilization of pipe line shall be in accordance with the American Water Works Association Specification C651-05 using granular HTH. The pipe line shall be disinfected by using a 50 mg/l chlorine solution for a contact period of 24 hours. Not before the end of the 24 hour retention period, the residual will be tested and the concentration shall be at least 25 ppm. Pipes shall be thoroughly flushed upon meeting the chlorine residual requirements.
- C. Before the main is chlorinated, it shall be filled to eliminate air pockets and flushed to remove particulates.
- D. Preliminary and final flushing velocity in the main shall not be less than 2.5 ft/sec unless waived by HCWD1. The required flow and opening size to flush pipelines at 40 psi residual pressure is provided below.

<u>Pipe Dia (in)</u>	<u>Size of Tap/Hydrant Outlet (in)</u>
4	1
6	1.5
8	2
10	2
12	2.5 (two)
16	2.5 (two)
20	4.5
24	8 or greater blow-off

- E. The environment to which the chlorinated water is to be discharged shall be inspected. All flushing of high chlorinated mains need to be dechlorinated prior to discharging.
- F. Before the pipes are placed in service, samples of the water must be taken by the Contractor and submitted to a state-certified laboratory for testing. No pipes shall be placed in service until the samples have been approved by the agency. The Contractor shall obtain prior approval lab services from HCWD1 and bear all the cost of sampling, testing and postage.
- G. Sampling locations shall be approved by HCWD1.

- H. A satisfactory report for the section(s) under test must be submitted to HCWD1 and the Engineer before authorizing domestic consumption of the water.
- I. Sterilization procedures shall be continued until approved samples have been obtained.

3.02 DISINFECTION AND FLUSHING OF CONVERTED 14" WATER MAIN

- A. Continuous feed method or slug method of chlorination per applicable sections off AWWA C651-14.

END OF SECTION 02675

SECTION 02930
RESTORATION OF LAWNS AND GRASSES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The work covered by this section shall include the establishment or restoration of all ground cover including areas to be seeded and/or sodded. This work shall include the supply of all materials, labor, superintendence and maintenance as outlined in these specifications.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 01565 - Erosion and Sediment Control

1.03 SCOPE OF THE WORK

- A. Restoration of Fields, Lawns and Grasses by seeding and/or sod placement shall be performed on all areas which are not occupied by structures, roads, curbs and gutters, sidewalks, and concrete slab walls, etc.
- B. Restoration of steep embankments adjacent to Dixie Highway (US 31) and other areas where the slope is 2H:1V or greater and as called for on the Drawings.

PART 2 - PRODUCTS

2.01 SEED

- A. The seed mixture furnished shall be in the following proportions:

Common Name	Proportion By Weight	Percent of Purity	Percent of Germination
Kentucky Bluegrass	40	90	85
Chewings Fescue	25	90	85
Italian Rye Grass	20	90	85
Red Top	10	90	85
White Clover	05	95	90

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

2.02 SOD

- A. Sod shall be bluegrass or fine fescue sod strongly rooted and free of pernicious weeds. It shall be a uniform thickness of not more than 1-2 inches and shall have not less than 2 inches of soil. All sod shall be grown on a commercial turf farm and no pasture sod shall be acceptable. The source of the sod must be approved by the Engineer before it is cut for delivery.
- B. The sod shall be delivered and installed within 48 hours of being harvested by the producer.

2.03 FERTILIZER

- A. A complete commercial fertilizer with a 1:2:2 ratio of nitrogen, phosphorus, and potassium shall be furnished. It shall be free flowing and suitable for application with approved equipment. The material shall conform to State fertilizer laws. Bagged fertilizer shall be delivered in sealed standard containers and shall bear the name, trademark, and warranty of the producer.

2.04 LIME

- A. Lime shall be agricultural grade limestone crushed so that no less than 85% will pass a No. 10 sieve.

2.05 TURF REINFORCEMENT MAT (TRM)

- A. TRM shall be green in color, polypropylene fiber, two nets. Withstand shear stress up to 10 lbs/sq ft and velocity up to 12 ft/sec. Provide Contech LANDLOK 450 or Equivalent.

PART 3 - EXECUTION

3.01 SEQUENCE OF WORK

- A. Temporary restoration (covered straw) shall be provided within 14 days of construction.
- B. All finish grading in a general area shall be complete before fertilizing and seeding or sodding begins.

3.02 SOIL PREPARATION AND SEEDING

- A. The work consists of furnishing all labor, equipment, and materials in all operations in connection with the fertilizing and seeding of all the finished graded areas not occupied by structures, roads, concrete slabs, sidewalks, walls, etc., and including grassed areas destroyed or damaged by the Contractor.
- B. The areas to be seeded shall be thoroughly tilled to a depth of at least 4 inches by discing, harrowing, or other approved methods until the condition of the soil is acceptable to the Engineer or, in the event of work on an existing utility easement, to the satisfaction of the easement holder. After harrowing or discing, the seed bed shall be dragged and/or hand raked to finish grade.
- C. The incorporation of the fertilizer and the agricultural lime may be a part of the tillage operation and shall be applied not less than 24 hours nor more than 48 hours before the seed is to be sown. Fertilizer shall be applied at a rate to provide not less than 2 pounds of nitrogen, 5 pounds of phosphorus, and 5 pounds of potash per 1,000 square feet. Agricultural limestone shall be applied at a rate of not less than 100 pounds per 1,000 square feet.
- D. Seed shall be broadcast either by hand or approved sowing equipment at the rate of ninety pounds per acre (two pounds per 1,000 square feet), uniformly distributed over the area. Broadcasting seed during high winds will not be permitted. The seed shall be drilled or raked into a depth of approximately 2 inch and the seeded areas shall be lightly raked to cover the seed and rolled. Drill seeding shall be done with approved equipment with drills not more than 3 inches apart. All ridges shall be smoothed out, and all furrows and wheel tracks shall be removed.
- E. Seed may be sown during the following periods:
 - 1. February 1 to April 15.
 - 2. August 15 to October 15.
- F. Seed may not be sown at any other time except with the written approval of Owner.
- G. After the seed has been sown, the areas so seeded shall be mulched with clean straw at the rate of one bale per 2,000 square feet (approximately 1-inch loose depth). Mulch on slopes exceeding 20% shall be held in place with binder twine staked down at approximately 18-inch centers or by other equally acceptable means.
- H. Areas seeded shall be protected until a uniform stand develops, when it will be accepted and the Contractor relieved of further responsibility for maintenance. Displaced mulch shall be replaced or any damage to the seeded area shall be repaired promptly, both in a manner to cause minimum disturbance to the existing stand of grass. If necessary to obtain a uniform stand, the Contractor shall fertilize, seed, and mulch again as needed. Scattered bare spots up to one square yard in size will be allowed up to a maximum of ten percent (10%) of any area.

3.03 SOIL PREPARATION AND SOD PLACEMENT

- A. This work consists of furnishing all labor, equipment, and materials and all operations in connection with the placement of sod on all of the finished graded areas not occupied by structures, roads, concrete slabs,

sidewalks, walls, etc., and including grassed areas destroyed or damaged by the Contractor.

- B. The areas where sod is to be placed shall be thoroughly tilled to a depth of at least 4 inches by discing, harrowing, or other approved methods until the condition of the soil is acceptable to the Engineer or, in the event of work on an existing utility easement, to the satisfaction of the easement holder . After harrowing or discing, the sod bed shall be dragged and/or hand raked to 1/2" below finish grade.
- C. The incorporation of the fertilizer and the agricultural lime may be a part of the tillage operation and shall be applied not less than 24 hours nor more than 48 hours before the sod is to be placed. Fertilizer shall be applied at a rate to provide not less than 2 1/2 pounds of nitrogen, 5 pounds of phosphorus, and 5 pounds of potash per 1,000 square feet. Agricultural limestone shall be applied at a rate of not less than 100 pounds per 1,000 square feet.
- D. Prior to the sod being placed, the area to be sodded shall be lightly watered to moisten the soil surface. The sod shall be carefully unrolled and trimmed to fit irregular areas, with the edges of the sod strips placed tightly together in such a manner as to conceal the joints between the strips. Following placement, the sod shall be lightly watered (approximately a 1/4" application) and rolled with a medium weight lawn roller to minimize any ridging at the seams.
- E. Sod may be placed whenever the sod is not dormant, and the ground is not frozen or muddy. Sod may not be placed at any other time.
- F. For a period of first two weeks following placement, the sod shall be maintained by thoroughly watering the entire area covered by the sod every second day, with a 1/2" minimum application by sprinklers or a misting hose. Lawn watering gauges shall be used to measure the application. Flooding or sheet watering will not be allowed. For the third through sixth weeks following placement, the sod shall be maintained by thoroughly watering the entire area covered by the sod twice weekly (three to four days apart), with a 1/2" minimum application by sprinklers or a misting hose. Lawn watering gauges shall be used to measure the application. Flooding or sheet watering will not be allowed.
- G. Actual rainfall event amounts received during the period of watering may be counted towards the required application totals when the amount of the rainfall exceeds 1/4" per event.
- H. In the third through sixth week following placement, the Contractor shall maintain the sodded areas by mowing to a height of not less than three inches, prior to water applications. Contractor shall not allow sod blade height to exceed five inches during this period.
- I. Following the six-week watering period, the area covered by the sod will be rolled one additional time with a medium weight lawn roller, and shall be inspected by HCWD1 for acceptance.

3.04 TRM INSTALLATION

- A. Provide two anchors per square yard and per manufacturer's recommendation.

3.05 RETORATION WARRANTY

- A. All restoration work shall carry a warranty period of 18 months upon final acceptance of work. The Contractor shall repair and address all restoration items upon notification during the warranty period at no additional cost to HCWD1.

END OF SECTION 02930

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Formwork.
- B. Reinforcing Steel.
- C. Expansion and Contraction Joints.
- D. Waterstops
- E. Concrete.

1.02 RELATED REQUIREMENTS

- A. Section 02225 – Excavating, Backfilling and Compacting for Utilities.
- B. Section 11213 – Package Water Booster Pump Station.

1.03 REFERENCES

- A. ACI 350R Environmental Engineering Concrete Structures.
- B. ACI318 - Building Code Requirements for Reinforced Concrete.
- C. ACI347 - Recommended Practice for Concrete Formwork.
- D. CRSI - Manual of Standard Practice.
- E. CRSI - Placing Reinforcing Bars.
- F. ASTM - A-615, A-120, A-185, C-31, C-39.

1.04 SUBMITTALS

- A. The Contractor shall submit the following data to the Engineer for review:
 - 1. Mix designs for all mixes proposed or required to be used, including all mixes containing admixtures.
 - 2. Certification by the manufacturer that cement meets the Specification contained herein.
 - 3. Shop drawing for reinforcing steel showing bar schedules, location, and splices.
 - 4. Reports on laboratory compression tests of cylinders taken during concrete placement.
 - 5. Manufacturer's cut sheets for all other concrete related products.

PART 2 - PART 2 - PRODUCTS

2.01 CLASSES OF CONCRETE AND USAGE

- A. Structural concrete of the various classes required shall be proportioned to produce the following 28-day compressive strengths:
 - 1. Selection of Proportions for 4,500 psi Concrete:
 - a. 4,500 psi compressive for strength at 28 days.
 - b. Type I/II cement plus air.
 - c. Maximum water/cement ratio - 0.42.
 - d. Minimum cement content - 658 lbs. (7.0 bags)/cubic yard concrete.
 - e. Nominal maximum size coarse aggregate - No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
 - f. Air content - 5% plus or minus 1% by volume.
 - g. Slump - 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture. Additional slump is allowed by use of water reducing or superplasticizing admixtures.
 - 2. Selection of Proportions for 3,500 psi Concrete:

- a. 3,500 psi compressive strength at 28 days.
 - b. Type I/II cement plus air.
 - c. Maximum water/cement ratio - 0.49.
 - d. Minimum cement content - 564 lbs. (6.0 bags)/cubic yard concrete.
 - e. Nominal maximum size coarse aggregate - No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
 - f. Air content - 5% plus or minus 1% by volume.
 - g. Slump - 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture.
- B. Concrete shall be used as follows:
- 1. 4,500 psi concrete for all concrete work except as noted below.
 - 2. 3,500 psi concrete for encasement of piping where indicated, and thrust blocking.
- C. All testing of aggregates and determination of proportions shall be or have been performed by a recognized independent testing laboratory.
- D. Cement for exposed concrete shall have a uniform color classification.
- E. Type I/II cement conforming to ASTM C-150 shall be used in all concrete.
- F. Coarse aggregate shall be crushed stone having clean, hard, uncoated particles, and shall be free from injurious amount of soft, friable, thin, elongated or laminated pieces. Coarse aggregates shall conform to all requirements of ASTM C-33.
- G. Fine aggregates shall be natural sand having clean, hard, uncoated grains, free from injurious amounts of clay, dust, organic matter or other deleterious substances, and shall conform to ASTM C-33.
- H. Water for concrete shall be clean, fresh, and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

2.02 ADMIXTURES

- A. An air entraining admixture shall be used on all concrete and shall be the neutralized vinsol resin type such as Master Builders MB-VR, Euclid Chemical Company AIR-MIX or equivalent. The admixture shall meet the requirements of ASTM C-260.
- B. Other admixtures (water reducing agents, accelerating agents, retarding agents, superplasticizing agents) shall be considered where necessary to meet the needs of construction.
- C. Admixtures shall be used in concrete design mixes in the same manner and proportions as in the field so that the effects of the admixtures are included in preliminary test submitted to the Engineer for review prior to the start of construction.

2.03 REINFORCEMENT

- A. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615. All bar reinforcement shall be deformed.
- B. Welded wire fabric shall conform to ASTM A-185 and shall be of weight and gauge as indicated on the Drawings.
- C. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall have approved high-density polyethylene tips so that the metal portion shall be at least one-quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks.

2.04 FORMS

- A. Forms shall be of suitable material, design, and construction so as to be rigid, tight enough to prevent the passage of mortar, and plane surfaces with a tolerance of 1/16-inch in 4 feet.
- B. For surfaces to be given burlap-rubbed finish, the form surface in contact with the concrete shall be made of heavy gauge metal, new plywood (used plywood which, in the opinion of the Engineer, is substantially

equal to new plywood may be used), tempered wood fiberboards with smooth surface, or similar materials. Metal forms or form linings shall have square edges so that the concrete will not have fins or fluting. Forms shall not be pieced out by use of materials different from those in the adjacent form or in such manner as will detract from the uniformity of the finished surface.

- C. For surfaces other than those to be given burlap-rubbed finish, forms shall be made of wood, metal, or other acceptable material. Wooden forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Plywood shall be reasonable good, as accepted. Metal forms shall be of an acceptable type for the work involved. Edges of forms in contact with concrete shall be flush within 1/16-inch.
- D. Form for walls, columns, or piers shall have removable panels at the bottom for cleaning, inspection, and scrubbing-in of bonding grout. Forms for thin sections (such as walls or columns) of considerable height shall be arranged with suitable openings so that the concrete can be placed in a manner that will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the fresh concrete, unless special spouts are used to place concrete, and so that construction joints can be properly keyed and treated.
- E. Forms for exposed surfaces shall be built with 3/4-inch chamfer strips attached to produce smooth, straight chamfers at all sharp edges of concrete.
- F. Form ties to be encased in concrete shall not be made of through-bolts or common wire, but shall be of a well-established type, so made and installed as to embody the following features:
 - 1. After removal of the protruding part of the tie, there shall be no metal nearer than 1 inch to the face of the concrete.
 - 2. That part of the tie which is to be removed shall be at least 1/2-inch in diameter, or if smaller, it shall be provided with a wood or metal cone 1 inch long placed against the inside of the forms. Cones shall be carefully removed from the concrete after the forms have been stripped.
 - 3. Ties which pass through walls subject to hydrostatic pressure shall be provided with acceptable water stops, such as washers, securely fastened to the ties.

2.05 OTHER MATERIALS

- A. Anchorage items shall be of standard manufacture and of type required to engage with the anchors to be installed therein under other sections of the Specifications and shall be subject to approval by the Engineer.
- B. Premolded expansion-joint filler strips shall conform to ASTM D-1752 and shall be 3/8-inch thick unless otherwise shown.
- C. Joint sealants shall conform to ANSI 116.1. The following joint sealants are acceptable:
 - 1. Colma by Sika Corporation.
 - 2. Hornflex by A. C. Horn, Inc.
 - 3. Sonolastic by Sonneborn Division of Contech, Inc.
- D. Grout
 - 1. Precision-support grout shall consist of a non-shrink, ready-to-use, precision grout material; proportioned, pre-mixed and packaged at the factory; delivered to the job site to place with only the addition of water; forming, placing and curing as stipulated by the manufacturer.
 - 2. Grouts which depend upon aluminum powders, chemicals, or other agents which produce gas for expansion are not acceptable.
 - 3. Precision-support grout shall also meet the following requirements:
 - a. Free of gas producing agents.
 - b. Free of oxidizing catalysts.
 - c. Free of inorganic accelerators, including chlorides.
- E. 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. Provide PVC waterstops as manufactured by Greenstreak Plastic Products company; Vinylex Corporation, or equivalent product.

2. Adhesive Waterstop:
 - a. Provide pre-formed 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. Provide adhesive waterstops as manufactured by Synko-Flex Products, Division of Henry Products, Inc.; or equivalent product.
 3. Hydrophilic Waterstops:
 - a. Hydrophilic waterstop may be used as an alternate to the adhesive waterstop.
 - b. Provide waterstops as manufactured by Greenstreak Plastic Products Company; Adeka, Inc.; or equivalent product.
- F. Membrane Forming Curing compound: ASTM C 309, Type I-D.
1. Provide without fugitive dye when requested by Engineer.
- G. Epoxy Bonding Agent: Provide two-component epoxy resin bonding agent as manufactured by Sika Chemical Corporation; A.C. Horn, Incorporated; or equivalent product.
- H. Adhesive Dowels:
1. Drilling equipment used and installation of adhesive dowels 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, embedment depths shall be based on a compressive strength of 2,500 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 HCWD1. Each installer shall be certified in writing by the manufacturer to be qualified to install the adhesive dowels.
 6. Provide two-component dowel installation adhesive as manufactured by Hilti Corporation, or approved equivalent product.

PART 3 - EXECUTION

3.01 FORMING

- A. Forms shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions and to the elevations indicated on the Drawings or specified, and exposed concrete will be substantially free from board or grain marks, poorly matched joints, and other irregularities or defects.
- B. Forms shall be sufficiently rigid to prevent displacement or sagging between supports, and so constructed that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.
- C. All falsework to support structural slabs, beams, girders, etc., shall be designed to safely and adequately support the concrete and forms during placement and curing. The adequacy and safety of the falsework shall be the sole responsibility of the Contractor.
- D. All forms shall be oiled with an acceptable nonstaining oil or liquid form coating before reinforcement is placed.
- E. Before form material is reused, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged places repaired, and all projecting nails withdrawn.
- F. Except as otherwise specifically authorized by the Engineer, forms shall not be removed until the concrete has aged for the following number of days-degrees* :
 1. Beams and slabs: 500 day-degrees.

2. Walls and vertical surfaces: 100 day-degrees.
 3. *Day-degree: Total number of days times average daily air temperature at surface of concrete. For example, 5 days at a daily average temperature of 60 degrees F, equals 300 day-degrees.
- G. Shores under beams and slabs shall not be removed until the concrete has attained at least 60 percent of the specified compressive strength and also sufficient strength to support safely its own weight and the construction live loads upon it.

3.02 PLACING REINFORCEMENT

- A. Reinforcement shall be bent cold to the dimensions and shapes shown on the Drawings and within tolerances specified in the CRSI Manual of Standard Practice.
- B. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond.
- C. Reinforcement shall be accurately placed in positions shown on the Drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied at all intersections except where spacing is less than one foot in both directions, then alternate intersections may be tied.
- D. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks for holding the reinforcement from contact with the forms shall be precast mortar blocks or approved metal chairs. Layers of bars will be separated by precast mortar blocks or other equally suitable devices; the use of pebbles, pieces of broken stone or brick, metal pipe and other such blocks will not be permitted. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.
- E. Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.
- F. Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the approval of the Engineer. Where splices are made, they shall be staggered insofar as possible.

3.03 TESTING AGGREGATES AND DETERMINING PROPORTIONS

- A. No concrete shall be used in the work until the materials and mix design have been accepted by the Engineer.
- B. The conformity of aggregates to the Specifications hereinbefore given shall be demonstrated and determined by tests per ASTM C-33 made with representative samples of the materials to be used on the work.
- C. The actual proportions of cement, aggregates, admixtures and water necessary to produce concrete conforming to the requirements set forth herein shall be determined by making test cylinders using representative samples of the materials to be used in the work. A set of four standard 6-inch cylinders shall be made and cured per ASTM C-31. Two shall be tested at 7 days and two at 28 days per ASTM C-39. The slump shall not be less than the greatest slump expected to be used in the work.
- D. Reports on the tests and a statement of the proportions proposed for the concrete mixture, shall be submitted in triplicate to the Engineer for review as soon as possible, but not less than five days prior to the proposed beginning of the concrete work. If the Contractor furnishes in writing, similar, reliable detailed information from an acceptable source, and of date not more than four months prior to the time when concrete will be used on this project, the above requirements for laboratory test may be modified by the Engineer. Such data shall derive from mixtures containing constituents, including the admixtures where used, of the same types and from the same sources as will be used on this project.
- E. The Engineer shall have the right to make check tests of aggregates and concrete, using the same materials, and to order changes as may be necessary to meet the specified requirements.
- F. The Contractor may request permission to add water at the job site; and when the addition of water is permitted by the Engineer, the quantity added shall be the responsibility of the Contractor and in no case

shall the total water per bag of cement exceed the ratio set forth herein.

- G. If concrete of the required characteristics is not being produced as the work progresses, the Engineer may order such changes in proportions or materials or both, as may be necessary to secure concrete of the specified quality. The Contractor shall make such changes at his own expense and no extra compensation will be allowed because of such changes.

3.04 MIXING

- A. All central-plant and rolling-stock equipment and methods shall conform to the Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready Mixed Concrete Association, as well as the ACI Standards for measuring, Mixing and Placing Concrete (ACI 614), and with the ASTM Standard Specification for Ready-Mixed Concrete, Designation C94, insofar as applicable.
- B. Ready-mixed concrete shall be transported to the site in watertight agitator or mixer trucks. The quantity of concrete to be mixed or delivered in any one batch shall not exceed the rated capacity of the mixer or agitator for the respective conditions as stated on the nameplates.
- C. Central-mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch, and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the premixed concrete is placed in the truck and shall continue without interruption until discharge. For transit-mixed concrete the major portion of the mixing water shall be added and mixing started immediately after the truck is charged.
- D. The amount of water initially added shall be recorded on the delivery slip for the Engineer's information; no additional water shall be added, either in transit or at the site, except as directed. Mixing (at mixing speed) shall be continued for at least 10 minutes followed by agitation without interruption until discharge. Concrete shall be discharged at the site within 1-1/2 hours after water was first added to the mix, and shall be mixed at least 5 minutes after all water has been added.
- E. Concrete which has become compacted or segregated during transportation to or in the site of the work shall be satisfactorily remixed just prior to being placed in the forms.
- F. Partially hardened concrete shall not be deposited in the forms. The retempering of concrete which has partially hardened (that is, the remixing of concrete with or without additional cement, aggregate, or water) will not be permitted.

3.05 COMPRESSION TESTS

- A. During the progress of the work, at least one (1) set of four (4) compression test cylinders shall be made for each 50 cubic yards of concrete or major fraction thereof, and not less than one such set for each type of concrete for each day's pouring. Cylinders made in the field shall be made and cured in accordance with the ASTM Standard Method of Making and Curing Concrete Test Specimens in the Field, Designation C31, except that wherever possible molds shall be left on the cylinders until they have reached the laboratory. Testing services to satisfy the requirements of ACI shall be paid for by the Contractor at his expense. Testing lab must be approved by the Engineer.
- B. One cylinder of each set shall be broken in accordance with ASTM C-39 at seven (7) days and the other two at twenty-eight (28) days. Two copies of these test results shall be submitted to the Engineer on the same day of the tests.
- C. On evidence of these tests, any concrete that fails to meet the specified strength requirements shall be strengthened or replaced as directed by the Engineer at the Contractor's expense.
- D. Contractor shall be responsible for furnishing all concrete testing.

3.06 METALWORK IN CONCRETE

- A. All trades shall be notified, at the proper time, to install items to be embedded in concrete.
- B. All castings, inserts, conduits, and other metalwork shall be accurately built into or encased in the concrete by the Contractor as directed, and all necessary precautions shall be taken to prevent the metalwork from being displaced or deformed.
- C. Anchor bolts shall be set by means of substantial templates.

3.07 PLACING AND COMPACTING CONCRETE

- A. At least twenty-four (24) hours before the Contractor proposes to make any placement of concrete, he shall notify the Engineer of his intention and planned procedure. Unless otherwise permitted, the work shall be so executed that a section begun on any day shall be completed during daylight of the same day.
- B. No concrete shall be placed until the subgrade has been accepted in accordance with the requirements of Section 01400, Quality Control, nor shall it be placed on frozen subgrade or in water. Placement of concrete shall not be scheduled until the forms, reinforcing, and preliminary work have been accepted. No concrete shall be placed until all materials to be built into the concrete have been set and have been accepted by the various trades and by the Engineer. All such materials shall be thoroughly clean and free from rust, scale, oil, or any other foreign matter.
- C. Forms and excavations shall be free from water and all dirt, debris, and foreign matter when concrete is placed. Except as otherwise directed, wood forms and embedded wood called for or allowed shall be thorough wetted just prior to placement of concrete.
- D. Concrete placed at air temperatures below 40 degrees shall have a minimum temperature of 50 degrees F. and a maximum of 70 degrees F. when placed.
- E. Concrete shall be transported from the mixer to the place of final deposit as rapidly as practicable and by methods which will prevent separation of ingredients and avoid rehandling.
- F. Chutes for conveying concrete shall be metal or metal-lined and of such size, design, and slope as to ensure a continuous flow of concrete without segregation. The slope of chutes shall be not flatter than 1 on 2 and all parts of a chute shall have approximately the same slope. The discharge end of the chute shall be provided with a baffle, or, if required, a spout; and the end of the chute or spout shall be kept as close as practicable to, but in no event more than 5 feet above the surface of the fresh concrete. When the operation is intermittent, the chute shall discharge into a hopper.
- G. In thin sections of considerable height (such as walls and columns), concrete shall be placed in such a manner as will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the mass of concrete being placed. To achieve this end, suitable hoppers, spouts with restricted outlets, etc., shall be used as required or permitted unless the forms are provided with suitable openings.
- H. Chutes, hoppers, spouts, etc., shall be thoroughly cleaned before and after each run and the water and debris shall not be discharge inside the form.
- I. For any one placement, concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section, and so as to maintain, until the completion of the unit, an approximately horizontal, plastic surface.
- J. No wooden spreaders shall be left in the concrete.
- K. During and immediately after being deposited, concrete shall be thoroughly compacted by means of suitable tools and methods, such as internal-type mechanical vibrators operating at not less than 5,000 rpm., or other tool spading, to produce the required density and quality of finish. Vibration shall be done only by experienced operators under close supervision and shall be carried on in such a manner and only long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents, "pumping" of air, or other objectionable results. All vibrators shall be supplemented by proper spade puddling approximately 2 to 3 inches away from forms to remove included bubbles and honeycomb. Excessive spading against the forms, causing the deposition of weak mortar at the surface, shall be avoided.
- L. The concrete shall be thoroughly rodded and tamped about embedded materials so as to secure perfect adhesion and prevent leakage. Care shall be taken to prevent the displacement of such materials during concreting.

3.08 BONDING CONCRETE AT CONSTRUCTION JOINTS

- A. In order to secure full bond at construction joints, the surface of the concrete previously placed (including vertical, inclined, and substantially horizontal areas) shall be thoroughly cleaned of foreign materials and laitance, if any, and then roughened.

- B. The previously placed concrete at the joint shall be saturated with clean water and kept thoroughly wet overnight, after which all pools shall be removed. After free or glistening water disappears, the concrete shall be given a thorough coating of neat cement mixed to a suitable consistency. The coating shall be 1/8-inch thick on vertical surfaces and 1/4-inch thick on horizontal surfaces, and shall be well scrubbed in by means of stiff bristle brushes wherever possible. New concrete shall be deposited before the neat cement dries.

3.09 CURING AND PROTECTION

- A. All concrete, particularly slabs and including finished surfaces, shall be treated immediately after concreting or cement finishing is completed, to provide continuous moist curing for at least seven days, regardless of the adjacent air temperature. Walls and vertical surfaces may be covered with continuously saturated burlap, or kept moist by other acceptable means. Horizontal surfaces, slab, etc., shall be ponded to a depth of 1/2-inch wherever practicable, or kept continuously wet by the use of lawn sprinklers, a complete covering of continuously saturated burlap, or by other acceptable means.
- B. For at least seven (7) days after having been placed, all concrete shall be so protected that the temperature at the surface will not fall below 45 degrees F.
 - 1. No manure, salt, or other chemicals shall be used for protection.
 - 2. Wherever practicable, finished slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

3.10 TRIMMING AND REPAIRS

- A. The Contractor shall use suitable forms, mixture of concrete, and workmanship so that concrete surfaces, when exposed, will require no patching.
- B. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed, recesses left by the removal of form ties shall be filled, and surface defects which do not impair structural strength shall be repaired.
- C. Defective concrete shall be cut perpendicular to the surface until sound concrete is reached, but less than 1 inch deep. The remaining concrete shall be thoroughly roughened and cleaned. Concrete around the cavity or the form-tie recess shall be thoroughly wetted and promptly painted with a 1/16-inch brush coat of neat cement mixed to the consistency of lead paint. The hole shall then be filled with mortar.
 - 1. Mortar shall be 1:1-1/2 cement and sand mix with sufficient white cement, or fine limestone screenings in lieu of sand, to produce a surface matching the adjoining work. Cement and sand shall be from the same sources as in the parent concrete.
 - 2. For filling form-tie recesses, the mortar shall be mixed slightly damp to the touch (just short of "balling"), hammered into the recess until it is dense and an excess of paste appears on the surface, and then troweled smooth. Mortar in patches shall be applied so that after partial set it can be compressed and rubbed to produce a finish flush and uniform in texture with the adjoining work. All patches shall be warm-moist cured as above specified.
- D. The use of mortar patching as above specified shall be confined to the repair of small defects in relatively green concrete. If substantial repairs are required, the defective portions shall be cut out to sound concrete and the masonry replaced by means of a cement gun, or the masonry shall be taken down and rebuilt, all as the Engineer may decide or direct.

3.11 SURFACE FINISH

- A. Fins and irregularities on formed surfaces to receive no other finish shall be smoothed.
- B. The top of concrete on which other concrete or unit masonry will later be placed shall be struck off true at the surface indicated on the Drawings or as permitted by the Engineer, as the concrete is being placed. As soon thereafter as the condition of the concrete permits and before it has hardened appreciably (normally within 2 hours after being deposited), all water, scum, laitance, and loose aggregate shall be removed from the surface by means of wire or bristle brooms in such a manner as to leave the coarse aggregate slightly exposed and the surface clean.
- C. Concrete surfaces shall be finished as follows, except as otherwise required by various sections of the Specifications or shown on the Drawings.

1. Wood-float finish shall be given to all top, substantially horizontal, exposed surfaces.
2. Burlap-rubbed finish shall be given to all interior and exterior surfaces placed against forms which will be exposed to view on completion of the work. (Finish shall be to one foot below ground and below normal liquid surface elevations).
3. All surfaces shaped without forms and over which liquids will flow shall be given a steel-trowel finish.
4. Concrete surfaces to which roof insulation or roofing are to be applied shall be finished sufficiently smooth to receive the roofing material, as obtained by steel trowel or very smooth wood-float finish.

3.12 METHOD OF FINISHING

- A. Broomed Finish: Surfaces to be given broomed finish shall first be given a steel-trowel finish. Immediately after troweling, the surface shall be lightly brushed in one direction with a hair broom to produce a nonslip surface of uniformly good appearance.
- B. Wood-float Finish:
1. Surfaces to be given a wood-float finish shall be finished by tamping with special tools to force aggregates away from the surface, and screeding with straight edges to bring the surface to the required line.
 2. As soon after the condition of concrete permits and before it has hardened appreciably, all water, film, and foreign material which may work to the surface shall be removed. Rough finishing shall be done with straight edges and derbies. Machine floating if used, shall not be started until the surface will support the float adequately without digging in and bringing excess fines to the surface. At such time, a minimum of machine and hand floating with a wood float shall be employed to bring the finish to a true and uniform surface with no coarse aggregate visible.
 3. Under no circumstances will sprinkling with water or dusting with cement be permitted during finishing of the slab.
- C. Steel Trowel Finish: Surfaces to be given a steel-trowel finish shall first be given a wood-float finish. This shall be followed by hand troweling with steel trowels to bring the surface to a uniform, smooth, hard, impervious surface free from marks and blemishes. Troweling shall not be started until all water has disappeared from the surface. Over-troweling shall be avoided. Dusting with dry cement or other mixtures or sprinkling with water will not be permitted in finishing.
- D. Burlap Rubbed Finish:
1. Immediately after the forms have been stripped and before the concrete has changed in color, all fins and other projections shall be carefully removed by use of a hammer or other suitable means, and imperfections shall be repaired as hereinbefore specified under "Trimming and Repairs". While the surface is still damp, a thin coat of cement slurry of medium consistency shall be applied by means of bristle brushes to provide a bonding coat within pits and minor blemishes in the parent concrete; the coating of large areas of the surface with this slurry shall be avoided.
 2. Before the slurry has dried or changed color, a dry (almost crumbly) grout composed of 1 volume of cement to 1-1/2 volumes of masonry sand shall be applied. The sand shall have a fineness modulus of approximately 2.25 and comply with the gradation requirements of the ASTM Standard Specifications for Aggregate for Masonry Mortar, Designation C144-76.
 3. The grout shall be uniformly applied by means of damp (neither dripping wet nor dry) pads of burlap of convenient size (approximately 6 inches square) and shall be allowed to harden for one to two hours, depending on the weather. In hot, dry weather the surface shall be kept damp by means of a fine fog spray during the hardening period.
 4. When the grout has hardened sufficiently, but before it becomes so hard as to be difficult to remove, excess grout shall be scraped from the surface of the parent concrete by the edge of a steel trowel, without removing the grout from the imperfections. Thereafter, the surface shall be allowed to dry thoroughly and then be rubbed vigorously with burlap to remove all dried grout so that no visible film remains on the surface after the rubbing. The entire cleaning operation for any area shall be so planned that sufficient time is allowed for the grout to dry and be rubbed after it has been cut with the trowel.
 5. On the day following the grouting and burlap rubbing, the concrete surface shall again be rubbed clean with a dry burlap to remove inadvertent dust. If any built-up film remains on the parent surface, it shall be removed by being rubbed with a fine abrasive stone without breaking through the

surface film of the original concrete. Such rubbing shall be light and sufficient only to remove excess material without working up a lather of mortar or changing the texture of the concrete. Following the final rubbing with burlap or abrasive stone, the surface shall be thoroughly washed with stiff bristle brushes (worked only along parallel lines) to remove extraneous materials from the surface. The surface shall then be sprayed with a fine fog spray to maintain a continually damp condition for at least three (3) days after application of the grout.

6. When the burlap-rubbed finish has been completed, the concrete surface shall be smooth, free from discolorations and stains, and of uniformly good appearance.

3.13 HOT WEATHER CONDITIONS

- A. Placing of concrete under conditions of high temperature, low humidity or wind shall be done in accordance with the American Concrete Institute "Hot Weather Conditions" (latest edition).

3.14 COLD WEATHER CONDITIONS

- A. Cold weather concreting procedures precautions shall conform with American Concrete Institute "Cold Weather Concreting" (latest edition).

END OF SECTION 03300

SECTION 11213

PACKAGED WATER BOOSTER PUMPING STATION

PART 1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK

- A. The Contractor shall furnish and install a factory built, above grade, water booster pumping station. The pump station shall be complete with all the necessary internal piping, pumps, motors, valves, control, and other necessary appurtenances installed on a fabricated steel base and enclosed in a structure as shown on the plans and specified herein. The completed booster pump station shall be one (1) piece when delivered and require only off-loading, installation on a foundation and slab, pipeline hookup and electrical service.
- B. The Contractor shall provide all labor and materials to connect the water booster pump to external piping and electrical power.

1.2 RELATED SECTIONS

- A. Section 01300 – Submittals
- B. Section 02610 – Water Pipe and Fittings
- C. Section 02640 – Water Valves and Gates
- D. Section 03300 – Cast-in place Concrete
- E. Section 16050 – Electrical Service for Booster Pumping Station

1.3 MANUFACTURERS

- A. The water booster pumping station shall be manufactured by Flo-Pak, A Business Unit of Patterson Pump Company or approved equivalent.
- B. Pre-bid approval must be obtained for other booster pump station manufacturers. The following information shall be submitted 10 working days before the bid opening:
 - 1. Demonstration and history of successful manufacture and operation of equipment of equivalent size, configuration and performance capabilities.
 - 2. A set of mechanical drawings showing all aspects of the proposed installation including equipment and piping layouts, dimensional requirements, foundation plans, etc.
 - 3. Engineering data on all proposed equipment including but not limited to pumps, valves, HVAC equipment, flow meters, etc.
 - 4. Electrical schematics showing the power and the instrumentation schematics of the proposed equipment.
 - 5. A list of five installations similar in size and type, complete with the name, address and phone number for the owner / operator responsible for the operation and maintenance of the equipment.

1.4 QUALITY ASSURANCE

- A. The equipment and materials covered by these specifications are intended to be standard equipment of proven reliability and as manufactured by reputable manufacturers having experience in the production of such equipment. The equipment furnished shall be designed, constructed and installed in accordance

with the best practices and methods and shall operate satisfactorily when installed as shown on the contract drawings and operated in accordance with the manufacturer's recommendations.

- B. The manufacturer of the selected equipment shall be regularly engaged in the manufacture, assembly, construction, start-up and maintenance of water distribution equipment of the type required for this project.
- C. The manufacturer shall have at least ten years of successful experience in providing stations of the type, design, function and quality as required for this project.
- D. The pump station manufacturer shall be required to affix an Underwriters Laboratories (UL) label attesting to it's compliance with the UL-QCZJ standard for packaged pumping systems.
- E. The station manufacturer shall provide warrant the station against defects in quality and workmanship for a period of at least one year from the date of owner acceptance, but not to exceed eighteen months from the original ship date.
- F. The station manufacturer shall have quality management and environmental policies in place and they shall be ISO 9000:2000 and ISO 140001:2004 certified.

1.5 SUBMITTALS

- A. Submittals shall be bound and in accordance with Section 01300 and this section. The Owner will retain four (4) copies.
- B. Each copy of the submittal shall contain a full size 11" x 17" mechanical drawing. The mechanical drawing shall be specific to this project and provide at least three different views. The drawing shall illustrate the National Electrical Code (NEC) clearances per Section 110-26 of the code. The submittal booklets will be complete with data sheets covering all individual components that make pump the booster pump station and the UL file number under which the manufacturer is listed.
- C. Booster pump station manufacturer's warranty.
- D. Detailed sequence of operation.
- E. Complete set of wiring schematics and drawing of control panel layout.

1.6 BOOSTER PUMPING STATION DESIGN CRITERIA

- A. The station shall have a triplex pump arrangement consisting of 2 duty pumps and 1 backup pump.
- B. Pump station design flows and TDH requirements shall be:

<i>Initial Conditions</i>	Single Pump Operation	Double Pump Operation
Total Station Design Flow	1700 gpm	2100 gpm
Maximum Suction Pressure	60 psi	60 psi
Minimum Suction Pressure	25 psi	25 psi
Pressure Boost @ Design Flow	425' TDH	530' TDH
<i>Ultimate Conditions</i>	Single Pump Operation	Double Pump Operation
Total Station Design Flow	2800 gpm	4600 gpm
Maximum Suction Pressure	60 psi	60 psi
Minimum Suction Pressure	25 psi	25 psi
Pressure Boost @ Design Flow	265' TDH	285' TDH

PART 2 - PRODUCTS

2.1 STRUCTURAL

A. Structural Support for Above Ground Water Booster Pumping Stations

1. The pump station shall be built on a structural steel base. The base shall provide adequate structural supports for the pumps, motors, piping and all other internal components of the station.
2. The structural steel base shall be designed with such rigidity that the base, when lifted, will not deflect more than one inch per 180 inches of length or width.
3. The structural steel base shall be furnished with ¼" thick floor plate covering the entire base. The floor plate shall be welded to the structural steel base. Where suction and discharge piping pass through the structural steel base, removable panels that provide access to pipe flanges and flange bolts shall be provided.

B. Pipe Supports

1. Pipe supports shall be designed and sized as follows:
 - a. 4" And small piping shall be 2" x 2" x 3/16" wall rectangular tubing;
 - b. 6" Through 12" piping shall be 3" x 3" x ¼" wall rectangular tubing;
 - c. 14" Through 24" piping shall be 4" x 4" x ¼" wall rectangular tubing;
 - d. All rectangular tubing shall have capped ends;
 - e. Pipe supports are to be fully welded at the base. Pipe shall be supported by a saddle and shall not be welded to the support.
 - f. Simple pipe stands made of pipe welded only at the flow and upholding a bracket with or without a threaded jack bolt or a U-bolt are not acceptable.
2. The structural steel base shall be provided with three floor drains within the pumping station room, located near each pump location. The floor drain piping shall be 4" diameter and be routed below the structural steel skid to the pipe trench.

2.2 ARCHITECTURAL

A. Pump Station Enclosure

1. Codes and Standards - The structure design and manufacture shall, as a minimum, conform to ASCE (American Society of Civil Engineers) current edition of "Minimum Design Loads for Buildings and Other Structures" and to the MBMA (Metal Building Manufacturers Association) "Recommended Design Practices Manual." Building shall be manufactured and built to satisfy current editions of the Kentucky Building Code (KBC), International Building Code (IBC), and the National Electrical Code (NEC). Building Manufacturer shall supply plans and calculations stamped by a Registered Professional Engineer in the State of Kentucky, and are responsible for obtaining any approvals and permits from the Kentucky Department of Housing, Buildings and Construction and Special Building Inspections, if required.
2. Loading - The building shall be designed to support the following loads:
 - a. Roof Load - 50 PSF (40# live and 10# dead)
 - b. Ceiling Dead Load - 10 PSF
 - c. Wall Load - 120 mph wind, plus wall mounted equipment.
 - d. Seismic Zone: Per UBC for site location.

3. Materials - The materials shall be new, unused, and fabricated in a workmanlike manner in a factory environment. Hot rolled steel to meet as a minimum standard ASTM –A36, and all galvanized steel to meet as a minimum standard ASTM A -653.
4. Perimeter Angle System - Building base shall have a hot rolled steel angle framework, welded, primed and painted, with minimum deflection of L/240. Base shall be pre-drilled for anchoring to a Steel Skid. Foundation to be by provided by the Contractor with building weights supplied by building manufacturer. Weld standards shall, as a minimum, meet AWS recommended practices.
5. Framework - The building shall have a complete, internal, self-supporting, structural steel frame which does not rely on the exterior panels or roof cover panels for its structural strength or framing. The building framework shall include 8 to 16 gauge, cold-formed, galvanized steel structural members. Building framework to have a flush wall, post and beam format with girts and purlins, and full trusses on both end walls which easily allows for future expansion and/or modifications. Wall and ceiling structural support system are to be designed to provide load carrying capability for anticipated equipment loads using 16 gauge galvanized steel hat channels behind liner panel for reinforcement as needed, with locations shown on approval drawings. Roof to have 8 to 14 gauge solid web hot rolled steel trusses.
6. Insulation - Exterior walls shall have a minimum of 3.5", fiberglass bat insulation and a vapor barrier. The ceiling shall have a minimum of 6" insulation and a vapor barrier. In addition to the insulation in the walls and ceiling, an additional 1" fiber-glass insulation blanket shall be installed over the entire building framework and under the exterior wall and roof panels, as a thermal break. The insulation system shall provide a minimum of R-14 in the walls, R-21 above the ceiling.
7. Roof - A roof pitched 1 inch in 12 or greater shall have a covering of overlapping, 26 gauge, "Multi-Rib" ribbed steel panels with a baked-on Kynar 500, PVDF resin-based finish over a galvalume substrate, in manufacturer's standard colors. Overlapping roof panels shall be installed with appropriate self-tapping fasteners with integral gaskets. A roof with a pitch of less than 1 inch in 12 shall have a roof covering of mechanically-seamed, 24 gauge, Standing-Seam Roofing, with a minimum seam height of 2". Standing seam roof panels shall be of Galvalume steel, with a baked-on Kynar 500, PVDF resin-based coating and shall have no visible fasteners on main run. Roof to include a matching, die-formed ridge cap, and a fully supported 3" overhang. Properly sized attic space ventilation shall be provided. Roof to be either a gable or one way slope with pitch as indicated on drawings. Heavy duty steel lift eyes to be supplied and mounted to the roof trusses as needed for lifting the building.
8. Exterior Walls - The exterior walls shall be 26 gauge "Multi-Rib" ribbed steel panels with a PVDF resin-based finish over a galvalume substrate in manufacturer's standard colors. Exterior siding panels to be overlapped and installed with appropriate self-tapping fasteners with integral gaskets, and shall be removable without any disturbance to interior panels. Butted seams are not allowed. All openings in walls are to be structurally framed, sleeved, trimmed, and provided with external drip caps. Repair or replacement of exterior panels must be able to be done entirely from outside.
9. Exterior Trim - The exterior trim package shall include stepped or boxed eave, rake, fascia, base, corner, jamb, and header trim in, 26 gauge Galvalume material with owner's choice of standard KYNAR colors.
10. Interior Finish - The building's interior walls and ceiling shall be lined with flush-fit 22 gauge, roll-formed liner panels, with concealed fasteners and a baked-on White polyester finish over G-90 galvanized substrate. The building interior shall feature a complete matching trim system including base, jamb, header, and ceiling trim. Liner to be reinforced with 14 gauge hat channels mounted vertically as needed for heavy wall mounted items.
11. Fasteners, Adhesives, and Sealants - The fasteners, adhesives, and sealants utilized shall be of types approved for use on this type of structure as required by the appropriate agency or governing body, as covered in section 2.2.A.1 of these specifications.
12. Closures - Matching, pre-molded, closed cell elastomeric closures provided by the siding and roof

panel manufacturer shall be installed according to the manufacturer's recommendations at the eave line, beneath the roof panels, and where the trim meets the wall panels.

B. Doors and Hardware

1. Doors shall at a minimum comply with Steel Door Institute directive SDI-100.
2. Doors to be constructed of no less than 18-gauge steel faced leafs with stiffeners and 16 gauge door frames. Doors and frames to be hot-dipped galvanized to ASTM designations A924 and A653, then factory primed and painted with epoxy enamel to match the building or the trim. Door to have insulated core.
3. Doors shall be provided as indicated on the drawings.
4. Door hinges shall be NRP stainless steel ball bearing hinges, minimum of three (3) per door.
5. Keyed, low profile rim device type panic interior openers, with cylinder lock entry and thumb latch exterior trim, by Von Duprin or equal shall be provided.
6. A door closer with hold open arm shall be provided.
7. A threshold, weather-stripping and sweeps shall be provided for each door as manufactured by Reese or equal.
8. A drip cap shall be provided for each door, extending 3" past door edge.
9. Gutters shall be provided of 26ga galvanized steel. They shall be mounted over eave trim on each side of the building. Both eave walls shall be provided with 1 down spout with necessary elbows.

C. Crane

1. A one ton capacity crane entirely supported by the ceiling trusses and building frame with trim matching interior liner panel shall be provided.
2. Bridge cranes requiring additional supports will be considered unacceptable.

D. Rolling Steel Door

1. A 10'-0" wide x 8'-0" high rolling steel door shall be provided as shown on the plans.
2. Door shall be insulated using foamed-in-place, CFC-free polyurethane.
3. Door shall have a finished R value not less than 7.7.

E. Enclosure Accessories – The following items shall be provided by the station manufacturer:

1. Four (4) 2 tube enclosed fluorescent lights as specified later in this section.
2. Three (3) wall mounted, interior convenience outlets as specified later in this section.
3. One (1) wall mounted, exterior convenience outlet as specified later in this section, located adjacent to the HVAC unit.
4. Two (2) exterior mounted weatherproof, HPS, lamp with photocell as specified later in this section.
5. Two (2) interior emergency lighting fixtures as specified later in this section.
6. One (1) wall mounted, HVAC unit as specified later in this section.
7. One (1) shutter mounted exhaust fan as specified later in this section
8. One (1) motorized damper as specified later in this section.

F. Pump station enclosure shall be manufactured by Trachte of Oregon, WI (608) 835-5707.

2.3 MECHANICAL

- A. For initial conditions the pumps shall be the two-stage horizontal split case centrifugal pump type. For ultimate conditions the pumps shall be horizontal split case centrifugal pump type.

1. Design Conditions (Initial Conditions)

Pump No.	Pump No. 1	Pump No. 2	Pump No. 3
Design Flow (GPM)	1700	1700	1700
Design TDH (Ft.)	425	425	425
Max Nom. Operating RPM	1785	1785	1785
Shutoff Head (Ft)	540	540	540
Pump Efficiency @ Design	82%	82%	82%
Minimum Motor HP	250	250	250
Motor Voltage	480	480	480

2. Design Conditions (Ultimate Conditions)

Pump No.	Pump No. 1	Pump No. 2	Pump No. 3
Design Flow (GPM)	2800	2800	2800
Design TDH (Ft.)	265	265	265
Max Nom. Operating RPM	1785	1785	1785
Shutoff Head (Ft)	313	313	3130
Pump Efficiency @ Design	87%	87%	87%
Minimum Motor HP	350	350	3500
Motor Voltage	480	480	480

3. Pump Casing

- a. Pump casing shall be of close grain cast iron type ASTM A48, class 40, designed for heavy-duty service. The casing shall be horizontally split; with an interconnecting passage between stages. Suction and discharge flanges cast integrally with the lower half in order that the upper part may be removed for inspection of the rotating element without disturbing pipe connections or pump alignment. Pump mounting feet are to be cast integrally into the lower half casing. The joint between halves of the casing shall be heavily flanged and bolted, and provided with dowel pins to insure accurate alignment. The upper half-casing flange shall have tapped holes for jackscrews. The interior shall be smooth and free from surface defects.
- b. Thickness, diameter and drilling dimensions of suction flanges shall be Class 125 ANSI standard. Discharge flanges shall be Class 125 ANSI standard. Pump casings shall have minimum 6" suction and a 5" discharge. Suction and discharge connections shall be located on opposite sides of the pump.

- c. Casings shall be drilled and tapped for vertical priming, gauge, and drain connections. Suitable lifting lugs or eyebolts shall be provided.
4. Impellers
- a. Impellers shall be of the single suction enclosed type made entirely of ASTM B584-836 bronze finish smooth all over and of ample strength and stiffness for maintaining the maximum capacity of the unit.
 - b. Impellers shall be statically and dynamically balanced and shall be keyed to the shaft and securely held in axial position on the shaft by means of ASTM B148-954 bronze sleeves extended through the stuffing box and an inter-stage bushing. Rotation of the shaft sleeves shall be prevented by the impeller key, which shall extend beyond the impeller hub and into the shaft sleeve on both sides of the impeller. Shaft sleeves shall be held in position by a locking shaft sleeve nut located outside of the stuffing box and shall have an O-ring seal between the sleeve and the nut to prevent entrance of air or liquid between the shaft and sleeve. Sleeves, which are threaded on to the pump shaft, are not acceptable.
 - c. Impellers shall be opposed on the shaft to balance hydraulic thrust loads.
5. Wear Rings
- a. At the running joint between the suction and discharge chambers, there shall be provided wear rings on both the casing and impeller.
 - b. The casing rings shall be of ASTM B505-927 bronze, positioned in the casing and locked against rotation by the upper half of the case.
 - c. Impeller rings shall be of ASTM B505-932 bronze, so fastened that they cannot rotate or become loose when the pump is subjected to reversed rotation. The rings shall be made to limit gauges, so that they may be renewed without fitting.
6. Pump Shaft
- a. The shaft shall be of AISI 1141 and of such dimensions that the maximum combined stress due to bending and torsion shall not exceed 8,000 pounds per square inch under the most severe conditions of operation.
 - b. The shaft shall be accurately machined over its entire length. The first critical speed of the rotating assembly shall occur at not less than 150% of the rated speed.
 - c. Threads on the pump shaft shall be located outside of the stuffing box.
7. Stuffing Boxes
- a. Each stuffing box shall be equipped with a throat bushing machined from 316 S.S. that on initial flooding of the pump, releases entrapped air from the seal chamber through an integral, self cleaning air vent in the top of the bushing. The throat bushing shall create fluid exchange inside the seal chamber to reduce frictional heat accumulation around the mechanical seal. The throat bushing shall position particulate for removal by conveying them from the bore of the stuffing box to the shaft by means of an integrally machined spiral and remove this particulate from the seal chamber.
 - b. Each stuffing box shall be equipped with a split mechanical seal. Repair or replacement of these seals shall not require disassembly of the pump. The seals shall be mechanically loaded with multiple springs which shall be isolated from the pumped product. The mechanical seal shall be of the stationary, hydraulically balanced, o-ring design to reduce heat generation, face wear and minimize horsepower consumption.
 - c. Mechanical seal springs shall not be of the coil design.
 - d. The rotary and the stationary seal faces shall be solid silicon carbide. The gland and rotary holder shall be 316 SS with Elgiloy springs and viton elastomers.

- e. The mechanical seal shall be rated for a working pressure of 400 PSIG and capable of sealing against a vacuum up to 28 inches of mercury.
 - f. All o-rings shall be of the ball and socket design and shall not require adhesives of any kind.
8. Bearings
- a. Bearings shall be of the anti-friction type grease lubricated ball.
 - b. The bearing configuration shall consist of one single row deep grooved anti-friction bearing on the inboard side and one or more anti-friction bearings mounted on the outboard side. The inboard bearing shall be designed to take the radial thrust loads. The outboard bearings shall be designed to take a combination of loads, both radial and axial; and hold the rotor in axial alignment.
 - c. Bearings shall have a minimum rated service life of 40,000 hours in accordance with the standards of the Bearings Manufacturers Association through out the specified operating range. Bearings shall be mounted in dust tight housings shall be rigidly supported by suitable brackets, which shall be cast with integrally with the lower half or the pump casing. Bearing housings or bearing housing supports, which are bolted to the side of the pump casing, are not acceptable.
9. Pump Base
- a. The pump and motor shall be mounted on a common base of fabricated ASTM A36 steel. Bent metal or formed bases are not acceptable.
 - b. The base shall be provided with an OSHA approved coupling guard.
 - c. All mounting surfaces shall have a machined finish.
10. Couplings
- a. The coupling shall be Martin Quadra-flex or approved equal with type S flanges and elastomeric sleeves of Hytrel, EPDM or similar material.
 - b. Sized to transmit the maximum required horsepower with a 1.5 service factor.
11. Motors shall be NEMA design B, open drip-proof design.
- a. Motor horsepower, RPM and voltage shall be as indicated in article 2.03.A.1.
 - b. The motor name plate horsepower shall be non-overloading throughout the entirety of the pump performance curve.
 - c. Motors shall have a 1.15 service factor on sine wave power.
 - d. Motors shall be inverter duty as defined by NEMA MG1 part 31.
- B. Pipe, Valves and Fittings
1. Piping
- a. Piping shall be ductile iron or steel and conform to material specification ASTM A-53 (CW) for nominal pipe size four (4) inches and smaller, and ASTM A-53 (ERW) Grade B for nominal pipe size five (5) inches and larger.
 - b. Steel butt-welding fittings shall conform to material specification ASTM A-234 Grade WPB and to the dimensions and tolerances of ANSI Standards B16.9 and B16.28 respectively.
 - c. Forged steel flanges shall conform to material specification ASTM A-105 Class 60 and/or ASTM A-181 for carbon steel forgings and to the dimensions and tolerances of ANSI Standards B16.5 as amended in 1992 for Class 150 and Class 300 flanges.
 - d. Certified welders employed by the pump station manufacturer shall perform all pipe welds. As part of the equipment submittal, the pump station manufacturer shall provide copies of the welding certificates of the employees who are to perform the pipe welds.
 - e. Piping of six (6) inches diameter and larger shall require a minimum of two (2) weld passes to complete each weld. The first pass, or root pass, shall be applied at the bottom of the bevel cut using the short circuit transfer-welding mode. The second pass, or cap pass, shall be applied over the root pass using the spray or pulse arc transfer welding modes to insure that at a

minimum the total weld thickness shall be equal to thinnest of the two pieces being welded together.

- f. The piping sizes shall be as shown on the drawings.
 - (1) Size 10" and below – Schedule 40
 - (2) Size 12" and above – Standard weight (.375" wall)
 - g. Piping Restraints - The main inlet and outlet piping to the station shall each be provided with two (2) or four (4) restraining points as welded on “eyes” or similar device welded to the framing to facilitate the attachment of joint restraint tie rods or other device to be used in retarding any pipe movement at the connections.
2. Flexible Couplings
- a. Flexible couplings shall have a casing made from ASTM A536, Grade 65-45-12 ductile iron.
 - b. Gaskets shall be NSF certified, Grade “E” EPDM.
 - c. Flexible couplings shall be rated for a minimum working pressure of 300 PSI or greater.
3. Elastomeric Connectors
- a. The inlet side of each booster pump shall include an elastomeric connector to help isolate vibration and noise in the piping system.
 - b. The elastomeric connector shall be of single sphere design, constructed of neoprene and nylon with bias-ply tire reinforcing cord to provide a 225 PSI working pressure rating for sizes up to and including 12” and 125 PSI working pressure rating for sizes above 12”.
 - c. The elastomeric connector shall pass through the plate steel flanges designed to grip the connector so the connector seals without gaskets when the flange bolts are drawn up.
 - d. A control joint limiting pipe connector movement shall be supplied with each pipe connector.
 - e. The booster station piping shall include a compression type, flexible coupling to prevent binding and facilitate removal of associated equipment where shown on the plans for this item. In lieu of a compression coupling, a grooved, flexible coupling may be used.
4. Valves
- a. Pump Suction Isolation Butterfly Valves
 - (1) Valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with all requirements of AWWA C504 for Class 150B.
 - (2) Valve bodies shall be ductile iron conforming to ASTM A 536, Grade 65-45-12 or ASTM A 126, Grade B cast iron. Shafts shall be ASTM A 276, Type 304 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A 536, Grade 65-45-12 or ASTM A 126, Grade B cast iron. The valve shall have a resilient seat.
 - (3) Valves shall be installed with the valve shafts horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.
 - (4) Valves shall be equipped with geared actuators designed, manufactured and tested in accordance with AWWA C504. Actuators shall be capable of holding the disc in any position between full open and full closed without any movement or fluttering of the disc. Actuators shall be furnished with fully adjustable mechanical stop-limiting devices. Actuators that utilize the sides of the actuator housing to limit disc travel are unacceptable. Valve actuators shall be capable of withstanding a minimum of 450 foot pounds of input torque in either the open or closed position without damage.
 - (5) Valves shall be hand wheel operated.
 - (6) Valve ends shall be flanged. Flange joints shall meet the requirements of ANSI B16.1, Class 125.

- (7) Valves shall be installed with disc shaft horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.
- b. Pump Discharge Isolation Butterfly Valves
1. Butterfly valves shall be manufactured for a full differential pressure of 350 psig. The valves shall be capable of operating at pressures of 350 psi. Valves shall be Henry Pratt Model HP350 as manufactured by the Henry Pratt Company.
 2. The valve body shall be constructed of Ductile Iron ASTM A536 Gr. 65-45-12, with flanged end connections drilled in accordance with ANSI B16.1, Class 250, or mechanical joint ends drilled in accordance with AWWA C111. The body wall thickness shall be in strict accordance with AWWA C504. Table #1, for gray iron 250B valves.
 3. The valve disc shall utilize an on-center shaft and symmetrical design, cast from Ductile Iron ASTM A536 Gr. 65-45-12. The disc edge shall be stainless steel type 316. Discs shall be retained by pins that extend through the full diameter of the shaft. The pin material shall be the same as the shaft material. Torque plugs or tangential fasteners shall not be allowed.
 4. The shaft shall be made of ASTM A-564 Type 630 condition H-1150. The shaft seals shall be "V" type packing. Shaft seals shall be of a design allowing replacement without removing the valve shaft. No O-ring or "U" cup packing shall be allowed. The bearing shall be a stainless steel backed teflon material. Bearing load shall not exceed 1/5 of the compressible strength of the bearing or shaft material.
 5. Manual actuators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without fluttering or creeping. The actuator shall have mechanical stops that will withstand an input torque of 450 lb./ ft. against each stop. Manual actuators shall conform to AWWA Standard C504 and shall be Pratt MDT or an approved equal.
- c. Flow Meter Isolation Gate Valve
- (1) The flow meter isolation gate valve shall comply with the latest revision of AWWA Standard C-590 covering resilient seated gate valves for all water supply service.
 - (2) The flow meter isolation gate valve shall have a cast iron body, bonnet and o-ring plate.
 - (3) The wedge shall be totally encapsulated with rubber. The sealing rubber shall be permanently bonded to the wedge to meet the requirements of ASTM D429.
 - (4) The gate valve shall be supplied with o-ring seals at all pressure retaining joints. No flat gaskets shall be allowed.
 - (5) The gate valve shall be of the non-rising stem design, opening by turning left and provided with a hand wheel with the word "open" and arrow to indicate the direction to open.
 - (6) The valve stem shall be cast bronze with integral collars in full compliance with AWWA. Valve stem shall operate with bronze stem nuts independent of wedge and of stem. Valve stem shall have two o-rings located above the thrust collar and one o-ring located below the thrust collar. Stem o-rings shall be replaceable with the valve fully opened and subjected to full pressure. The valve stem shall have two low torque thrust bearings located above and below the stem collar to reduce friction during operation.
 - (7) The waterway shall be smooth, unobstructed and free of all pockets, cavities and depressions in the seat area.
- d. Check Valves shall be the silent type as specified below.
- (1) Check valves shall be of the silent operating type that begins to close as the forward flow diminishes and is fully closed at zero velocity preventing flow reversal and resultant water hammer or shock.
 - (2) Globe style valves shall be provided in sizes 12 in (300 mm) through 48 in. (1200 mm) and have flanges in accordance with ANSI B16.1 for Class 125 or Class 250 iron flanges and

ANSI B16.5 for Class 150 or Class 300 steel flanges. Iron flanges shall be flat faced. Sizes 10 in (250 mm) and smaller shall be capable of mating directly to a wafer butterfly valve without disc interference.

- (3) Wafer style valves shall be provided in sizes 3 in (75 mm) through 10 in. (250 mm) for installation between ANSI B16.1 Class 125 or Class 250 iron flanges or ANSI B16.5 Class 150 or Class 300 steel flanges.
 - (4) Threaded style valves shall be provided in sizes 2 in and smaller.
 - (5) The valve design shall incorporate a center guided, spring loaded disc, guided at opposite ends and having a short linear stroke that generates a flow area equal to the pipe size.
 - (6) The operation of the valve shall not be affected by the position of installation. The valve shall be capable of operating in the horizontal or vertical positions with the flow up or down. Heavy duty springs for vertical flow down installations shall be provided when specified on 14 in. and larger valves.
 - (7) All component parts shall be field replaceable without the need of special tools. A replaceable guide bushing shall be provided and held in position by the spring. The spring shall be designed to withstand 100,000 cycles without failure and provide a cracking pressure of 0.5 psi and to fully open at a flow velocity of 4 ft/sec. (1.22 M/sec).
 - (8) The valve disc shall be concave to the flow direction providing for disc stabilization, maximum strength, and a minimum flow velocity to open the valve.
 - (9) The valve disc and seat shall have a seating surface finish of 32 micro-inches or better to ensure positive seating at all pressures. The leakage rate shall not exceed one-half of the allowable rate for metal seated valves allowed by AWWA Standard C508 or 0.5 oz (15 ml) per hour per inch (mm) of valve diameter.
 - (10) The valve flow way shall be contoured and unrestricted to provide full flow areas at all locations within the valve.
 - (11) The valve body shall be constructed of ASTM A126 Class B cast iron for Class 125 and Class 250 valves.
 - (12) The seat and disc shall be ASTM B584 Alloy C83600 cast bronze or ASTM B148 Alloy C95200 aluminum bronze.
 - (13) The compression spring shall be ASTM A313 Type 302 stainless steel with ground ends
 - (14) A Buna-N seal shall be provided on the seat to provide zero leakage at both high and low pressures without overloading or damaging the seal. The seal design shall provide both a metal to metal and a metal to Buna-N seal.
- e. Pressure Relief Valve
- (1) The pressure relief valve shall be a Claval model 52-03, pilot controlled, hydraulically operated, diaphragm type automatic control valve or equivalent by Watts.
 - (2) The pressure relief valve shall be isolated from the system with butterfly valves in accordance with these specifications.
 - (3) The main valve shall be furnished with a resilient, replaceable seat.
 - (4) The control pilot shall be a direct acting, adjustable, spring loaded, normally closed pilot designed to close the main valve whenever the sensed pressure is below the pilot spring setting.
 - (5) The relief valve shall function to limit the discharge header pressure to the value set into the control pilot.
 - (6) The valve shall be sized in accordance with NFPA 20, 2007 edition, table 5.25.
 - (7) Relief valves shall be globe pattern, flanged to meet ANSI Class 250, and have a maximum pressure rating of 300 PSI.

2.4 ELECTRICAL

A. Electrical Design

1. Electrical service provided to the pump station will be 480 volt, 3 phase, 60 hertz, 4-wire wye.
2. The electrical apparatus and control panel design, assembly, and installation, and the integration of component parts will be the responsibility of the manufacturer of record for this booster pumping equipment. That manufacturer shall maintain at his regular place of business a complete electrical design, assembly and test facility to assure continuity of electrical design with equipment application.

B. Conformance To Basic Electrical Standards

1. The electrical control panels including mounting and installation, shall be done in strict accordance with the requirements of UL Standard 508 and the National Electrical Code (NEC) latest revision.
2. No exceptions to the requirements of these codes and standards will be allowed; failure to meet these requirements will be cause to remove the equipment and correct the violation.

C. U.L. Listing

1. All service entrance, power distribution, control and starting equipment panels shall be constructed and installed in strict accordance with Underwriters Laboratories (UL) Standard 508 "Industrial Control Equipment." The UL label shall also include an SE "Service Entrance" rating stating that the main distribution panel is suitable for use as service entrance equipment. The panels shall be shop inspected by UL, or constructed in a UL recognized facility. All panels shall bear a serialized UL label indicating acceptance under Standard 508 and under Enclosed Industrial Control Panel or Service Equipment Panel.
2. A photocopy of the UL labels for this specific project shall be transmitted to both the project engineer and the contractor for installation within their permanent project files, prior to shipment of the equipment covered under these specifications.

D. E.T.L Listing

1. All control panels shall be E.T.L. Listed by Interek Testing Services (ITS) under Category 4 – Industrial Control Equipment. Each completed panel shall bear an E.T.L. listing label. The listing label shall include the station manufacturer's name, address, and telephone number.
2. The station manufacturer shall have quarterly inspections performed by ITS at the manufacturer's facilities to ensure that the products being listed comply with the report and procedural guide for the product.

E. Equipment Grounding

1. Each electrical equipment item in the station shall be properly grounded per Section 250 of the National Electrical Code. Items to be grounded include, but are not limited to, pump motor frames, control panel, transformer, convenience receptacles, dedicated receptacle for heater, air conditioner, dehumidifier, lights, light switch, exhaust fans and pressure switches.
2. All ground wires from installed equipment shall be in conduit and shall lead back to a ground buss located in the Main Control Panel specifically for grounding purposes and so labeled. The ground buss shall be complete with a lug large enough to accept the installing electrician's bare copper earth ground wire. The bus shall serve as a bond between the earth ground and the equipment ground wires.

F. 480 Volt Main Panel

1. Rating: Voltage and ampere ratings are shown on the Drawings. Unless otherwise indicated interrupting ratings (RMS symmetrical) are 14,000 amps for 480 volt panelboards and 10,000 amps for 240 and 208 volt panelboards.
2. Boxes: Code gauge galvanized steel; sized to accommodate devices indicated and afford wire bending space in accordance with NEC requirements.
3. Fronts: Surface or flush as indicated, door-in-door construction, finished in light grey enamel over a

rust inhibitor. Furnish flush lock for fronts less than 48-inches high and vault type handle with three point catch for fronts 48-inches and higher. Key all locks alike.

4. Bus: Copper, arranged for bolt-on circuit breakers. Furnish insulated neutral bus and ground bus with main lug bonded to the box.
5. Circuit Breakers: NEMA AB-1; molded case type, thermal-magnetic trip with internal common trip on multi-pole breakers. Provide breaker fully rated for interrupting ratings noted; series ratings are not acceptable.
6. Provide a UL service entrance label for panelboards used as service entrance equipment.

G. Power Center

1. Provide a unitized, encapsulated dry-type transformer, primary main breaker, and a secondary distribution panel with a main breaker all integrally assembled with factory interconnect wiring; UL Listed.
2. Enclosure: Suitable for indoor use,
3. Circuit Breakers
 - a. Primary main circuit breaker rated for 480VAC, coordinated with transformer interrupting rating as indicated on Drawings.
 - b. Secondary main breaker rated for 240/120VAC, coordinated with transformer, interrupting rating as indicated on Drawings.
 - c. Feeder Breakers shall be bolt-on type with an interrupting rating of 10kA1C.
4. Transformer: NEMA ST-20; transformers are two winding type. Three phase units are connected delta primary and wye secondary; insulation shall be 185 degrees C, 115 degrees C rise for ratings 30kVA and below. Provide (2) 5 percent FCBN taps for ratings 15kVA and smaller; (6) 2 % percent taps for ratings larger than 15kV A.

H. Disconnect Switches

1. Provide switches with voltage, ampere, and number of poles as indicated on the Drawings.
2. Switches are non-fused type, unless Drawings note otherwise, or the switch is used as a disconnect for an item of equipment with a maximum fuse size designated on the nameplate. In such cases, provide fusible type with appropriate fuse. If fusible switches protect conductors with an ampacity less than the rating of the switch, provide a nameplate on the inside front cover of the switch designating the maximum allowable fusing.
3. Install switches so they are rigidly supported and readily accessible. Provide mounting channel or phenolic spacers to give nominal 1/2-inch separation from concrete walls in wet or damp locations.
4. For disconnect switches serving motors with space heaters, provide lamecoid nameplate engraved "WARNING - Motor space heater energized with switch open".

I. Surge Protective Devices

1. Surge protective devices (SPD) and all components shall be designed, manufactured, tested and listed in accordance with the latest edition of ANSI/UL 1449 3rd Edition.
2. UL designation: Type 2.
3. Electrical Requirements
 - a. Maximum Continuous Operating Voltage (MCOV): Not less than 115% of the nominal system voltage.
 - b. Protection Modes: Protect all modes (L-L, L-N. etc.), of the electrical system being utilized with a minimum of seven mode protection,

- c. Nominal Discharge Current (In): 20kA.
- d. Voltage Protection Rating (VPR) shall not exceed the following:

Voltage Rating	L-N	L-G	N-G	L-L
208Y/120-240	700	700	700	1200
480Y/277	700	700	700	2000
240Δ	N/A	1500	N/A	3000
480Δ	N/A	1500	N/A	2000

- e. Surge Current Capacity: ANSI/IEEE C62.41 Category C; 240 kA per phase, 120 kA per mode.
- f. EMI/RFI noise suppression: -50db attenuation at 100 kHz tested per MIL-STD 220B.

4. SPD Design

- a. Unit shall incorporate thermally protected metal-oxide varistors (MOVs).
- b. All internal components shall be hardwired and soldered; no plug-in modules will be permitted.
- c. Provide LED status for each protected phase, a form C dry contact for remote status, and a surge event counter.
- d. SPD shall be mounted integral to the electrical distribution equipment.

J. Eighteen-Pulse, Variable Frequency Drives

1. The AC Drive shall convert the input AC mains power to an adjustable frequency and voltage as defined below and indicated on the drawings or motor control schedules.
 - a. For AC Drives rated 40–500 hp, the AC Drive manufacturer shall supply an 18 pulse design using a multiple bridge rectifier with integral reactor and phase shifting transformer. The 18 pulse configuration shall result in a multiple pulse current waveform that approximates near sinusoidal input current waveform. The power section shall be insensitive to phase rotation of the AC line.
 - b. The output power section shall change fixed DC voltage to adjustable frequency AC voltage. This section shall use insulated gate bipolar transistors (IGBT) or intelligent power modules (IPM) as required by the current rating of the motor.
2. Construction
 - a. The AC Drive shall be mounted in a Type 1 enclosure with an externally operated disconnect device.
 - b. A mechanical interlock shall prevent an operator from opening the AC Drive door when the disconnect is in the On position. Another mechanical interlock shall prevent an operator from placing the disconnect in the On position while the AC Drive door is open. It shall be possible for authorized personnel to defeat these interlocks.
 - c. Provisions shall be made for locking all disconnects in the Off position. Provisions for additional padlocking shall be made by the customer using an approved lockout/tagout device.
 - d. Provisions shall be made for accepting a padlock to lock the enclosure door.
3. Seismic Qualification
 - a. A certificate of compliance shall be provided for all wall- and floor-mounted enclosures to the seismic provisions of the IBC (International Building Code) and ASCE/SEI 7 (American Society of Civil Engineers/Structural Engineering Institute Seismic Performance Requirements).

- b. The seismic ratings shall meet the site specific requirements of the installed location as determined by the latest edition of: IBC, NFPA 5000, CBC (California Building Code), and ASCE/SEI 7.
 - c. Seismic code compliance testing shall be in accordance with ICC ES AC156 Shake-Table Test Acceptance Criteria protocol with an importance factor of at least 1.5.
 - d. All anchorage, lateral bracing, and mounting guidelines shall be specified with drive instruction documentation and/or markings.
 - e. The manufacturer shall exhibit a seismic qualification label on the equipment stating compliance to these requirements.
4. Motor Data
- a. The AC Drive shall be sized to operate the following AC motors and shall be defined to match the load schedules and the type of connections used between the motor and the load, such as a direct connection or a power transmission connection:
 - b. Motor horsepower rating(s) – 350 HP (Ultimate Pump Motor Condition)
 - c. Motor full load ampere ratings coordinated to NEC2005 Table 430-250.
 - d. Motor synchronous speed 1800, at 60 Hz.
 - e. Motor utilization voltage 460 VAC
 - f. Motor service factor 1.15
5. Application Data
- a. The AC Drive shall be sized to operate a variable torque load.
 - b. The speed range shall be from a minimum speed of 0.1 Hz to a maximum speed of 60 Hz.
6. Environmental Ratings
- a. AC Drive shall meet IEC 60664-1 and NEMA ICS-1 Annex A standards.
 - b. The AC Drive shall be designed to operate in an ambient temperature of -10 to + 40 °C (+14 to 104 °F).
 - c. The storage temperature range shall be -25 to +65 ° C (-13 to +149 °F).
 - d. The maximum relative humidity shall be 95% at 40 °C (104 °F), non-condensing with no dripping water, conforming to IEC 60068-2-3.
 - e. The AC Drive shall be rated to operate at altitudes less than or equal to 3,300 feet (1000 meters) without de-rating. For altitudes above 3,300 feet (1000 meters), the manufacturer's de-rating factors shall apply.
 - f. The AC Drive shall conform to IEC 600721-3-3-3M3 Amplitude for Operational Vibration Specifications.
7. Ratings
- a. The AC Drive shall be designed to operate from an input voltage of 460 VAC plus or minus 10%.
 - b. The AC Drive shall operate from an input voltage frequency range of 47–63 Hz.
 - c. The displacement power factor shall not be less than 0.95 lagging under any speed or load condition.
 - d. The efficiency of the AC Drive at 100% speed and load shall typically not be less than 96%. Efficiency shall vary with the power rating of the AC Drive.
 - e. The variable torque rated AC Drive overcurrent capacity shall be 110% for one minute.
 - f. The output carrier frequency of the AC Drive shall be randomly modulated depending on the Drive rating for low noise operation. No AC Drive with an operable carrier frequency above 16 kHz shall be allowed.
 - g. The output frequency shall be from 0.1–200 Hz.
 - h. The AC Drive shall develop rated motor torque at 0.5 Hz (60 Hz base) in a sensor-less flux vector

(SVC) mode using a standard induction motor without an encoder feedback signal.

8. Protection

- a. Upon power-up, the AC Drive shall automatically test for valid operation of memory, valid operation of option module, loss of analog reference input, loss of communication, dynamic brake failure, DC to DC power supply, control power, and the pre-charge circuit.
- b. The AC Drive shall be UL Listed according to UL 508C for use on distribution systems with 100,000 A available fault current. The AC Drive shall have a coordinated short circuit rating designed to UL 508C and listed on the nameplate. UL 508A industrial panels shall be rated per the specification of the customer.
- c. The AC Drive shall have protection against short circuits, protection between output phases and ground; and protection between the logic and analog outputs.
- d. The AC Drive shall have minimum AC under-voltage power loss ride-through of 200 milliseconds. The AC Drive shall have the user-defined option of frequency fold-back to allow motor torque production to continue to increase the duration of the power-loss ride-through.
- e. The AC Drive shall have a selectable ride-through function that shall allow the logic to maintain control for a minimum of one second without faulting.
- f. The AC Drive shall have an auto restart function that shall provide programmable restart attempts for a fault condition other than a ground fault, short circuit, or internal fault condition. The programmable time delay before restart attempts shall be unlimited.
- g. The AC Drive shall have a programmable deceleration mode for normal and fault conditions. The stop modes shall include freewheel stop, fast stop, and DC injection braking.
- h. Upon loss of the analog process follower reference signal, the AC Drive shall enter a tripped condition and/or operate at a user-defined speed set between software programmed low-speed and high-speed settings.
- i. The AC Drive shall have solid state I_{2t} protection that is UL Listed and meets UL 508C as a Class 10 overload protection and meets IEC 60947. The minimum adjustment range shall be from 20–150 % of the nominal output current rating of the AC Drive.
- j. A thermal switch with a user selectable pre-alarm shall provide the AC Drive with a minimum of 60 seconds delay before over-temperature fault.
- k. The heatsink shall have bonded fin, molded, or block-milled construction for maximum heat transfer.
- l. The AC Drive shall have a fold-back function that shall automatically anticipate a controller overload condition and fold back the frequency to avoid a fault condition.
- m. The output frequency of the AC Drive shall be software enabled to fold back when the motor is overloaded.
- n. There shall be three skip frequency ranges with hysteresis adjustment that can each be programmed independently, back to back, or overlapping.

9. Adjustments and Configurations

- a. The AC Drive shall self-configure to the main operating supply voltage and frequency. Operator adjustments shall not be required.
- b. Upon power up, the AC Drive shall automatically send a signal to the connected motor. The stator resistance data shall be measured at rated current. The AC Drive shall automatically optimize the operating characteristics according to the stored data.
- c. The AC Drive shall be factory preset to operate most common applications.
- d. A choice of at least two types of acceleration and deceleration ramps shall be available in the AC Drive software: linear and S curve. Other product specific curves may be available.
- e. The acceleration and deceleration ramp times shall be adjustable from 0.01 to at least 3,200 seconds.

- f. The volts per hertz ratios shall be user selectable to meet variable torque loads, normal, and high-torque machine applications.
 - g. The memory shall retain and record run status and fault type of at least the past four faults.
 - h. Slip compensation shall be adjustable from 0–150%.
 - i. The software shall have an “Energy Saving” function that shall reduce the voltage to the motor when the variable torque setting is selected. A constant volts/hertz ratio shall be maintained during acceleration. The output voltage shall then automatically adjust to meet the torque requirement of the load.
 - j. The AC Drive shall offer programmable DC injection braking that will brake the AC motor by injecting DC current and creating a stationary magnetic pole in the stator. The level of current shall be adjustable between 10% and 100% of rated current and available from 1.0 to at least 20 seconds continuously. For continuous operation after 30 seconds, the current shall be automatically reduced to 50% of the nameplate current of the motor.
 - k. Sequencing logic shall coordinate the engage and release thresholds and time delays for the sequencing of the AC Drive output, mechanical actuation, and DC injection braking in order to accomplish smooth starting and stopping of a mechanical process.
10. Graphic Display Terminal Interface
- a. The graphic display terminal shall provide 8 lines of 240 by 160 pixels (in English) to control, adjust, and configure the AC Drive. All electrical values, bar charts, configuration parameters, I/O assignments, application and activity functions, faults, local control, adjustment storage, self-test, and diagnostics shall be accessible through the terminal interface. There shall be a standard selection of six additional languages built into the operating software.
 - b. The AC Drive model number, torque type, software revision number, horsepower, output current, motor frequency, and motor voltage shall be listed on the drive identification display as viewed on the graphic display terminal.
 - c. At a minimum, the selectable outputs shall consist of speed reference, output frequency, output current, motor torque, output power, output voltage, line voltage, DC voltage, motor thermal state, drive thermal state, elapsed time, motor speed, machine speed reference, and machine speed.
 - d. The graphic display terminal shall consist of programmable function keys. The functions shall allow both operating commands and programming options to be preset by the operator. A hardware selector switch shall lock out the graphic display terminal from unauthorized personnel.
 - e. The graphic display terminal shall offer a simple to advanced user menu consisting of parameter setting, I/O map, fault history, and drive configuration. A software lock shall limit access to the main menu.
 - f. The navigation scheme shall provide the ability to scroll through menus and screens, select or activate functions, or change the value of a selected parameter.
 - g. An Escape key shall return a parameter to the existing value if an adjustment is not required and the value shall be displayed. The escape function shall also return to a previous menu display.
 - h. A Run key and a Stop key shall command a normal start and stop as programmed when the AC Drive is in keypad control mode. The Stop key must be active in all control modes.
 - i. A user interface shall be available that is a WINDOWS® based personal computer, serial communication link, or detachable graphic display terminal.
 - j. The keypad and all door-mounted controls must be Type 1 rated.
11. Control
- a. External pilot devices may be connected to a terminal strip for starting/stopping the AC Drive, speed control, and displaying operating status. All control inputs and outputs shall be software assignable.
 - b. A 2-wire or 3-wire control strategy shall be defined within the software. The 2-wire control shall

allow automatic restart of the AC Drive without operator intervention after a fault or loss of power. The 3-wire control shall require operator intervention to restart the AC Drive after a fault or loss of power.

- c. The control power for the digital inputs and outputs shall be 24Vdc.
- d. The internal power supply shall incorporate an automatic current fold-back function that protects the internal power supply if incorrectly connected or shorted. The transistor logic outputs shall be current limited to 220 mA and shall not be damaged if shorted or if excess current is pulled.
- e. All logic connections shall be furnished on pull-apart terminal strips.
- f. There shall be two software assignable analog inputs with interference filtering. The analog inputs shall be software selectable and shall consist of user-defined configurations: x y mA or x y V.
- g. There shall be at least four software assignable logic inputs that shall be selected and assigned in the software. The logic input assignments shall consist of forward, reverse, jog, plus/minus speed (2 inputs required), set-point memory, preset speeds (up to 8 inputs), auto/manual control, controlled stop, terminal or keypad control, output contactor (2 inputs required), motor switching, and fault reset.
- h. There shall be at least one software assignable analog output with interference filtering. The analog outputs can be selected and assigned in the software. The analog output assignments shall be proportional to the following motor characteristics: frequency, current, power torque, voltage, and thermal state. The output signal shall be user-defined configurations: x y mA or x y V.
- i. Two voltage-free Form C relay output contacts shall be provided. One of the contacts shall indicate AC Drive fault status. The other contact shall be user assignable.
- j. There shall be a hardware input/output extension module that also provides interlocking and sequencing capabilities. The module shall be fully isolated and housed in a finger-safe enclosure with pull-apart terminal strips. The module shall add four logic inputs, two analog inputs, two relay outputs, and one analog output. All of the inputs and outputs shall be user assignable in the software as previously defined (excludes S-Flex).
- k. The combination enclosure shall have the following optional 22mm door-mounted operators:
 - (1) Power On pilot light (red)
 - (2) Drive Run pilot light (green)
 - (3) Drive Fault pilot light (yellow)
 - (4) Hand-Off-Auto selector switch
 - (5) Manual speed potentiometer

12. Conduit

- a. All wiring within the equipment enclosure and outside of the control panel or panels shall be run in conduit or metallic wire-ways, except for the watertight flexible conduit and fittings properly used to connect pump drivers, fan motors, solenoid valves, limit switches, etc., where flexible connections are best utilized.
- b. Interior conduit shall be electrical metallic tubing (EMT) or metallic wire-ways.
- c. Service entrance conduits shall be intermediate metal conduit (IMC) and shall be sized to accept the inbound service conductors in accordance with the National Electric Code. Conduit shall be provided from the utility power source to the pump station, through an opening in the skid and shall terminate at the pump station control center. Service conduit and wiring shall be provided by the installing contractor.
- d. Conduit and metallic wire-ways shall be sized for the type, number and size of equipment conductors to be carried, in compliance with Article 358, Article 376 or Article 344 of the National Electrical Code as applicable and NEMA TC-2, Federal WC-1094A and UL-651 – Underwriter’s Laboratory Specifications.

- e. Where flexible conduit is necessary, the conduit shall be liquid-tight, flexible, metal, corrosion resistant, non-conductive, UL listed flexible conduit. Flexible conduit shall be sized for the type, number and size of equipment conductors to be carried, in compliance with Article 350 of the National Electrical Code.

13. Wiring

- a. Motor circuit wiring shall be sized for load. All branch circuit conductors which supply a single motor shall have an ampacity of not less than 125 percent of the motor full load current based upon NEC table 430.250. Wiring shall be dual rated type THHN/THWN, as set forth in Article 310 and 430 Part II of the National Electrical Code.
- b. Control and accessory wiring shall be sized for load, type MTW/AWM (Machine Tool Wire/Appliance Wiring Material) as set forth in Article 310 and 670 of the National Electrical Code, except where accessories are furnished with a manufacturer supplied UL approved rubber cord and plug.

14. Lighting

- a. Interior Lighting
 - (1) Light fixtures shall be two-tube, 32 watt per tube, electronic start, enclosed and gasketed, forty-eight (48) "minimum length fluorescent type that is UL listed for wet locations.
 - (2) A UL listed, CSA certified light switch shall be located conveniently adjacent to the personnel entrance. It shall be mounted in a weather proof enclosure.
- b. Emergency Lighting
 - (1) A 120 volt emergency lighting fixture shall be provided on the interior of the pumping station.
 - (2) Emergency light fixtures shall be UL listed for damp location use.
 - (3) Emergency light fixtures shall provide two adjustable heads that allow the operator to direct light where it will be most useful.
 - (4) Emergency light fixtures shall have a maintenance free, sealed lead calcium, 6.0 volt, battery backup with a maximum full recharge time of twenty four hours and provide one and a half hour emergency operation.
 - (5) Lamps shall be rated for 5.4 watts each.
 - (6) Emergency light fixtures shall be provided with a test switch and LED charge /AC voltage indicator.
 - (7) Emergency light fixture housings shall be made from impact resistant, injection molded thermoplastic.
- c. Exterior Lighting
 - (1) Exterior light fixtures shall be UL listed 120 volt, 70 watt, weather-proof HPS type.
 - (2) Exterior light fixtures shall be equipped with a photo cell to allow for automatic dusk till dawn operation.
 - (3) Exterior light fixture housings shall be one piece, injection molded, bronze polycarbonate.

15. Receptacles

- a. Receptacles shall be duplex, ground fault circuit interrupter type receptacles with fault indicator light.
- b. All receptacles shall be mounted in weather-proof enclosures.
- c. All receptacles shall be UL and CSA listed and conform to NEMA WD-1 and WD-6.

16. Dehumidifier

- a. Capacity of 25 pints per 24 hours.
- b. Compressor shall be rated for 1/5 horsepower, 4.1 amps, 400 watts

- c. Condensate shall be piped to nearest floor drain.
- d. 120 Volt A.C. operation by dial controlled, adjustable humidistat.
- e. U.L. listed rubber cord.

17. Electrical Room HVAC Unit

- a. HVAC unit must be a one piece, factory assembled; pre-charged, prewired and tested air conditioning unit approved and listed by Underwriters Laboratories with built in heater.
- b. The total cooling capacity of the unit shall be 30,000 BTUH and the sensible cooling capacity shall be 24,100 BTUH when handling 1000 CFM of indoor air at entering conditions of 80° F DB and 67° F WB and 95° DB outdoor ambient.
- c. The unit shall be provided with a supplemental heater designed to provide 22,000 BTUH at 460 volts. The heater shall be a nominal 6 KW, 3 phase, 460 volts. Each heater is to be equipped with an automatic reset limit switch and a one time high temperature thermal cut out for additional safety back up protection.
- d. Coils shall be of copper tube construction with mechanically bonded aluminum plate fins.
- e. The compressor shall be a welded hermetic type with internal vibration isolators and built in thermal and over current protection devices.
- f. The cabinet shall be a single, enclosed weatherproof casing constructed of 20 gauge galvanized steel. Each exterior casing panel to be bonded and finished with baked-on exterior polyester enamel paint prior to assembly.
- g. The unit shall be designed so that it pulls air from the outside when ambient temperatures are cool enough to satisfy cooling requirements without running the compressor.
- h. The HVAC unit shall be provided with a separate, exterior mounted disconnect switch mounted in a NEMA 3R enclosure adjacent to the HVAC unit.

18. Pump Room Ventilation

- a. Ventilation/exhaust shall be provided to maintain a temperature rise above ambient of no more than 10 degrees F, with a maximum space temperature of 104 degrees Fat ASHRAE 0.4% summer design conditions.
- b. Ventilation/exhaust design/sizing shall include consideration for the ambient site conditions the dimensions of the building, the building envelope heat gains, and the heat generated by the equipment within the building.
- c. Motorized dampers shall be 120 volt, 1 phase and shall be of aluminum construction. Dampers shall be spring actuated such that they close upon power failure.
- d. Exhaust fans shall be shutter mounted, 120 volt, 1 phase and shall be of aluminum construction.

2.5 INSTRUMENTATION

A. Pressure Gauges

- 1. System suction and discharge pressure gauges shall be panel mounted and located as shown on the drawings.
- 2. Pressure gauges shall be glycerin filled with a built-in pressure snubber.
- 3. Pressure gauges shall have a 4" face.
- 4. Pressure gauges shall be turret style. Case material shall be stainless steel with clear acrylic faces.
- 5. The gauge shall be bottom connected and accept a 1/4" NPT female thread. Combination pressure gauge range and scale graduations shall be in PSI and feet of water.
- 6. All gauges will be panel mounted off the pipeline and be connected to their respective sensing point via copper tubing. The gauge trim tubing shall be complete with both isolating and vent valves, and the tubing shall be so arranged as to easily vent air and facilitate gauge removal. Gauges mounted directly to the pipeline or at the sensing point will not be accepted.

B. Pressure Transmitters

1. The system manufacturer shall provide two pressure transmitters to monitor suction and discharge pressure.
2. The pressure transmitter shall have the following features:
 - a. UL listed
 - b. >10,000,000 pressure cycles minimum (cycle life)
 - c. Operating temperature of -15 to 85 degrees C
 - d. 4-20ma output
 - e. Repeat Accuracy of +/- 0.1% of the measuring range
 - f. Reverse polarity, short circuit and overload protection

C. Flow Meters

1. The booster pump station shall include one (1) Electromagnetic flow meter, size sixteen (16) inch. The Electromagnetic meter shall be flanged and shall conform to ANSI Class 150. The meter shall have a remote mount transmitter and shall have a universal electronics module compatibility.
2. The meter shall effectively transmit for minimum velocity of 0.3 fps, and shall have an isolated analog 4-20mADC into 800 ohms; with scaled pulse selectable based on anticipated flows and compatibility with associated equipment.
3. The Meter shall be an Endress Hauser, Model 50W, or approved equivalent.

2.6 SCADA/RTU CABINET

- A. SCADA, PLCs and Cabinet will be provided and installed by the Owner at the location shown on the drawings.
- B. Booster pump station manufacturer shall provide wiring and conduit from the instrumentation to the RTU Cabinet location. The Owner will make wire terminations after the cabinet is installed.

2.7 CORROSION PROTECTION

- A. All surfaces of the exposed steel structure, interior and exterior, shall be grit blasted equal to commercial base cleaning (SSPC-SP6).
- B. The protective coating shall take place immediately after surface preparation.
- C. The protective coating shall be Delft Blue Potapox FC20 consisting of two-component, high solids, and amide-cured epoxy system formulated for high build application having excellent chemical and corrosion resistant properties.
- D. The epoxy system shall be self-priming and require no intermediate coatings. The protective coating shall provide in two (2) applications a total dry mil thickness of 8.0 mils.

PART 3 DESIGN, ASSEMBLY AND TESTING

3.1 CERTIFIED FACTORY PUMP PERFORMANCE TESTING

- A. A certified performance test shall be performed on each pump utilizing its specified electric motor.
- B. All tests shall be performed in accordance with the Hydraulic Institute Test Standards for Centrifugal Pumps - 1.6 (1988).
- C. Six evenly spaced test points shall be taken and shall include conditions at shut-off (zero flow) and the operating points specified herein. Preliminary test data must be submitted to the owner seven days prior to the actual test date.

- D. The engineer and/or a representative of the owner shall be given sufficient notice of the testing dates and shall have the opportunity to witness these test.

3.2 HYDRO-STATIC TESTING

- A. When the station plumbing is completed, the pressure piping within the station (including valves, pumps, control valves, and fittings) connections make up, the entire system shall be hydro-statically tested at a pressure not less than 150% of max system design pressure.
- B. The test pressure shall be applied for a minimum of 60 minutes, during which time all joints, connections, and seams shall be checked for leaking.
- C. Any deficiencies found shall be repaired and the system shall be re-tested at no expense to the contractor.

3.3 ELECTRICAL SEQUENCE TESTING

- A. Prior to shipment, the electrical system and controls shall be tested at the manufacturer's facility to insure the specified sequence of operation is met.
- B. Copies of the test report shall be provided as a part of the systems operation and maintenance manual.

PART 4 INSTALLATION AND START-UP

4.1 INSTALLATION

- A. Unloading of the package should be done using a spreader bar to insure the lifting cables/slings do not damage piping, control panels, etc. Spreader bar to be six feet longer than the width of the enclosure.
- B. The pump system should be set on a perimeter footing or concrete slab of adequate design to suit site conditions.
- C. Level the skid using metal wedges or shims if necessary, and as required.
- D. Make system connections. If through-the-floor connections are specified, the final turn-up cut shall not be made until the system is set in place.
- E. Position the floor drain shipped loose with the skid and pipe the outlet to a drain or as indicated on the contract drawings.
- F. After making the piping connections, back fill as required.
- G. Electrical connections should be completed to the pump station control center (as required).
- H. Items shipped loose for installation by the contractor:
 - 1. Floor drain
 - 2. Gutters & downspouts

1.2 START-UP SERVICES

- A. Start-up service technician shall be a certified booster station technician by the system manufacturer or authorized service representative.
- B. The manufacturer of the pump station shall provide a start-up service technician for two – eight hour days for the purpose of start-up supervision and operator training.
- C. The manufacturer of the pump station shall provide three bound O & M manuals.
- D. The start-up service technician shall prepare a service report following start-up and distributed as follows:
 - 1. Manufacturer's File
 - 2. Engineer's File

3. Contractor's File
4. Owner's File

END OF SECTION

SECTION 11300
MASTER METER VAULT

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. This section includes the work for providing one (1) underground packaged master meter vault.

1.2 RELATED WORK

- A. Section 02150 – Shoring and Bracing
- B. Section 02200 – Earthwork
- C. Section 02225 – Excavating, Backfilling and Compacting for Utilities
- D. Section 03300 – Cast-In-Place Concrete
- E. Section 16000 – Electrical Work

1.3 SUBMITTALS

- A. Mechanical shop drawings for master meter vault (paper and digitally by ACAD).
- B. Service and Installation Instructions
 - 1. Valves
 - a. Gate Valves
 - b. Control Valves
 - c. Check Valves
 - 2. Meters
 - a. Magnetic meter
 - 3. Pipe and Fittings
 - 4. Accessories
 - a. Sump Pump
 - b. Dehumidifier
 - c. Ventilation blowers
 - d. Other
 - 5. Paint product data sheets and Color Chart

1.4 REFERENCES

- A. OSHA
 - 1. Confined Spaces
- B. American Water Works Association (AWWA)
 - 1. Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges – C115
 - 2. Rubber-gasket Joints for Ductile Iron Pressure Pipe and Fittings – C111
 - 3. Protective Fusion-bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile Iron and Gray Iron Fittings for Water Supply Service – C116
 - 4. Protective Epoxy Interior Coatings for Valves and Hydrants – C550
 - 5. Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water – C104
 - 6. Ductile Iron and Gray Iron Fittings for Water – C110
 - 7. Steel Pipe Flanges for Waterworks Service Sizes 4-inches through 144-inches – C207
 - 8. Steel Water Pipe – 6in and larger – C200
 - 9. Cold Water Meters – Magnetic Meter – C701
 - 10. Disinfecting Water Mains – C651
 - 11. Swing-Check Valves for Waterworks Services – C508
 - 12. Resilient-Seated Gate Valves for Water Supply Services – C509 and C515
- C. American Society for Testing and Materials (ASTM)
- D. Plastic Pipe Institute
- E. ANSI/NSF 61 – Drinking Water Components – Health Effects

- F. Society for Protective Coatings (SSPC)
- G. Hydraulic Institute (HI)
- H. National Electrical Code (NEC)
- I. National Fire Protection Code (NFPA)
- J. National Electrical Manufacturers Association (NEMA)
- K. American National Standards Institute (ANSI)
- L. International, Kentucky and Local Building Codes
- M. American Welding Society (AWS)

PART 2 - PRODUCTS

2.1 GENERAL PROVISIONS, MATERIALS AND EQUIPMENT

- A. Provide a factory built underground master meter vault. Equipment shall be factory installed in a welded steel chamber with a prefabricated roof scuttle and ladder for access. The internal equipment shall include three Endress-Hauser magnetic meters, piping and valves, sump pump, ventilation system, and internal wiring and panelboard. The specifications and drawings represent the minimum acceptable standard of quality for equipment, materials, and methods of construction.
- B. Deliver, store, and handle products according to manufacturer's written instructions, using means and methods that will prevent damage, deterioration, and loss, including theft. The Contractor shall bear the risk of loss and/or damage to the materials and work until the work final acceptance by the Owner.
- C. The station and equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when operated per manufacturer's recommendations. The station manufacturer shall be required to affix an UNDERWRITERS LABORATORIES (UL) LABEL attesting to the compliance of that assembled equipment under the Packaged Pumping Systems (QCZJ) UL Listing Category. This label shall be inclusive of the entire station with enclosure so as to demonstrate compliance with the National Electrical Code requirements for working clearances and wiring procedures. Equipment manufactured without this third party certification label will not be allowed.
- D. The station shall be manufactured by Engineered Fluids of Centralia, IL, USEMCO of Tomah, Wisconsin or approved equivalent.
- E. When construction is finalized, the master meter vault will be turned over to the Louisville Water Company. The primary electrical service for the meter vault will be 240 V, single phase, 3 wire installed to the meter vault by the Contractor.
- F. Provide items that comply with the Contract Documents, are undamaged, and are new at the time of installation. Provide products and equipment complete with accessories, trim, finish, and other devices and components needed for a complete installation and the intended use and effect.

2.2 STRUCTURE

- A. Steel Chamber / Shell
 - 1. Dimensions: The chamber shall be a vertical elliptical chamber with a minimum clear inside height 8 feet for the master meter vault. Drawings for this equipment illustrate centerline and clearance/maintenance dimensions about major equipment items. Dimensions less than those shown on the drawings will not be accepted.
 - 2. NEC: The equipment chamber shall be sized to provide for National Electrical Code mandated clearances and for proper clearances above, below and around equipment to provide for safe servicing, removal and reinstallation of that equipment. Likewise, the entrance manway and/or equipment hatches shall be sized to provide eventual removal and replacement of any component within the station without altering station to accomplish that task.

3. Steel: The plate steel and structural shapes employed throughout the chamber shall meet or exceed the requirements for ASTM A-36 and shall meet or exceed the following thicknesses:

<u>Chamber Component</u>	<u>Minimum Steel Thickness</u>
Side Shell	3/8"
Vertical End Walls	3/8"
Chamber Floor	3/8"
Chamber Top	3/8"

4. Structural Reinforcement:
 - a. The station manufacturer shall determine the chamber floor and top reinforcement. The design of all members shall be in accordance with the recommended practices for design as specified in the Manual of Steel Construction, published by the American Institution of Steel Construction, Inc.
 - b. The equipment chamber shall be reinforced as required to adequately support all soil loads including 12" soil cover over the top of the station and a live loading factor of 250 pounds per square foot.
 - c. At a minimum, 8" channel shall be used for the top reinforcement.
 - d. The tangent wall shall be reinforced on a maximum of 27-inch centers each way.
5. Welding:
 - a. Manufacturer shall weld the complete chamber, including entrance hatches.
 - b. Manufacturer shall construct the station shell in two major sections, consisting of the pump chamber and the prefabricated roof scuttle. Both sections shall be joined at the factory before shipment, to minimize field erection.
 - c. Manufacturer shall weld the chamber floor and top to the side shell on both the inside and the outside by using either a T-Joint weld or a lap joint weld. Welds shall be of adequate section to ensure the structural integrity of the completed unit.
 - d. All welding shall be in accordance with standard AWS practices, with proper fillet section and continuity to assure a sound, watertight structure. Where possible, all joints shall be welded inside and outside the chamber.
 - e. All welds shall be continuous and watertight.
 - f. All welds shall be sound and free from embedded scale or slag.
 - g. All welds shall have tensile strength across the weld not less than that of the thinner of the connected sections.
 - h. Butt welds shall be used for all welded joints in line pipe assemblies.
 - i. Fillet welds shall be used for flange attachments in accordance with AWWA C207.
 - j. All welds shall be ground to remove all weld scale, heat tint, slag, pinnacles, and sharp edges.
 - k. All pinholes shall be filled.
 - l. All square edges shall be beveled to a minimum of 1/32" radius.

B. Attachments to Chamber Shell

1. Sump - The master meter vault capsule shall contain one sump located in the chamber floor to ensure proper and complete drainage of the floor. Sump shall be fabricated from 1/4-inch steel plate and shall be a minimum of eighteen (18) inches in diameter by eight (8) inches deep.
2. Entrance - The chamber entrance shall be a prefabricated metal roof scuttle.
3. Hoisting Points – Minimum of four (4) steel lifting plates of 3/8" minimum thickness shall be welded and located about the perimeter of each capsule to facilitate the lifting and handling of the station.
4. Mounting Anchors – Provide mounting anchors as described in Section 02310, subsection 3.7.A.2.
5. Chamber Penetrations:
 - a. Where steel pipes pass through the chamber walls, a continuous watertight weld shall be made on both sides of the wall.

- b. All non-weld piping required to pass through the chamber wall shall be housed in a 1/4-inch thick steel wall sleeve
 - c. Link seal type penetrations are not allowed.
 - d. Where feasible, all penetrations for conduits and sump discharge shall be through the chamber roof. Location of sidewall penetrations for these items shall be approved in advance by the Engineer.
- C. Floor Mat
- 1. A dielectric rubber floor mat shall be placed on the floor of each chamber, in all normal walk areas, to protect the floor from abrasion.
 - 2. The safety mat shall not be glued to the floor surface.
- D. Ladder
- 1. The ladder shall meet the requirements of OSHA for Type I Heavy-Duty service, and ANSI A14.2.
 - 2. Ladder shall be installed per OSHA 1910 requirements for fixed ladders. The pitch of the fixed ladder shall be in the range of 75 to 85 degrees with the horizontal.
 - 3. The ladder shall be aluminum.
 - 4. Side rails shall be 3" extruded I-Beams, the rungs shall be 1 1/4" diameter serrated aluminum tubing, double crimped to the side rails.
 - 5. Plastic caps bolted into place shall protect the uppermost ends of the side rails.
 - 6. The complete access ladder will be bolted into place, at a minimum of two (2) points on both top and bottom, so as to be easily removable to facilitate equipment maintenance.
 - 7. Install on the ladder below the roof scuttle a Bilco Model LU-4 Ladder-UP safety post. The Ladder-UP safety post shall be manufactured of aluminum with telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions.
- E. Entrance Hatch
- 1. Entrance cover shall be 11-gauge aluminum with a 3" beaded flange.
 - 2. Insulation shall be glass fiber 1" thick, fully covered and protected by a metal liner of 18-gauge aluminum.
 - 3. The curb shall be 12" in height and of 18-gauge aluminum. It shall be formed with a 3 1/2" flange with holes for bolting to the framing on the equipment chamber top. Curb shall be equipped with an integral metal flashing of the same gauge and material as the curb, full welded at the corners for weathertightness.
 - 4. For the master meter vault station, the roof scuttle shall be Bilco Model NB-50 roof scuttle, with a minimum clear inside opening of 54" x 30". The scuttle shall be completely assembled with heavy pintle hinges, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles and padlock hasps, weatherproof padlock with two keys, and an automatic hold open arm with vinyl grip release. All hardware shall be zinc plated and chromate sealed.

2.3 COATINGS AND CORROSION PROTECTION

- A. Coatings
- 1. The manufacturer shall provide one (1) week notification to the Engineer prior to application of protective coating to provide the Owner the opportunity for weld inspection.
 - 2. Visually inspect all welds and plates for acceptance prior to coating applications as indicated above in subsection 2.3.A.5 - Welding. Repair all deficiencies and irregularities.
 - 3. After all welding has been completed, all interior and exterior surfaces of the structure shall be factory blasted to remove all rust, mill scale and weld slag. All weld spatter and surface roughness shall be removed by grinding. Surface preparation will comply with SSPC-SP10 specifications. The blast profile on the steel should be 1.5 to 2.5 mils in depth and be of a sharp, jagged nature. Surfaces must be free of grit dust.

4. Following the cleaning, all weld areas shall be coated by hand brushing using Devoe High Performance Coatings Bar-Rust 235 multi-purpose epoxy coating or approved equivalent.
5. Immediately after cleaning the interior surface of the structure, the unburied portions of the chamber and exterior surface of the piping shall receive a 4-8-mil minimum dry film thickness or 5.9 to 11.7 mils wet coat of Devoe High Performance Coatings Bar-Rust 235 multi-purpose epoxy coating or approved equivalent. The high solids coating shall be an advanced technology epoxy and have exceptional corrosion protection. The coating shall be suitable for salt and fresh water immersion. Solids by volume shall be 68% +/- 2%.
6. Following blasting, the exterior portions of the chamber which are buried, shall receive a 12 mil coating of a one coat, high build polyamide cured Sher-Tar epoxy enamel containing 24% pigment by weight / 76% vehicle by weight or approved equivalent.
7. A touch-up kit containing epoxy coatings, as specified above, shall be provided for the coating of all field welds and for repair of any scratches or abrasions that have occurred during shipment or installation.

B. Cathodic Protection - Passive

1. A minimum of six (6) anode packs shall be provided for the master meter vault.
2. Each magnesium bag shall have 20-foot long dual lead wires of #12 stranded or solid copper HMWPE for watertight seal.
3. The anode conduit shall be sealed watertight.
4. Anode leads shall be run through strain relief couplings and gland seals, provided through the chamber wall, then down into the anode test boxes located in the chambers.
5. Supply and install NEMA 4X non-metallic enclosure anode test boxes for each lead.
6. Supply and install a 0-30 milliamp gauge and a selector switch to monitor the performance of each anode. The master meter vault shall be supplied with two anode test panels.

2.4 PIPING IN STATION

A. Pipe and Fittings

1. Pipe Standards
 - a. Piping shall be steel and conform to material specification ASTM A-53(CW) for nominal pipe size four (4) inches and smaller and ASTM A-53(ERW) Grade B for nominal pipe size five (5) inches and larger.
 - b. Steel butt-welding fittings shall conform to material specification ASTM A-234 Grade WPB and to the dimensions and tolerances of ANSI Standards B16.9 and B16.28 respectively.
 - c. Forged steel flanges shall conform to material specification ASTM A-105 Class 60 and/or ASTM A-181 for carbon steel forgings and to the dimensions and tolerances of ANSI Standards B16.5 as amended in 1992 for Class 150 and Class 300 flanges.
2. Pipe Sizes
 - a. Pipe sizes shall be as shown on the drawing.
 - b. Size 10 inch and below - Schedule 40.
 - c. Size 12 inch and above - Standard weight (.375" wall).
3. Pipe Welds
 - a. All pipe welds shall be performed by certified welders employed by the pump station manufacturer. As part of the equipment submittal, the pump station manufacturer shall provide copies of the welding certificates of the employees who are to perform the pipe welds.
 - b. All piping surfaces shall be prepared by sandblasting, or other abrasive blasting, prior to any welding taking place.
 - c. Piping of 5" diameter and smaller may be cut by saw. Piping of 6" diameter and larger shall be bevel cut. Oxyfuel or Plasma-arc cutting
 - d. techniques shall be used to assure and facilitate bevel pipe cuts. No saw cuts or other form of abrasive cut-offs are allowed on 6" and larger diameter pipe.

- e. In all cases, short circuit transfer, spray transfer or pulse-arc transfer modes of the gas metal arc welding process shall be applied semi-automatically. When utilizing the short circuit mode, shielding gas consisting of 50% carbon dioxide and 50% argon gas shall be used. When utilizing the spray or pulse-arc transfer modes, a shielding gas consisting of 5% carbon dioxide and 95% argon shall be used. In all cases, welding wire with a minimum tensile strength of 70,000 psi shall be employed. All flange welds and butt welds of equal size pipe shall be a single continuous nonstop weld around the complete circumference of the pipe. Whenever possible, vertical up weld passes shall be applied to all pipe welds. No vertical down weld passes will be allowed.
 - f. Completed welding assemblies shall create no internal obstruction, restriction or create any unintended sources of water deflection.
 - g. Piping of six (6) inch diameter and larger shall have a minimum of two (2) weld passes to complete each weld. The first pass, or root pass, shall be applied at the bottom of the bevel cut using the short circuit transfer welding mode. The second pass, or cap pass, shall be applied over the root pass using the spray or pulse arc transfer welding modes to ensure that at a minimum the total weld thickness shall be equal to thinnest of the two pieces being welded together.
 - h. Piping with fusion bonded internal pipe coatings shall include a chamber penetration sleeve. The sleeve shall be manufactured using the next size larger piping with fabricated weld cap ends. The sleeve shall be slipped on the pipes and be attached to the pipes by end seam welds prior to the epoxy coating. The sleeve shall prevent destruction of the pipe coating during welding of the sleeve to the chamber weld. The sleeve shall be shown in the submittal drawings.
 - i. Suction and discharge piping and bypass piping shall be fabricated utilizing tees and/or reducing tees to maintain smooth water flows and to minimize hydraulic losses. Manufactured piping where as the piping is cut and welded to form the tee connection is not acceptable.
4. Pipe Supports - Pipe supports by minimum sizing shall be as follows:
- 4" and smaller piping shall be 2" x 2" x 3/16" wall rectangular tubing;
 - 6" through 12" piping shall be 3" x 3" x 1/4" wall rectangular tubing;
 - 14" through 24" piping shall be 4" x 4" x 1/4" wall rectangular tubing and, also;
 - 6" and larger piping shall be provided with "kick" bracing projecting fully from the underside of the pipe to the floor at an angle of no less than 15° from vertical out at a right angle to the run of the pipe being supported. These "kick" braces shall be in addition to the vertical pipe supports called out above.

Pipe supports are to be fully welded at both end points to the pipe and steel floor where required.

Simple pipe stands made of pipe or angle iron welded only at the floor and upholding a yoke U-bolt or bracket with or without a threaded jack bolt are not acceptable, as no lateral or transverse support is provided.

5. Steel Transmission Fusion Bonded Internal Pipe Coating
- a. Steel transmission piping shall have applied to it a Fusion Bonded Epoxy Coating on the interior pipe surface that conforms to AWWA C-213-91 for steel water pipelines. The powder coating product shall be National Sanitation Foundation (NSF) Standard 61 certified material. The final product shall be capable of meeting Salt Spray Resistance ASTM B117 (1000 hour) with no blistering, undercutting or rust bleed; Humidity Resistance ASTM D2247 (1000 hour) with no blistering, undercutting or rust bleed; and Impact Resistance of ASTM G14-72 (160 in. lbs.). Cleaning, surface preparation, application, curing, and final dry film thickness shall be per manufacturer recommendations.

- b. Prior to shipment of the station, the station manufacturer shall provide in writing to the Engineer certification that the proper fusion bonded epoxy coating has been applied to all internal surfaces of the steel piping using the proper method. Said certification shall show under the station manufacturer's letterhead:
 - Date of application;
 - Material manufacturer and product designation including a product data sheet for the coating;
 - Applier of the fusion bonded coating, name, and address and phone number;
 - Notarized signature of an officer of the station manufacturing company stating the fusion bonded epoxy coating was applied in accordance with AWWA Standard C213-91 or the latest revision.
6. Service Connections on Internal Piping
 - a. All plumbed devices within the station eventually requiring service, such as meters, control valves, pumps and like equipment, shall be easily removed from the piping by the presence of appropriately placed and sufficient quantity of adapters and couplings as shown on the drawings; no less than the quantity of couplings and adapters shown shall be allowed.
 7. Exterior Pipe Ends
 - a. The main inlet and outlet piping shall be plain end steel.
 8. Compression Couplings
 - a. The station piping shall include compression type, flexible couplings or flanged coupling adapters to prevent binding and facilitate removal of associated equipment where shown on the plans. Flexible couplings shall consist of two steel follower rings, two resilient gaskets, one steel middle ring, and a set of steel follower trackhead bolts. All compression couplings or flanged coupling adapters (FCA), and flexible connectors/expansion joints shall include a minimum of two (2) control joint rods with gusset plates to provide positive restraint across the coupling.
 9. Pipe Connections
 - a. A single, right angle outlet, smooth nose, brass hose bibb shall be located on the suction piping of the station.
 - b. A vent connection with ¾" ball valve shall be installed at the high point of the station piping.
 - c. Isolation Kit – The vault shall be cathodically isolated from the water main at a point outside of the station by a full-face, neoprene gasket dielectric isolation kit, including bolts. This system shall also be outside of any restraining all-thread rodding. The isolation kits shall be provided by the installation Contractor.

2.5 ENVIRONMENTAL EQUIPMENT

A. Ventilation

1. Piping - Fresh air shall enter and exit each chamber from above the ground through a screened vent mounted on 6" steel pipe. The intake pipe shall extend down to 18" from the floor. Air shall be exhausted above grade, via a blower system. Intake and exhaust piping must be rigid and permanently fixed. The screen vents shall be rust proof vinyl coated with bronze screen and heavy 14 gauge top hats. Each screen vent shall be "The Green Vent" as manufactured by Ohio Electric Control Company or approved equivalent.
2. Blower - The ventilation system shall work to exhaust air from the chamber and draw air into the chamber. The ventilator shall be direct driven by a shaded pole, 1 phase, 60-hertz, 115-volt motor. The blowers shall be supplied with power supply cord to facilitate maintenance. Each ventilator shall be a high efficiency type blower with a capacity of 458 cubic feet per minute at 0.0 inches static pressure. The master meter vault shall have two (2) blowers installed in tandem to provide approximately 30 air changes per hour.

B. Sump Pump and Discharge Piping

1. Pump – A submersible sump pump shall be installed in the chamber sump pit. Sump pump shall have a heavy duty, oil filled, close-coupled motor, in cast iron housing and shall operate on 1 phase, 60 hertz, 115 volt power. The minimum capacity of the sump pump shall be 18 gallons per minute at 18' total dynamic head. A mercury float switch, capable of operation in the depth of the sump pit, shall control the sump pump. Each sump pump shall have a minimum 1-1/4 inch black iron discharge.
 2. Piping - The sump pump discharge piping shall be 1 1/4" black iron pipe and include one check valve, one union for disassembly, and 1/4" drain back tubing from just inside the chamber discharge coupling to the sump. The discharge piping shall terminate out of the roof of the station, next to the exhaust vents, through a 180 degree return bend with a removable stainless steel insect screen
- C. Dehumidifier
1. A dehumidifier shall control humidity in the meter vault.
 2. The dehumidifier shall have a minimum rating of 50 pints per day at 80 degrees Fahrenheit and 60% relative humidity.
 3. Condensate shall be piped to the sump, using minimum 1/2" polyethylene tubing, and the tubing shall not be routed above electrical equipment.
 4. Dehumidifier shall be mounted at a height so that the controls are visible and adjustable without the use of a ladder.
- D. Receptacles
1. One (1) duplex, ground fault circuit interrupter type receptacle with fault indicator light shall be furnished as near as possible to the PLC cabinet location.
 2. One (1) additional receptacle, three-wire grounded type, shall be installed and dedicated solely to sump pump/dehumidifier service only.
 3. Two (2) receptacles, three-wire grounded type, shall be installed and dedicated solely to ventilation blowers.
 4. All receptacles shall be mounted in weatherproof enclosures.
 5. All receptacles shall be UL listed.
- E. Lighting
1. Three (2) tube, 32 watt per tube, electronic start, enclosed and gasketed, forty-eight (48) inch minimum length fluorescent light fixtures shall be installed within the equipment capsule. Fixtures shall be UL listed for wet locations.
 2. The light switch shall be UL listed of the night glow type and be located within the hatch periphery. It shall be mounted in a weatherproof enclosure.
 3. The light switch shall be wired to operate the ventilation equipment whenever the equipment capsule lights are on.
 4. Open fluorescent or incandescent fixtures will not be accepted.
- F. Panelboard
1. Rating: Voltage and ampere ratings are shown on the Drawings. Unless otherwise indicated interrupting rating (RMS symmetrical) is 10,000 amps for 240 volt panelboards.
 2. Boxes: Code gauge galvanized steel; sized to accommodate devices indicated and afford wire bending space in accordance with NEC requirements.
 3. Fronts: Surface or flush as indicated, door-in-door construction, finished in light grey enamel over a rust inhibitor. Furnish flush lock for fronts less than 48-inches high and vault type handle with three point catch for fronts 48-inches and higher.
 4. Bus: Copper, arranged for bolt-on circuit breakers. Furnish insulated neutral bus and ground bus with main lug bonded to the box.
 5. Circuit Breakers: molded case type, thermal-magnetic trip with internal common trip on multi-pole breakers. Provide breaker fully rated for interrupting ratings noted.
 6. Provide a UL service entrance label for panelboards used as service entrance equipment.

2.6 MECHANICAL EQUIPMENT

- A. Ball valve curb stops
 1. Brass in contact with potable water shall conform to AWWA Standard C800 (UNS No C89833).
 2. 300 psi working pressure.
 3. Shall be non-directional and watertight with flow in either direction.
 4. Ends shall be integral to body or secured with adhesive to prevent unintentional disassembly.
 5. Hole for attaching curb box rod or handle shall be provided in the tee-head.
 6. UL Classified to ANSI/NSF Standard 61.
 7. Valves shall be Ford Meter Box Style B11-xxx-NL or Mueller 300 Ball Curb valve.
- B. Water Meter And Transmitter
 1. The master meter vault station shall include three 4" magnetic type meters. Each meter shall be a Endress & Hauser Magnetic Meter Proline ProMag Model 50W with ground ring and sized as shown on the plans.
 2. The meter shall be flanged and shall conform to ANSI Class 125. The meter shall comply with the applicable provisions of AWWA Standard C704. Maximum operating pressure shall be 150 psi.
 3. Meter shall be placed such that adequate upstream and downstream pipe diameters are maintained in accordance with meter manufacturer's recommendations to guarantee accuracy.
 4. The flow meter transmitter shall be mounted between the meter maincase and the register. The transmitter shall be an Endress Hauser Pressure Transmitter (without cable assembly).
 5. Instrumentation wire and conduit shall be provided for the electronic flow meter transmitter to the PLC cabinet location at a later date by LWC.
- C. Check Valves
 1. Sizes and location as shown on plans.
 2. Rated for a working pressure of minimum 200 psi minimum.
 3. Wafer style, silent check shall be center guided, spring loaded, non-slam type.
 4. The plug, with integral shaft, shall be fully guided in bronze bearings at both ends and shall be retained at both its fully opened and closed positions by a minimum length of one shaft diameter.
 5. Check valves shall be a ValMatic 1400A Series or Metraflex 700 wafer style silent check valve.
- D. Gate Valves
 1. Size and location as shown on Drawings.
 2. The valve shall meet or exceed AWWA Standard C-509 or C-515.
 3. Each gate valve shall be cast iron body, bronze mounted, resilient seat, NRS (non-rising stem).
 4. The valve shall be flanged pattern with flange and drilling complying with ANSI B16.1, Class 125.
 5. The valve will be complete with handwheel operator and shall be constructed so as to open left (counter-clockwise).
 6. The valve shall be rated for a minimum water working pressure of 150 psi.
 7. The valve shall be a resilient wedge gate valve as manufactured by Clow, American Flow Serve, Kennedy or approved equivalent.

2.7 ACCESSORIES FOR MASTER METER VAULT

- A. PLC cabinet will be furnished and installed by LWC.
- B. Pressure Instrumentation will be furnished and installed by LWC.
- C. Pressure Gauges
 - 1. Two pressure gauges, one for suction pressure and one for discharge pressure, shall be mounted on the piping in the master meter vault. The gauges shall be 4 ½" in diameter, with dual scale ranges in psi/ ft of H2O. Rated accuracy will be +/- ½ % of full scale. The gauges shall be suitable for applications with vibration and pulsation or shall be furnished with a pulsation dampener. Standard features shall include fiberglass reinforced polypropylene case, clear acrylic plastic window with fiberglass reinforced polypropylene threaded ring, stainless steel movement, phosphor bronze bourdon tube, silver brazed to socket and tip. Connection shall be bottom only with brass 1/4" NPT. Gauges shall be Ashcroft Duragauge with glycerin fill and a pulsation dampener, Ashcroft Duragauge Plus Performance (XLL option) or approved equivalent.
 - 2. Instrumentation wire and conduit shall be provided for the pressure transmitter to the PLC cabinet location at a later date by LWC.
 - 3. Combination pressure gauge range and scale graduations shall be 0 to 100 psi (0 to 230 feet), 5 psi or smaller figure intervals, with graduating marks every 1 psi.in psi and feet of water.

PART 3 - EXECUTION

3.1 FACTORY TESTING

- A. Prior to assembly, all station components shall be inspected for quality and tested for proper function and freedom from defects.
- B. The master meter vault shall be air tested at the manufacturer's factory for leaks in the piping system. Tests of the electrical system shall also be made to insure correct operation of all electrical equipment.

3.2 INSTALLATION AND SERVICE INSTRUCTIONS

- A. The station manufacturer shall provide the following:
 - 1. Installation Instructions - Installation of the master meter vault station shall be in accordance with the written instructions furnished by the manufacturer.
 - 2. Service Instructions / O&M Manuals - The manufacturer shall furnish four complete and detailed Operating Instructions, Service and Repair Sheets in bound manuals for each station. Each manual shall cover the initial start-up, operating procedures, maintenance and servicing procedures on the major component parts provided in the pump station. One manual shall be shipped in the station, the rest shall be sent directly to the Engineer.
 - 3. Provide an overall commissioning, equipment testing and facility startup plan that provides the structure, schedule and coordination planning for the testing and startup process of the following systems:
 - Ventilation components and equipment
 - Pumps, piping, valves, meters and appurtenances
 - Lighting and Electrical Systems
 - Corrosion Protection System

3.3 FACILITY PERFORMANCE AND START-UP

- A. Field Facility Performance Demonstration: The manufacturer shall provide the services of a factory-trained representative for a minimum period of one day to assist the contractor and

owner with the initial start-up of the master meter vault. It shall be the responsibility of the contractor to inform all parties of this initial start-up, and to insure their attendance.

- B. The manufacturer’s representative shall instruct all personnel attending the start-up in the correct and required operation, maintenance and service procedures for the master meter vault.
- C. Equipment and System Checklist
- D. The following equipment shall be commissioned in this project:

System	Equipment	Check
Master Meter Vault	Valves	
	Exhaust / Ventilation Fans	
	Endress-Hauser Magnetic Flow Meters	
	Gauges (Pressure, etc)	
	Electrical System – Lights, Switches, etc	
	Cathodic Protection Panel	
	Sump Pump	
	Safety Equipment, Ladder and Hatches	

- E. Report - The technician shall prepare a start-up service report. The service report shall include the following information as a minimum:
 1. Project Name
 2. Date and Time of Test
 3. Equipment or Item Tested
 4. Type of Test Performed (Functional or Performance)
 5. Test Method
 6. Test Conditions
 7. Test Results
 8. Field Adjustments Made

This report shall be distributed within one (1) week to the Manufacturer, Distributor, Contractor(s), and Owner.

3.4 WARRANTY

- A. The warranty is the responsibility of the station manufacturer and that warranty shall be provided in written form to the Engineer for inclusion with the submittal. The manufacturer shall guarantee the master meter vault to be free from defects in materials and workmanship for a period of one year from the date of start-up or for a period of eighteen (18) months from the date of shipment, whichever occurs first.
- B. All consumable parts shall be considered part of routine maintenance and shall not be covered under the terms of the manufacturer’s warranty. The warranty shall cover all other equipment, components, and systems provided in or with the station. The warranty shall provide for replacement and/or repair of faulty or defective components at no cost to the owner during the warranty period. Where deemed necessary, the manufacturer will be responsible for the labor of removal and reinstalling the defective or faulty components without cost to the owner.
- C. The Contractor is hereby notified that responsibility for the complete and satisfactory operation or function of all equipment and material is definitely a part of this contract, regardless of the manufacturer’s guarantee on any item furnished. It is the contractor’s responsibility to place all

equipment in operation, furnish all lubrication, check all fittings for tightness, and see that proper operating and maintenance instructions are prepared and followed.

END OF SECTION

SECTION 13324
MAGNETIC FLOW METERS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Magnetic flow metering systems shall be provided to measure, indicate, transmit, record and totalize process flows. Each system shall consist of a magnetic flow primary and magnetic flow transmitter.

1.2 SUBMITTALS

- A. Complete catalog data for all meters.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Flow Tubes: Foxboro 8300 Series or approved equal.
- B. Transmitters: Foxboro I/A Series Model IMT20 or approved equal.
- C. Signal Cable: Foxboro No. R0125 or approved equal.

2.2 MAGNETIC FLOW PRIMARY

- A. Each flow primary shall be of the magnetic induction type in which the output signal is directly proportional to flow.
- B. Each primary shall have a 304 stainless steel tube with a polyurethane liner.
- C. Each primary shall have conical self-cleaning 316L stainless steel measuring electrodes.
- D. Units shall operate on 115 VAC, 60 Hz via the transmitter converted to a DC pulse.
- E. Magmeters 4 inches and below shall be for insertion between 150-pound flanges.
- F. Magmeters above 4 inches shall have 150-pound ASA flanged end connections.
- G. Each primary shall withstand accidental submergence (up to 30 feet for 48 hours.) without damage to internal components.
- H. Each magnetic flow primary shall be supplied and installed with two (2) 304 stainless steel grounding rings.
- I. Magmeters shall be provided complete with shielded cable for interconnecting the primary and transmitter.

2.3 MAGNETIC FLOW TRANSMITTER

- A. The transmitters shall be microprocessor based, with a multi-function, 4-digit LCD display with a nominal character height of .5 inches. The display shall indicate flow rate in direct reading engineering units or 0-100% of flow as well as calibration parameters, error messages, and diagnostics. An integral 8-digit LCD totalizer shall be provided. The totalizer shall reset via an external magnetic reset switch. The reset function shall be locked out if desired. The transmitter housing shall be for surface mounting. The nominal supply voltage and frequency shall be 120V, 60 HZ with power consumption not to exceed 15W. The transmitter shall provide full diagnostics and the ability to configure process parameters directly without the need for external configuration devices. A zero flow lock circuit shall be available to prevent false readings when

the tube is empty. The enclosure shall have two compartments, one for the digital electronics and one for the power supply and field connections. The enclosure shall provide NEMA 4X protection. The transmitter shall have a signal output of 4 to 20 ma with an accuracy of $\pm 0.25\%$ of flow for sizes up to 12" and $\pm 0.5\%$ of flow for sizes above 12" plus ± 0.01 ma. The intelligent transmitter shall also transmit a digital signal via a superimposed FSK frequency on the same wires used to transmit the 4-20mA signal.

- B. The unit shall have a CSA certification for installation in Class 1, Division 2 hazardous locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Material and equipment shall be installed in a neat, workmanlike manner, and in accordance with the manufacturer's written recommendations as approved by the Engineer.

3.2 TRAINING

- A. Training shall be a part of overall system training as outlined in Section 13400.

END OF SECTION

SECTION 15065
PIPE: FUSIBLE POLYVINYL CHLORIDE (Fusible PVC)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fusible PVC pipe.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 02446 – Horizontal Directional Drilling.
2. Section 02610 – Water Pipe and Fittings
3. Section 02675 – Disinfection of Potable Water Pipe.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
 - a. D638, Standard Test Method for Tensile Properties of Plastics.
 - b. D790, Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - c. D1238, Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
 - d. D1505, Standard Test Method for Density of Plastics by the Density-Gradient Technique.
 - e. D1603, Standard Test Method for Carbon Black Content in Olefin Plastics.
 - f. D1784, Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds.
 - g. D2152, Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) Pipe and Molded Fittings by Acetone Immersion.
 - h. D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
 - i. D3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 - j. F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - k. F1057, Standard Practice for Estimating the Quality of Extruded Poly (vinyl Chloride) Pipe by the Heat Reversion Technique.
 - l. F1674, Standard Method for Joint Restraint Products for Use with PVC Pipe
 - m. F2620, Standard Practice for Heat Fusion
2. American Water Works Association (AWWA):
 - a. PVC (polyvinyl chloride) materials:
 - 1) C605, Standard for Underground Installation of Polyvinyl Chloride Pressure Pipe and Fittings for Water.
 - 2) C900, Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 IN Through 12 IN, for Water Distribution.
 - 3) C905, Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 IN through 48 IN, for Water Transmission and Distribution.
3. Plastic Pipe Institute (PPI):
 - a. Technical Report 3 (TR-3), Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe.

- b. Technical Report 4 (TR-4), PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe.

B. Manufacturer and Installer Qualifications:

1. Pipe and fittings shall be by the same manufacturer.
2. All fusion equipment must be approved by the Fusible PVC pipe manufacturer and operated by workers certified by the Fusible PVC pipe manufacturer.

1.3 ABBREVIATIONS

A. DR: Dimension Ratio.

B. DIPS: Ductile Iron Pipe Size.

C. ESCR: Environmental Stress Crack Resistance.

D. HDB: Hydrostatic Design Basis.

E. PENT: Pennsylvania Notch Test.

F. UV: Ultraviolet.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.
2. Method of pipe fusion.
3. Method of recording temperature requirements, interfacial fusion pressure and the weld tensile strength for the butt fusion joining method.
4. Manufacturer's installation instructions.
5. Installer certifications for each type of fusion method proposed.
6. Field quality control documents.
7. Data logger information on each weld including temperature, fusion pressure, weld tensile strength, submitted weekly, identified by pipe station.

B. Fabrication and/or layout drawings:

1. Piping drawings (minimum scale 1 IN equals 10 FT) with information including:
 - a. Dimensions of piping lengths.
 - b. Acknowledgement of bury depth requirements.

C. Product technical data including:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Resin type.
3. Material thickness and dimensions.
4. Copies of manufacturer's written directions regarding material handling, delivery, storage and installation.
5. Separate schedule sheet for each piping system showing compliance of all system components.
 - a. Attach technical product data on pipe, fittings, and other components.

D. Miscellaneous Submittals:

1. Test Reports:
 - a. Copies of pressure test results on all piping systems.
 - b. Copies of fusion reports.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers of Fusible PVC pipe are acceptable:

1. Fusible PVC Pipe:
 - a. Fusible C-900, Underground Solutions, Inc.
2. Butt Fusion Equipment:
 - a. McElroy Manufacturing, Inc.
 - b. Or approved equal.
3. Data Logger for Butt Fusion:
 - a. McElroy Data Logger.
 - b. Or approved equal.

2.2 FUSIBLE PVC PIPE

A. General:

1. Provide DR 21 (200 psi) 24-IN DIPS with a minimum wall thickness of 1.82 IN for pipe and fittings.
2. Provide fusible PVC pipe in accordance with AWWA C905.
3. Materials used for manufacturing the fusible PVC pipe and fitting shall be made of ASTM cell class 12454 with the following properties:
 - a. Tensile Strength = 7,000 psi.
 - b. Modulus of Elasticity = 400,000 psi.
4. The material shall a minimum Hydrostatic Design Basis (HDB) of 4,000 psi at 73 DegF when tested in accordance with PPI TR-3 and shall be listed in the name of the pipe manufacturer in PPI TR-4.
5. Identify each length of pipe clearly at intervals of 5 FT or less.
 - a. Name and/or trademark of the pipe manufacturer.
 - b. Nominal size of pipe.
 - c. Dimension ratio.
 - d. NSF Approval.
 - e. Blue in color (potable water).

B. Flange Adapters:

1. 36-IN Blind Flanges: DR 21 DIPS with ductile iron back up ring.
2. Bolts and nuts shall be heavy hexagonal head, Type 316 stainless steel. Bolts shall extend ¼” to ½” beyond the nut after assembly of the joint.

2.3 TRACER WIRE

A. Continuous, insulated TW, THW, THWN, or HMWPE insulated copper, 10 gauge or thicker wire.

PART 3 - EXECUTION

3.1 GENERAL

- A. Fusible PVC pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the Drawings, and as specified herein.
- B. Care shall be taken in loading, transporting, and unloading to prevent damage to the pipe. Pipe shall not be dropped. All pipes shall be examined before installation and no pipe shall be installed that is found to be defective.
- C. Ropes, fabric, or rubber-protected slings and straps shall be used when handling pipe. Chains, cables, or hooks shall not be used.

- D. Pipe shall be stored on level ground free of sharp objects that could damage the pipe. Stacking of the pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipe in the anticipated temperature conditions. Where necessary due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

3.2 INSTALLATION

A. Joining Procedures:

1. Joining method of the pipe and fittings shall be the butt fusion method in accordance with ASTM F2620.
2. All joint fusion shall be performed in accordance with the joining equipment and fusible PVC pipe manufacturer's recommendations.
3. All fusion equipment must be approved by the fusible PVC pipe manufacturer and operated by operators certified by the fusible PVC pipe manufacturer.
4. Fusion joiner must be qualified by type of fusion (e.g. butt fusion) and fuse pipe only as qualified.
5. Cost for testing and certifying personnel shall be born by the Contractor.
6. Fuse PVC joints on the surface prior to installation
7. Each joint must be visually inspected inside and outside for damage, dirt, moisture, or any other abnormalities prior to fusing.

B. Tracer Wire:

1. All pipe shall be installed with a tracer wire for pipeline location purposes by means of an electronic line tracer.
2. The wires shall be installed along the entire length of the pipe.
3. Sections of wire shall be spliced together using approved splice caps and waterproof seals. Twisting the wires together is not acceptable.

3.3 FIELD QUALITY CONTROL

A. Fusion reports shall be submitted for each fusion joint performed on the project, including any joints that are rejected. The reports shall include the following:

1. Pipe size and DR.
2. Fusion equipment size and identification.
3. Fusion technician identification.
4. Job identification number.
5. Fusion number and joining parameters.
6. Ambient temperature.

B. Hydrostatic Testing:

1. Hydrostatic leakage testing shall comply with ASTM F2164.
2. Water required for hydrostatic testing shall be potable water.
 - a. Potable water for passing test will be provided by the Owner.
 - b. Contractor is responsible for providing all equipment and temporary piping, hosing and valves to perform the test.
 - c. Transporting and storage of potable water shall be provided by the Contractor.
3. Preparation:
 - a. Notify the Engineer 48 HRS prior to each test.
 - b. Fill pipe with water at least 24 hours before beginning the testing procedure to allow the water, pipe, and soil to thermally stabilize.
 - c. Fill pipe slowly with water to prevent surges and air entrapment.
 - d. Ensure that all air is removed from the pipe before applying pressure.
 - e. Before applying pressure, all piping and all components in the test section must be restrained against movement.
 - f. Perform pressure test using calibrated pressure gauge. Select gauge so that the specified test pressure falls within the upper half of the gauge's range.
4. Required Test Pressure:

- a. The fusible PVC finished water main shall be tested at a gauge pressure equivalent to 100 psi at the highest part of the main.
- b. Pressure shall not vary by more than ± 5 psi from the required test pressure.
5. Testing Procedure:
 - a. Apply and maintain test pressure for 3 hours to allow for initial expansion of the pipe.
 - b. Reduce test pressure by 10 percent and monitor pressure for one hour. If the test pressure remains steady (within 5 percent of the test pressure less the 10 percent reduction) for 1 hour, no leakage is indicated.
6. Bear the cost of all testing and inspecting, locating and remedying of leaks and any necessary retesting and re-examination.

END OF SECTION

SECTION 15067
PIPE: POLYETHYLENE (HDPE)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyethylene pipe.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 02446 – Horizontal Directional Drilling.
2. Section 02610 – Water Pipe and Fittings
3. Section 02660 – Disinfection of Potable Water Pipe
- 4.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
 - a. D638, Standard Test Method for Tensile Properties of Plastics.
 - b. D790, Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - c. D1238, Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
 - d. D1505, Standard Test Method for Density of Plastics by the Density-Gradient Technique.
 - e. D1603, Standard Test Method for Carbon Black Content in Olefin Plastics.
 - f. D1693, Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
 - g. D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
 - h. D3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
 - i. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
 - j. F714, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
 - k. F1473, Standard Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins.
 - l. F2164, Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.
 - m. F2620, Standard Practice for Heat Fusion
2. American Water Works Association (AWWA):
 - a. C906, Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 63 In. for Water Distribution and Transmission.
3. Plastic Pipe Institute (PPI):
 - a. Technical Report 3 (TR-3), Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe.
 - b. Technical Report 4 (TR-4), PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe.

B. Manufacturer and Installer Qualifications:

1. Pipe and fittings shall be by the same manufacturer.

2. All fusion equipment must be approved by the HDPE pipe manufacturer and operated by workers certified by the HDPE pipe manufacturer.
3. Manufacture and install HDPE in accordance with the Plastic Pipe Institute (PPI) recommendations.

1.3 ABBREVIATIONS

- A.DR: Dimension Ratio.
- B. IPS: Iron Pipe Size.
- C. CTS: Copper Tube Size.
- D.ESCR: Environmental Stress Crack Resistance.
- E. HDB: Hydrostatic Design Basis.
- F. HDPE: High Density Polyethylene.
- G. PE: Polyethylene.
- H. PENT: Pennsylvania Notch Test.
- I. UV: Ultraviolet.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.
2. Method of pipe fusion.
3. Method of recording temperature requirements, interfacial fusion pressure and the weld tensile strength for the butt fusion joining method.
4. Manufacturer's installation instructions.
5. Installer certifications for each type of fusion method proposed.
6. Field quality control documents.
7. Data logger information on each weld including temperature, fusion pressure, weld tensile strength, submitted weekly, identified by pipe station.

B. Fabrication and/or layout drawings:

1. Piping drawings (minimum scale 1 IN equals 10 FT) with information including:
 - a. Dimensions of piping lengths.
 - b. Acknowledgement of bury depth requirements.

C. Product technical data including:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Resin type.
3. Material thickness and dimensions.
4. Copies of manufacturer's written directions regarding material handling, delivery, storage and installation.
5. Separate schedule sheet for each piping system showing compliance of all system components.
 - a. Attach technical product data on pipe, fittings, and other components.

D. Miscellaneous Submittals:

1. Test Reports:
 - a. Copies of pressure test results on all piping systems.
 - b. Copies of fusion reports.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers of PE pipe are acceptable:

1. HDPE Pipe:
 - a. Phillips Driscopipe.
 - b. ISCO Industries.
 - c. Polypipe.
 - d. Or approved equal.
2. Butt Fusion Equipment:
 - a. McElroy Manufacturing, Inc.
 - b. Or approved equal.
3. Data Logger for Butt Fusion:
 - a. McElroy Data Logger.
 - b. Or approved equal.

2.2 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

A. General:

1. Provide PE 3408 HDPE piping with fittings and appurtenances to locations shown on Drawings.
2. All HDPE pipe shall conform to ASTM F714. All HDPE pipe and fittings shall be the product of single manufacturer.
3. Provide DR 11 30-IN IPS pipe with a minimum wall thickness of 3.273 IN for pipe and fittings.
4. Fittings (bends and reducing tees) shall be fabricated from HDPE pipe of a compound matching the compound used in the pipe manufacturing. Mitered bends shall be fabrication as follows:
 - a. 45-degree bends shall be fabricated with three (3) segments with 22.5-degree miter angles.
 - b. Bends with a 22.5-degree and below shall be constructed of two (2) segments.

B. HDPE Pipe and Fittings

1. Shall be manufactured in accordance with AWWA C906. Materials used for manufacturing the polyethylene pipe and fittings shall be PE 4710 HDPE meeting ASTM D3350 cell classification of PE 445474C, as specified in the following table:

Cell Classification	Property	Test Method	Cell Classification Limits	Units
4	Density	ASTM D1505	0.947 to 955	g/cm ³
4	Melt Index	ASTM D1238	less than < 0.15	gm/10 min
5	Flexural Modulus	ASTM D790	110,000 to 160,000	psi
5	Tensile Strength	ASTM D638	3,500 to 4,000	psi
7	Slow Crack Growth (ESCR)	ASTM D1693	greater than 5,000 (in 100% Igepal solution)	hours
	Slow Crack Growth (PENT)	ASTM F1473	greater than 500	hours
4	HDB (at 73 DegF)	ASTM D2837	1,600	psi
C	UV Stabilizer	ASTM D1603	2 to 2.5%	carbon-black content by weight

2. The material shall a minimum Hydrostatic Design Basis (HDB) of 1,600 psi at 73 DegF when tested in accordance with PPI TR-3 and shall be listed in the name of the pipe manufacturer in PPI TR-4.
3. Identify each length of pipe clearly at intervals of 5 FT or less.
 - a. Name and/or trademark of the pipe manufacturer.
 - b. Nominal size of pipe.
 - c. Dimension ratio.
 - d. The letters PE followed by the polyethylene grade in accordance with ASTM D1248 followed by the hydrostatic design basis.
 - e. Manufacturing standard reference (e.g. ASTM F714).
 - f. A production code from which the date and place of manufacture can be determined.
 - g. NSF Approval.

C. Flange Adapters:

1. 36-IN Blind Flanges: DR 11 IPS with ductile iron back up ring.
2. Bolts and nuts shall be heavy hexagonal head, Type 316 stainless steel. Bolts shall extend ¼” to ½” beyond the nut after assembly of the joint.

2.3 TRACER WIRE

- A. Continuous, insulated TW, THW, THWN, or HMWPE insulated copper, 10 gauge or thicker wire.

PART 3 - EXECUTION

3.1 GENERAL

- A. HDPE pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the Drawings, and as specified herein.

- B. Care shall be taken in loading, transporting, and unloading to prevent damage to the pipe. Pipe shall not be dropped. All pipe shall be examined before installation and no pipe shall be installed that is found to be defective.
- C. Ropes, fabric, or rubber-protected slings and straps shall be used when handling pipe. Chains, cables, or hooks shall not be used.
- D. Pipe shall be stored on level ground free of sharp objects that could damage the pipe. Stacking of the pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipe in the anticipated temperature conditions. Where necessary due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

3.2 INSTALLATION

A. Joining Procedures:

- 1. Joining method of the pipe and fittings shall be the butt fusion method in accordance with ASTM D3261 and ASTM F2620.
- 2. All joint fusion shall be performed in accordance with the joining equipment and HDPE pipe manufacturer's recommendations.
- 3. All fusion equipment must be approved by the HDPE pipe manufacturer and operated by operators certified by the HDPE pipe manufacturer.
- 4. Fusion joiner must be qualified by type of fusion (e.g. butt fusion) and fuse pipe only as qualified.
- 5. Cost for testing and certifying personnel shall be born by the Contractor.
- 6. Fuse HDPE joints on the surface prior to installation. Each joint must be visually inspected inside and outside for damage, dirt, moisture, or any other abnormalities prior to fusing.

B. Tracer Wire:

- 1. All pipe shall be installed with a tracer wire for pipeline location purposes by means of an electronic line tracer.
- 2. The wires shall be installed along the entire length of the pipe.
- 3. Sections of wire shall be spliced together using approved splice caps and waterproof seals. Twisting the wires together is not acceptable.

3.3 FIELD QUALITY CONTROL

A. Fusion reports shall be submitted for each fusion joint performed on the project, including any joints that are rejected. The reports shall include the following:

- 1. Pipe size and DR.
- 2. Fusion equipment size and identification.
- 3. Fusion technician identification.
- 4. Job identification number.
- 5. Fusion number and joining parameters.
- 6. Ambient temperature.

B. Hydrostatic Testing:

- 1. Hydrostatic leakage testing shall comply with ASTM F2164.
- 2. Water required for hydrostatic testing shall be potable water.
 - a. Potable water for passing test will be provided by the Owner.
 - b. Contractor is responsible for providing all equipment and temporary piping, hosing and valves to perform the test.
 - c. Transporting and storage of potable water shall be provided by the Contractor.
- 3. Preparation:
 - a. Notify the Engineer 48 HRS prior to each test.
 - b. Fill pipe with water at least 24 hours before beginning the testing procedure to allow the water, pipe, and soil to thermally stabilize.
 - c. Fill pipe slowly with water to prevent surges and air entrapment.
 - d. Ensure that all air is removed from the pipe before applying pressure.

- e. Before applying pressure, all piping and all components in the test section must be restrained against movement.
 - f. Perform pressure test using calibrated pressure gauge. Select gauge so that the specified test pressure falls within the upper half of the gauge's range.
4. Required Test Pressure:
- a. The HDPE finished water main shall be tested at a gauge pressure equivalent to 100 psi at the highest part of the main.
 - b. Pressure shall not vary by more than ± 5 psi from the required test pressure.
5. Testing Procedure:
- a. Apply and maintain test pressure for 3 hours to allow for initial expansion of the pipe.
 - b. Reduce test pressure by 10 percent and monitor pressure for one hour. If the test pressure remains steady (within 5 percent of the test pressure less the 10 percent reduction) for 1 hour, no leakage is indicated.
6. Bear the cost of all testing and inspecting, locating and remedying of leaks and any 50 necessary retesting and re-examination.

END OF SECTION

SECTION 16000
ELECTRICAL WORK

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Instruction for Bidders, General Conditions, Supplemental Conditions, Division 1 of the Specifications and all Contract Documents shall apply and govern the Work of all sections in this Division regardless of how the Work may be apportioned to various trades or subcontractors.
- B. The Contractor shall furnish all labor and materials to install a power and control system as shown on the Contract Drawings and specified herein for the following two (2) locations:
 - 1. Water Booster Pumping Station
 - 2. Master Meter Vault

1.2 RELATED WORK

- A. Packaged Water Booster Pumping Station – Section 11213
- B. Master Meter Vault – Section 11300
- C. Electric Service for Booster Pumping Station – Section 16050

1.3 GENERAL

- A. All materials and equipment installed shall be new and unused and shall be of the latest design of manufacturers regularly engaged in the manufacture of such products that conform with the requirements of the Contract Drawings and Specifications.
- B. These Specifications, the associated Drawings, and other Contract Documents have been prepared with intention of their yielding, through construction, electrical installations that are fully operable, safe, complete and in full compliance with the latest editions of the National Electrical Code, local codes and ordinances, and any other authority having jurisdiction over the Work. The omission of miscellaneous electrical items or accessories not specifically called for in these Contract Documents which would detract from this intention shall not relieve the Contractor of the responsibility of furnishing and installing these items and accessories.

1.4 SUBMITTALS

- A. Shop drawings, clearly marked to show only items applicable to this specific contract, shall be submitted for review and shall include complete sizing of components.

1.5 GUARANTEE

- A. The Contractor shall refer to the article on guarantees and warranties in the general conditions and special conditions to determine the extent of his guarantee periods.

1.6 DIMENSION VERIFICATION AND DOCUMENTATION

- A. Scale dimensions as shown on the Drawings shall be considered as approximate. The Contractor shall be responsible for making field verifications. Specific attention shall be given to the exact location of any underground lines installed under this Contract. These lines shall be dimensioned to easily identifiable points on permanent building structures for location and elevation and these dimensions shall be entered and shown on the Record Drawings.

1.7 CODES AND STANDARDS

- A. All electrical equipment and details of installations shall comply with the requirements of the latest editions of the National Electrical Code (NFPA-70), the National Electrical Safety Code (ANSI C2), OSHA and all applicable codes.

1.8 APPROVAL AND MARKING OF EQUIPMENT

- A. Electrical devices and materials shall be listed and/or labeled by the Underwriters' Laboratories, Inc.

1.9 EQUIPMENT SPECIFIED ELSEWHERE

- A. Certain items of control and other equipment are indicated on the electrical drawings for connection, but are specified in other Sections of these Documents. Such items are not furnished as part of the electrical work.

1.10 PROTECTION OF ELECTRICAL EQUIPMENT

- A. Electrical equipment shall be protected from the weather, especially from water dripping or splashing upon it, at all times during shipment, storage, and construction. Equipment shall not be stored outdoors even if its enclosure is rated as weatherproof, watertight, etc. Where equipment is installed or stored in moist areas, such as an unheated building, etc., it shall be provided with an acceptable means of preventing moisture damage such as a uniformly distributed source of heat to prevent condensation.

1.11 DEFECTIVE OR DAMAGED EQUIPMENT

- A. Should it be determined by the Contractor, Owner or Engineer that any equipment or material has been subjected to possible damage by water, it shall be thoroughly dried and put through a dielectric test as directed by the manufacturer, at the expense of the Contractor or shall be replaced by the Contractor without change in contract price. Any equipment found to be marginal or that fails to meet manufacturer's standards shall be replaced at no additional charge to the Owner or Engineer.
- B. Any equipment damaged during shipment, while stored, or during construction shall be replaced at the Contractor's expense. Minor scratches on equipment cabinets, etc., may be repaired on site. Any current carrying parts, switch blades, operators, coils, contacts, etc., which are damaged, shall be replaced at no cost to the Owner or Engineer.

1.12 PERMITS AND APPROVALS

- A. The Contractor shall obtain all permits necessary. The Contractor shall furnish inspection by an agency licensed or otherwise qualified to perform electrical inspections in the Commonwealth of Kentucky.
- B. The Contractor shall notify the electrical inspector, in writing, immediately upon the start of the Work and a copy of the notice shall be sent to the Engineer.
- C. All costs incidental to the electrical inspection shall be borne by the Contractor.
- D. The Contractor shall furnish certificates of final approval by the electrical inspector and final payment will be withheld until he has presented the Engineer with the aforementioned certificate of approval.

1.13 CIRCUIT LOADS

- A. The Contractor shall verify the total load to be placed on the circuits as well as voltage, phase, frequency and connections required for equipment before rough-in, and if they differ from the Drawings and Specifications, he shall contact the Engineer immediately for further instructions before the Work commences.

1.14 ELECTRICAL SERVICE

- A. The Contractor shall obtain and install a complete electrical service with new service equipment at each location.
- B. The new equipment, connections, and conduit shall be sized for the application and the service shall meet the requirements of the National Electrical Code (NEC) and the local utility company.
- C. This Contractor shall contact Louisville Gas & Electric (LG&E), negotiate the Contract and arrange to have the work done in an orderly and timely manner. Complete coordination shall be made between the Contractor, LG&E, Engineer, and the Owner, keeping all informed of the plans and any other particulars concerning the work. Down-time shall be kept to a minimum.

LG&E Contact:
Travis Blanton
Travis.blanton@lge-ku.com
502-364-8375

PART 2 - PRODUCTS

2.1 CONDUIT

- A. No conduit smaller than 3/4-inch shall be used.
- B. Rigid Conduit: Rigid conduit shall be standard weight, mild steel pipe. The conduit shall receive a protective zinc coating both inside and outside by means of hot-dip galvanizing. Threads shall not have any coating which will reduce the conductivity of the joint. Coupling, bends, elbows, fittings, etc., shall be subject to the same requirements as for the straight lengths. All conduit and fittings shall be UL approved. Rigid conduit shall be delivered with plastic protectors on the threads.
- C. Electrical Metallic Tubing (EMT): No EMT will be allowed on this project.
- D. Liquid tight flexible metallic conduit shall be constructed of flexible or spirally wound galvanized steel enclosed in light gray colored PVC outer jacket. Liquid tight flexible metallic conduit shall be equivalent to American Brass "Sealtite" Type UA. Connectors shall be equivalent to Midwest Type LT.
- E. Plastic conduit shall be schedule 80, PVC, rated for use with 90 degrees Celsius conductors and for use in direct sunlight, with chemical weld joints. The Contractor shall provide all fittings, adapters, etc., required for a complete installation as shown on the Drawings.

2.2 WIRE AND CABLE

- A. All conductors shall be insulated so that they are rated at 600 volts.
- B. No conductors smaller than AWG No. 12 shall be used except for signal or control systems, or where otherwise indicated.
- C. All conductors shall be soft drawn, 98 percent conductivity copper conforming to the latest ASTM Specifications and the requirements of the National Electrical Code.
- D. Single conductors shall be insulated with THHN/THWN insulation and all conduits shown on the Drawings are sized accordingly.

2.3 GROUNDING

- A. The resistance value of the main grounding conductor measured between the main switchgear and a good earth ground shall not exceed five (5) ohms.

- B. Ground Rods: Ground Rods shall be the copper clad steel type and shall be a minimum of 10 feet in length, 3/4-inch in diameter. Ground rods shall be equivalent to those as manufactured by Copperweld Steel Company.
- C. Grounding electrode conductors shall be bare copper. Equipment grounding conductor shall be copper, THHN/THWN insulated, green (or green with yellow tracer) in color, and rated at 600 volts.
- D. Ground clamps for use on metallic pipes shall be of copper, brass or silicon bronze with a rigid metal base providing good contact by proper seating on the pipe. Strap type clamps shall not be used.

2.4 SAFETY SWITCHES

- A. Safety switches shall be service duty rated, heavy-duty, load break type with a quick-make, quick-break, switch mechanism, in a NEMA 4X enclosure. Ampere rating and number of poles shall be as noted on the Drawings. Padlocking capability shall be provided for locking the switch either in the closed (on) position or open (off) position. Fuse clips shall be rejection type. Switches shall be provided with a cover-blade interlock so that the cover cannot be opened when the switch blades are closed, nor can the switch blades be closed with the cover open. Interlock bypassing devices shall be included for use by authorized personnel. Switches shall be Square-D, Class 3110, or equivalent.

2.5 FUSES

- A. The Contractor shall provide fuses as called for on the Drawings. Where the fuse size is not indicated, the Contractor shall size the fuse for actual load installed. Where the fuse size is indicated on the Drawings, the Contractor shall verify the actual load installed and provide fusing accordingly. Unless otherwise indicated on the Drawings, all fuses shall be non-renewable, current limiting, dual element, time-lag type. The fuses shall have an interrupting capacity of at least 100,000 amperes RMS symmetrical. Fuses shall be as manufactured by Bussman or equivalent.

2.6 SERVICE POLE

- A. The service pole(s) shall be southern pine, pressure creosote treated, roofed and gabled before treatment and of the length and class as shown on the Drawings. Pole hardware shall be galvanized steel.

2.7 SUPPORTING DEVICES

- A. All mounting brackets and strut used outside shall be aluminum or stainless steel. Fasteners used to mount equipment outside shall be stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavation, Backfilling and Grading:
 - 1. The Contractor shall perform all earth and rock excavation, backfilling and grading required for this part of the work. Rock excavation shall be made to a depth of 4 inches below pipe and filled to subgrade with dense graded aggregate limestone. After the Bid is submitted there will be no additional funds forthcoming for excavation work on this project. All excavation shall be Bid as unclassified.
 - 2. Trenches shall be maintained free of water until backfilling is completed.

3. Backfilling material in earth excavation shall be clean earth to a line at least 12 inches above the top of the conduit. From this line upward, rock not more than 6 inches in diameter may be used provided it is spaced at least 12 inches apart. Filling between rock shall be of clean earth, thoroughly tamped in 6-inch layers to the finished grade. All surplus rock and earth shall be removed from the site as directed by the Engineer.
4. Depth of bury for all conduit shall be a minimum of 24 inches below finished grade.

B. Conduit:

1. Rigid steel conduit shall be used for emergence from underground, or from below slab-on-grade and where exposed. Schedule 80 PVC shall be used underground. Adapters shall be used and rigid steel extended above grade from PVC that is installed underground or below slab-on-grade. PVC shall be concrete encased where it passes under roadways or where otherwise shown on drawings. PVC shall not be used where exposed on the exterior nor where exposed to direct sunlight. Conduit shall be installed so as to insure against trouble from the collection of trapped condensation. This Contractor shall plan his work so that runs of conduit miss equipment by other trades. Conduit bushing shall have insulating material which has been permanently fastened to the fittings. Bushings for conduit 1-1/2 inches trade size and larger shall be complete with grounding lug and shall be bonded to the box by means of bare copper wire. All field bends shall be made with standard tools and bending equipment manufactured especially for this purpose. Bends in metallic conduit shall be made while cold and in no case shall the conduits be heated. Conduits shall not be bent through more than 90 degrees. Size of conduits shall not be less than that required by the National Electrical Code. The Contractor shall install larger size conduits than detailed where there is more than 100 feet of unbroken run or where the total of the angles through which the conduit has been bent during a single run exceeds 270 degrees.
2. All conduit installed on concrete surfaces shall be anchored with spacer type conduit clamps preventing contact between the conduit and the concrete surface. Conduits penetrating walls shall be grouted in place to form a seal.
3. All conduit shall be run continuous between devices with a minimum number of bends. Back-to-back 90 degree bends (180 degree change of direction) will not be acceptable. During construction, all new conduits shall be kept dry and free of moisture and debris. Before the wire is pulled in, all conduits shall be swabbed to clear all moisture and debris which may have unavoidably accumulated.

C. Wire and Cable:

1. Direct Burial Cable: No cable buried directly in the earth, not in raceway will be allowed on this project.
2. Wire shall not be installed until all work of any nature that may cause injury to the wire is completed. Mechanical means shall not be used in pulling in wires No. 8 or smaller. Approved wire pulling lubricant shall be used as required to prevent insulation damage and overstressing of the wire while pulling through conduit. In no case shall conductors be greased or coated with any substance injurious to the conductor insulation or sheath.
3. All wires connected to terminal boards, terminal blocks, or to other similar terminals shall terminate by means of pressure terminals. Where terminal boards, terminal blocks, etc. are designed and manufactured to accept bare wire and have a pressure plate on each side of the wire, no pressure terminals on the wire will be required. Where the wire would have to encircle the holding screw to make a proper connection, the wire terminals are required.
4. Where the wire is shown larger than that required for the load, it is done so for voltage drop or other purposes and must be installed as shown. Where the wire is stranded, the removal of strands in order to install the wire into a lug provided on any equipment will not be permitted. A larger lug shall be installed which will accept the wire size indicated.
5. Each wire shall be labeled at both termination points with an adhesive type label as manufactured by Panduit Corporation, or equivalent. All wiring shall be neatly bundled and supported.

6. Insulation on ungrounded conductors larger than AWG #10 and on grounded (neutral) and grounding (equipment ground) conductors larger than AWG #6 may be black with color coding accomplished with the use of colored plastic tape. Tape shall be installed on the conductors wherever they are visible and shall be wrapped at least three (3) turns around the conductor.
7. All wiring on this project, except control wiring, shall reflect the phase relationship of black, red and blue for ungrounded conductors, white for neutral conductors.

D. Grounding:

1. Ground rods shall be driven vertically into the earth to at least 1 foot below finished grade. Where rock is encountered at a depth of less than 4 feet, rods shall be buried in a trench at not less than 2 feet below finished grade.
2. Connections to ground rods and all other ground connections below grade shall have a minimum mechanical contact surface area between the conductor and the ground rod of not less than three square inches. All connections made below finished grade shall be exothermic. Installation of grounding conductors shall be such that they are not exposed to physical damage. All connections shall be firm and tight.
3. All metal electrical equipment cabinets shall be securely bonded to a grounding conductor running through any conduit terminating at the cabinet or enclosure by use of a grounding lug bushing and jumper wire to the enclosure wall. Junction boxes and other enclosures shall utilize an equipment ground bus or lug as required to securely bond the equipment grounding conductor to the enclosure. The grounding conductor shall be connected with pressure connectors at the main disconnect to the main grounding system. Where screw terminals or set screw lugs are used, sufficient lugs shall be provided such that not more than one conductor is installed into each lug or terminal.
4. No flexible conduit shall serve as a grounding conductor.
5. Where lightning arresters are furnished and installed either separately or with equipment and the grounding connections are not inherently provided, a suitable, separate, grounding conductor shall connect the lightning arrester with a separate ground rod. This rod shall be interconnected with any adjacent grounding system.

3.2 ELECTRICAL FIELD ACCEPTANCE TESTS

- A. General: After the electrical installation is complete, tests shall be made to demonstrate that the entire system is in proper working order and in accordance with the Drawings and Specifications. The test outlined herein shall be in addition to, and not substitution for, the tests of the individual items at the manufacturer's plant. Insulation and ground resistance tests shall be made before operating tests.
- B. Defective Equipment: All wiring and equipment found defective or failing to meet the specified requirements shall be replaced by the Contractor without charge, unless written permission for repair is given by the Engineer.
- C. Operating Tests:
 1. Switches, Circuit Breakers, Control Devices: All switches, circuit breakers, and control devices shall be operated to show correct and satisfactory operation.
 2. Controls: Controls circuits shall be fully operated with the power circuits to the motors de-energized to assure proper sequence and operation before the system is energized.
 3. Connections at equipment shall not be made up permanently until correct phase rotation of all the equipment has been determined. These connections shall be installed and insulated temporarily, if necessary, while determining proper rotation. Permanent connections shall be made after proper rotation has been established and subsequent to the completion of the insulation resistance and dielectric tests.

- D. Ground Resistance Tests: The Contractor shall test each entire grounding system for continuity of connections and for resistance. The ground resistance of conduits, equipment cases, and supporting frames shall not vary appreciably from that of the system as a whole and shall not exceed 5 ohms.
- E. Witness: The Engineer shall be notified at least seven (7) calendar days in advance of each of the tests covered in this Section of the Specifications so that he may arrange to witness the tests.
- F. Test Records: A record of all tests shall be delivered to the Engineer before final acceptance will be forthcoming.

END OF SECTION

SECTION 16050
ELECTRIC SERVICE FOR BOOSTER PUMPING STATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. This section includes the site work for providing electrical service to the booster pump station.
- B. The work for this project includes all labor, tools, equipment, and materials necessary to completely install, test, place in service and deliver to the Owner a complete electrical system in accordance with the following specifications and associated drawings.
- C. The electrical subcontractor must be a licensed electrical contractor in **Hardin County**, Kentucky.
- D. Project Task Summary – the following is a summary of the primary work elements associated with this project. This summary is not all inclusive of the work to be performed:
 - 1. Provide 480 Volt, 3 phase, 4 wire, 1000 amp electrical service to the booster pump station. This shall include provision and installation of a utility pole, transformer pad, conduit, wire, fuses, meter socket, grounding, and associated devices. The Contractor shall route the service conductors from the padmount transformer underground via rigid conduit encased in concrete to the new station service rated automatic transfer switch. Refer to the contract drawings for details.
 - 2. The Contractor shall coordinate with Electric Utility (Louisville Gas & Electric) for the installation of electrical service to the site. Contractor shall pay Electric Utility any costs associated with the installation. Contractor shall be reimbursed by Owner actual costs of Electric Utility (no markup); see Allowance.
 - 3. Obtain electrical permit and inspection.
 - 4. Provide “as built” mark ups of electrical drawings.

1.2 RELATED WORK

- A. Packaged Water Booster Pumping Station – Section 11213
- B. Electrical Work – Section 16000

1.3 SUBMITTALS

- A. Shop Drawings, clearly marked to show only items applicable to this specific contract, shall be submitted for review and shall include complete sizing of components.
- B. Any items substituted by the Contractor without the approval of the Project Manager shall be subject to replacement by the Contractor at no cost to the Owner and at no impact on the project schedule.
- C. Generator and Permits

1.4 REFERENCES

- A. American National Standards Institute (ANSI)
- B. Kentucky and Local Building Codes
- C. National Electrical Code (NEC)
- D. National Electrical Manufacturers Association (NEMA)
- E. National Electric Safety Code (NESC)
- F. National Fire Protection Code (NFPA)
- G. Underwriter’s Laboratories Inc (UL)

PART 2 – PRODUCTS

2.1 GENERAL

- A. The Contractor shall furnish and install the items listed.
- B. Note that the manufacturers and part numbers provided are considered minimum design requirements and are not meant to inhibit the Contractor from providing components of equal or better quality. However, the Contractor shall receive written approval from the Project Manager for any component substituted. The materials used shall be new, unused and as hereinafter specified.

2.2 MATERIALS

- A. Utility Metering
 - 1. Provide materials as required by Electric Utility for installation of metering equipment, service conductors, and mounting of utility company equipment.
- B. Service Rated Automatic Transfer Switch
 - 1. 480V, 3-pole, 3-wire, 1200Amp, 35KAIC
 - 2. NEMA 3R with inner door for operator interface devices and deadfront, padlockable outer door
 - 3. Delayed transition operation
 - 4. Anti-condensate heater
 - 5. Microprocessor controller and keypad with display
 - 6. Test-Automatic-Bypass delay selector switch
 - 7. Switch position and source availability indicator lights
 - 8. 120VAC, dry contacts for the following SCADA signals:
 - a. Normal Source Available
 - b. Normal Source Available
 - c. Switch in Normal Position
 - d. Switch in Emergency Position
 - 9. Manufactured by Russelectric or equal.
- C. Standby Generator
 - 1. 480V, 3Phase, 750KW, 0.8P.F. permanent magnet generator
 - 2. Diesel Engine meeting all EPA requirements for permanently-installed standby, emergency generators.
 - 3. Sub-base fuel tank, 48-hour storage @ 100% load.
 - 4. Critical grade silencer
 - 5. Output circuit breaker
 - 6. Generator controller with display and Hand-On-Auto switch
 - 7. Battery charger, 120VAC, single phase, wired to termination blocks for external power source
 - 8. Block heater, 480VAC single phase, wired to termination blocks for external power source
 - 9. Sound attenuated, lockable (provide 4 sets of keys), weather-proof housing. Owner shall pick color of exterior housing during submittal phase.
 - 10. 120VAC, dry contacts for the following SCADA signals:
 - a. Generator Running
 - b. Generator Warning
 - c. Generator Fault
 - d. Generator Low Fuel
 - e. Fuel Tank Leak
 - 11. Provide Caterpillar or equal.
- D. Conduit
 - 1. All exposed conduit shall be rigid metal conduit (RMC), hot dip galvanized with threaded ends and cast fittings and condulets.
 - 2. Underground conduit to the pump station shall be rigid, heavy wall, steel conduit, encased in concrete with threaded watertight connections and shall be adequately sized to handle the type, number, and size of the incoming service conductors.

3. Conduit sizes shall be as indicated on the drawings, minimum 3/4".
 4. Exposed conduit stubs for future use shall be terminated with galvanized pipe caps.
- E. Wire and Cable
1. All conductors shall be 98% conductive stranded copper unless noted otherwise.
 2. All conductors shall be rated for 600 Volts with XHHW, 90° C insulation.
 3. Power wires shall not be less than #12 AWG and control wires shall not be less than #14 AWG.
- F. Ground Rods
1. The ground rods shall be 3/4" x 10' copper or copper-clad steel.
- G. Electrical Service Cabinet
1. Fabricate as shown on drawings and as necessary in field.
 2. Provide all equipment supports as necessary, including conduit and raceway supports and enclosure supports.
 3. All materials shall be stainless steel.
 4. Unistrut shall be P1000.
 5. Include end caps for unistrut.

PART 3 - EXECUTION

3.1 GENERAL CONSTRUCTION

- A. Continuous Work
1. The Contractor shall be aware that work on this project shall be continuous. Periods of intermittent work shall not be permitted.
- B. Workmanship
1. All devices shall be mounted, fabricated and wired with the highest quality workmanship by builders and electricians with at least 3 years experience building and wiring controls and enclosures.
- C. Construction Coordination
1. The Contractor shall be responsible for coordination with the appropriate utility for termination of power and phone conductors.
 2. Power shall be provided to pump station concurrent with the installation of the station.

3.2 INSTALLATION

- A. Equipment Installation - All equipment supplied shall be installed in accordance with manufacturers' recommendation.
- B. Code Inspection
1. This installation shall in all respects conform to all local and state codes and to the latest edition of the National Electrical Code including use of hand tools and temporary services.
 2. All electrical work shall be inspected by the local Electrical Inspector.
 3. Any concealed work shall be inspected by the Electrical Inspector prior to concealment. If concealed work must be exposed for inspection, all additional costs shall be the responsibility of the Contractor.
- C. Grounding
1. The ground rods shall be driven below grade in direct contact with earth.
 2. The grounding clips shall be connected to the ground conductor.
 3. The ground conductors shall be connected by Cadweld to the ground rods.
 4. Provide foundation grounding where required.
 5. Provide equipment grounding conductor in all branch panel feeder circuits and in all branch circuits serving lighting fixtures, receptacles, equipment, etc.
 6. Size conductor per NEC Table 250-122.

D. Conduit Installation

1. The conduit routings shown on the contract drawings are for concept only, actual routings may vary.
2. The Contractor shall layout all conduit systems so as to avoid conflict with other services or systems. Routing of conduit shall be such that it is not near moving machinery, piping, or equipment. Conduit routing shall not prevent or block access to other equipment, piping, or inhibit maintenance functions.
3. All conduit shall be installed with runs parallel or perpendicular to wall structural members or intersection of vertical planes and ceilings, with right angle turns consisting of metal fittings or symmetrical bends.
4. Conduit shall be capped during construction to prevent entrance of dirt, trash, and water. Caps shall be threaded PVC or galvanized rigid steel.
5. Underground conduit shall be galvanized Rigid Metallic Conduit concrete encased (2500 psi, Class A concrete) with 3” of concrete all around and at least 24 inches of earth cover, native backfill. Metal underground marking tape shall be placed near top of trench for future detection.

E. Wiring Practice

1. No more than two wires shall be landed on a termination point.
2. All wires shall be marked at every termination point using printed labels.

F. Wire Identification

1. Conductor identification of branch control circuits shall be by color coding.
2. Wire shall be color coded and sized per the following chart, unless noted otherwise on the contract drawings:

24 VDC	Control	Orange, Min. #14 AWG
24 VDC	Negative	Blue, Min. #14 AWG
120 VAC	Control	Red, Min. #14 AWG
120 VAC	Hot	Black, Min. #12 AWG
120 VAC	Neutral	White, Min. #12 AWG
All AC	Ground	Green, Min. #12 AWG
480 VAC	Motor Leads	Black, Min. #12 AWG

G. Wire Markers

1. All conductors shall be identified by plastic-coated sleeved printed markers or stamped metal foil markers which are oil resistant and permanently attached.
2. Conductor identification shall be provided within each enclosure where tap, splice or termination is made.
3. Control circuit termination shall be properly identified per the engineering drawings or documents.

H. Splices

1. Splices shall be made on terminal blocks only.
2. Splices shall not be made with wire nuts or bolted connection wrapped with electrical tape.

I. Connectors

1. Staycon fork-style connectors shall be used for all stranded conductor connections to wiring devices.
2. Landing stranded wire directly on the wiring devices will not be acceptable.

J. Pole-Mounted Equipment

1. Provide hot-dipped galvanized uni-strut and lag screw to mount any electrical equipment to wooden poles and posts.
2. Cap uni-strut ends.

K. Enclosure Penetration

1. The Contractor shall not penetrate enclosures unless required.
2. Penetrations shall not violate the NEMA rating of the enclosure.

3. Unused holes or conduits shall be properly sealed with hole plugs or conduit plugs.
- L. Sealing of Equipment
1. All outdoor equipment shall be permanently sealed at the base, and all openings into equipment shall be screened or sealed with concrete grout to keep out rodents and insects the size of wasps and mud daubers.
 2. Small cracks and openings shall be sealed from inside with silicone sealant, Dow-Corning "795" or General Electric "SCS 1200".
- M. Transformer Pad
1. The Contractor shall provide a concrete transformer pad to meet Electric Utility requirements.

3.3 GENERATOR AND TRANSFER SWITCH

- A. Permits: The Contractor shall submit and pay for all required permit applications and pay all fees for such. This typically includes a State permit for the fuel tank and air quality.
- B. Installation:
1. The Contractor shall provide a level concrete pad of sufficient dimensions to provide 2 foot apron around the perimeter of the generator provided. Anchor generator to pad with stainless steel anchor bolts.
 2. Ground frame to concrete pad reinforcing steel and #4/0 bare copper ground loop around pad. Provide 3/4" x 10' ground rod driven at each corner of pad.
- C. Transfer Switch
1. Configure for service voltage and source configuration.
 2. Coordinate with Owner in programming of dropout voltage, delay to start engine, delay to re-transfer, engine cooldown, transition delay, and other parameters as may be required.
- D. Operation
1. The Generator is sized to operate the following:
 - a. Two VFD Service Pumps
 - b. All 480V miscellaneous equipment such as unit heaters, AC, etc.
 - c. All single phase lights, heaters, and accessories.
- E. Testing and Startup
1. Contractor to provide fuel for testing, Top-off fuel tank prior to final completion. Fuel shall include any summer or winter additives.
 2. Contractor shall provide all coolant and oil prior to start up.
 3. Provide 2-hour load bank test at 100% load.
 - a. Record coolant temperature, oil pressure, volts, amps, and KW at 15 minute increments.
 - b. Provide start up report.
 4. Measure and report noise at property line.
 5. Configure transfer switch for service voltage and configuration.

3.4 ACCEPTANCE AND TESTING

- A. Inspection
1. All equipment installed with this project shall be inspected and adjusted prior to placing installation in service.
 2. It shall be the Contractor's responsibility to prove to the Project Manager that the electrical system provided complies with this specification and the contract documents.
 3. Proper connection of the anodes shall be verified on the test panels.
- B. Operation Testing
1. Electrical contractor must have an electrician at the pump station startup.
 2. At the pump station start-up, the pump motors provided with the pump station shall be checked for proper rotation. Do not electrically operate the pumps for any length of time without water service and proper lubrication.
 3. The single phase environmental equipment, lights, etc. that are provided by the pump station manufacturer shall also be checked for proper operation.

C. As-Built Records

1. The Contractor shall maintain a clean set of neatly marked up drawings as an as-built record of the system.
2. As-built drawings shall show all underground conduit run lengths and materials, and a north-south dimension (e.g. 50' South of C/L of Main Street) and east-west dimension for all starting points (e.g. pole), termination points (e.g. vault) and any horizontal bends.

END OF SPECIFICATION

APPENDIX A
GEOTECHNICAL REPORT



January 27, 2015

Mr. Kevin Brian, PE
HDR Engineering, Inc.
401 W. Main Street
Louisville, Kentucky 40202

Subject: Report for Geotechnical Engineering Exploration
Louisville Water Company Pipeline Extension and Pump Station
Five Road and Railroad Crossings
Hardin County, Kentucky
Vector Project Number 14-2387

Dear Mr. Brian,

Vector Engineers, Inc. has completed the geotechnical subsurface site characterization for the proposed water transmission main expansion along Dixie Highway in Hardin County, Kentucky. This exploration is in general accordance with our Proposal No. 14-827, dated October 17, 2014.

The purpose of our exploration was to obtain subsurface data to determine if the site is suitable for the proposed water main expansion and pump station. This report describes our understanding of the project, summarizes our findings, discusses geotechnical concerns, and contains our preliminary recommendations.

PROJECT INFORMATION

The proposed water main expansion will consist of an approximate 19,950 linear feet extension to the existing Louisville Water Company main which presently terminates at Katherine Station Road near the intersection at US 31W (Dixie Highway). The water main expansion consists of a transitioning 16 to 30 inch diameter ductile iron pipe installed with a minimum depth of 48 inches below ground. The line will extend through West Point, Kentucky and terminate near Mercer Road. There will be various other crossings along the alignment. Our scope of services was to drill soil test borings at the following crossings:

1. The Salt River just east of the Highway Bridge
2. US 31 West
3. The Paducah and Louisville Railroad Track
4. The CSX Railroad Track
5. Main Street

The beginning of the new water main will connect to the existing Louisville Water Company main which presently terminates just south of the east side of Dixie Highway at Katherine Station Road. In October of 2014, there was a small slope failure along the eastern side of Dixie Highway about 100 feet south of Katherine Station Road extending about 200 feet south. The slope occurred due to cutting of numerous trees along the embankment slope. The slope was repaired by the Kentucky Transportation Cabinet. The new water main will extend along the eastern side of Dixie Highway through a portion of the area that had been repaired.

The proposed water main will cross an easement for a gas line on the Jefferson County side of the Salt River. The main will have a bend in the line to accommodate the gas line. At the Salt River crossing, an approximately 750 linear foot horizontal directions drill will be required to bore under the river. We understand that bore pit will be about 15 feet deep.

Located directly south of Salt River is the proposed meter vault (Figure 1). The vault will be metal framed and positioned below grade. The meter vault will be anchored to a subsurface concrete pad on 12 inches of compacted crushed stone and geotextile fabric. Dimensions for the vault are 22 feet long by 8 feet wide. The anticipated bearing pressure exerted on the bearing soils by the meter vault slab will be 500 pounds per square foot.

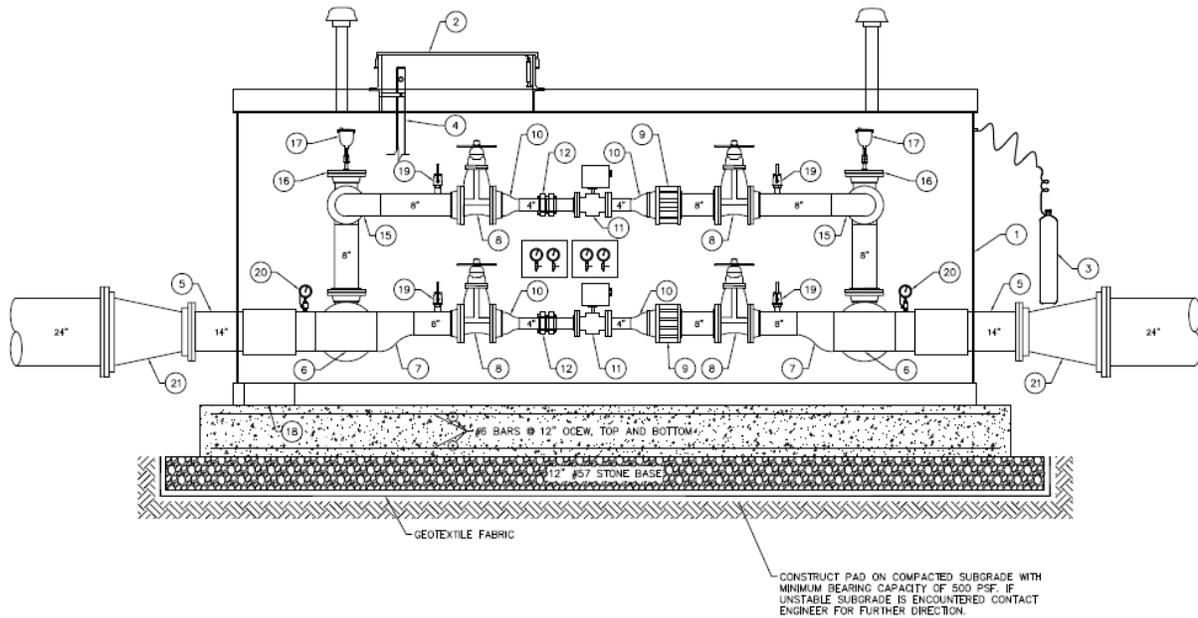


Figure 1: Below Grade Meter Vault

At Main Street in West Port, several bends will be required, ranging from 16 inch – 45 degree bends, 24 inch to 16 inch reducers and 16 inch – 11 ¼ degree bends. The transition main will cross Dixie Highway and run along the west side of the road crossing two railroad tracks, requiring boring under the tracks with various bends. The main will then run along a Louisville Gas and Electric gas line easement. The transmission main will run along the north side of the easement where a new pump station will be located off the highway. The transmission line will then travel several thousand feet along the LG&E Easement where it turns about 90 degrees toward Mercer lane at its terminus.

The pump station will consist of an above ground package booster station situated on a 44 foot by 15 foot concrete pad. The site will be raised about 5 feet to a finished floor elevation of 444.0 feet mean sea level. Actual structural loading information is not known at this time. Figure 2 illustrates the pump station site development plan.

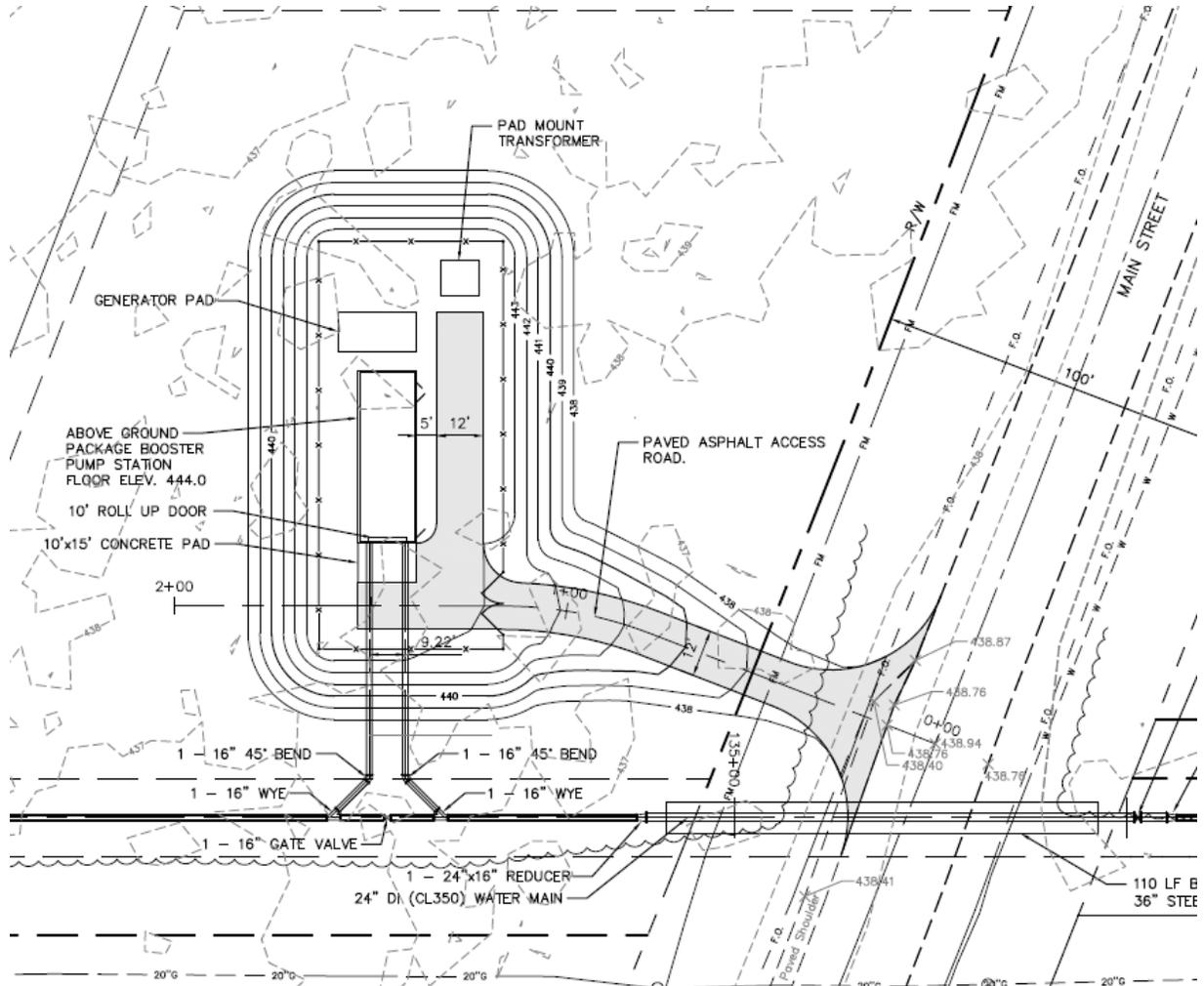


Figure 2: Pump Station Site Plan

FINDINGS

As part of our geotechnical site characterization, we observed site conditions, reviewed regional geological maps, and performed a subsurface exploration. The following sections report our findings.

Site Surface Conditions

Mr. Barnett and Mr. Spata, Geologists with Vector Engineers visited the site during the middle of November 2014, to assist in drilling operations and observe surface conditions to aid in interpreting the subsurface data and to detect conditions which could affect the project. The following is a general descriptions of the site.

The Hardin County water main project extends over the course of approximately 3¾ miles. Boring locations are depicted in aerial photographs Figures 6 through 9 in the attachments.

At this time, the route includes a portion of wooded river bank (Salt River) near borings B-1 and B-2, with the water main being routed under the river channel (Figure 6). A change in elevation of about 10 feet occurs in topography from borings B-1 and B-2.

Following the pipeline southwest to borings B-3 and B-4 (Figure 7), terrain varies from commercially and residentially developed land. Boring B-3 was located in the residential mobile home parking lot across the road from Boring B-4. The boring was located in the grass approximately 10 feet from the road way. Boring B-4 was located in a parking area approximately 10 feet off the roadway. The parking area was in poor condition.



Photograph 1: Site location of Boring B-3, grass area approximately 10 feet off the road



Photograph 2: Site location of Boring B-4, degraded asphalt cause by age and weathering

The terrain remains developed land and transitions to agricultural and forested lands west of Boring B-4. Borings B-5 and B-6 are located near railroad tracks. The water main will go under these tracks (Figure 8). Boring B-5 was located next to a gravel walking trail, adjacent to a sloped bank for the elevated train tracks. The train tracks are located north of Boring B-5. Boring B-6 is located in a grassy area at the bottom of a wooded slope near the railroad tracks. The railroad tracks are to the north of Boring B-6 and the grassy area is to the south.



Photograph 3: Site location of Boring B-5, located at the bottom of the elevated railroad tracks



Photograph 4: Site location of Boring B-6, located at the bottom of a slope for the railroad tracks

Continuing southwest toward boring B-7 and B-8, the terrain generally remains wooded on both sides of the Dixie Highway (Figure 9). Boring B-7 is located approximately 10 feet east off the roadway and approximately 2 feet west of a wooded area in grass south of the cleared area for electrical transmission lines. Boring B-8 is located approximately 10 feet west of the roadway, approximately 2 feet east of a wooded area in grass south of the cleared area for electrical lines.



Photograph 5: Site location of Boring B-7



Figure 6: Site location of Boring B-8

Area Geology

Vector Engineers reviewed the area geological maps of West Point, Kentucky published by the Kentucky Geologic Survey. The published information indicates that the site is underlain by the Older Alluvium formation, Alluvium formation and a small location of Artificial Fill. The Older Alluvium Formation is composed of silt, clay, sand, and gravel unit in stratigraphic column is described as Older Alluvium and outwash. Outwash, in the Ohio River valley, is clay, silt, sand, and gravel. Alluvium consist of silt, clay, sand, and gravel, moderate yellowish brown. Chiefly silt and clay as a 10 to 20 foot thick veneer along Ohio River. Sand and gravel of local origin along smaller streams; gravel chiefly pebbles and granules of chert and limonite cemented siltstone, with some cobbles and scattered quartz geodes derived from weathering of the Muldraugh Member of the Borden Formation. Figure 3 depicts the geology of the site which may include scattered areas of bedrock near Boring B-5.

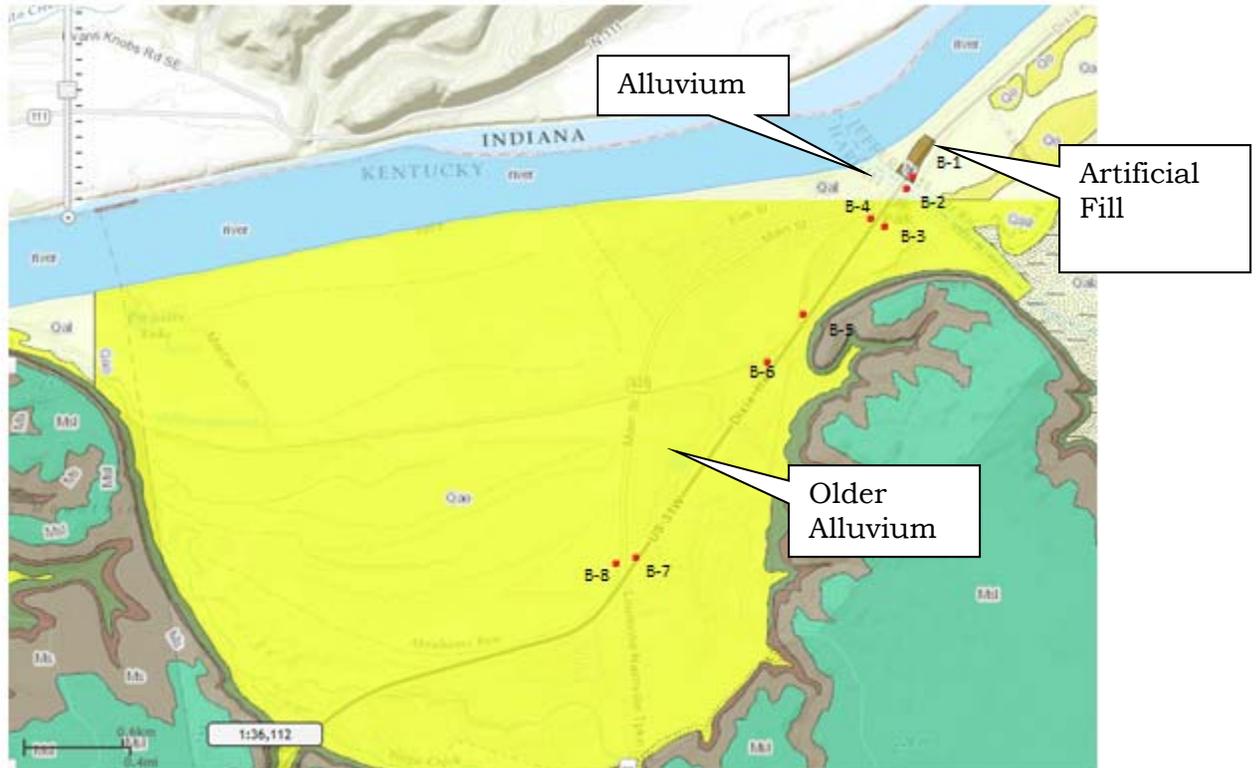


Figure 3: Geologic Map

We reviewed the Kentucky Geological Survey (KGS) website for Karst potential and for closed depressions. The KGS mapping of the area indicates non-karst for the majority of the project site; except for the formation shown in Figure 1 southeast of Boring B-5. The nearest formation indicates a low rank for karst potential. We did not observe any obvious surface indications of sinkhole activity within the stretch of road near our boring locations. Based on the published information and our on-site observations, we do not believe the Karst potential for this site is an issue.

Subsurface Exploration

After researching the readily available published geological information, a preliminary subsurface profile is formulated. The soil exploration program is a means to substantiate the assumptions made in our preliminary profile and assist us in developing a representative subsurface profile of the site. The subsurface conditions will vary between exploration points thereby making the development of a representative and reliable profile dependent upon the number of subsurface explorations obtained during the field operations. The following discusses our interpretation of the subsurface

profile on the site based on the published information, and our recent subsurface exploration. The individual Boring Logs attached to this report will have specific details.

Field Exploration and Laboratory Testing Methods

The procedures used by Vector Engineers for field and laboratory sampling and testing are in general accordance with ASTM procedures and established engineering practice. A brief summary of the field and laboratory procedures is included in the attachments.

Drilling was conducted in the middle of November of 2014. We drilled a total of eight borings to explore the subsurface conditions across the site. Mr. Seth Barnett, geologist, under the guidance of Dr. Wayne Karem, PE, directed drilling operations. The boring locations were determined and marked in the field during a site visit by Mr. Barnett and Mr. Brian of HDR Engineering. Boring surface elevations were approximated using Google Earth. Because of the methods used, the elevations shown on the Boring Logs in the attachments are approximate. The stratification lines shown on the Boring Logs represent the approximate boundaries between soil types. The transitions may be more gradual than shown.

We obtained soil samples using a split-barrel sampler driven by automatic hammer assembly in general accordance with ASTM D1586. Soil samples were sealed in the field and returned to our laboratory where Dr. Karem assigned the applicable laboratory tests. All soil samples were visually classified according to the Unified Soil Classification System (USCS, ASTM D2487). We conducted moisture contents on several soil samples. Atterberg limits and unconfined compression tests were performed on select soil samples to determine the engineering properties of the soil. The laboratory data and descriptions of these tests are included in the attachments.

Subsurface Conditions

In general, the subsurface exploration encountered four soil strata:

- Stratum 1 Firm to very stiff, lean clay
- Stratum 2 soft to firm, silt
- Stratum 3 firm to stiff, lean clay
- Stratum 4 loose to very firm, coarse sand

The following discussion provides additional details about each stratum.

Beneath the about 3 inches of topsoil, a yellowish brown to brown lean clay (Stratum 1) was encountered and extended to 10 feet in borings B-1 and B-2. In borings B-3 through B-8, the lean clay extended to 20½ feet at which the borings were terminated at a predetermined termination depth without encountering refusal material. Standard penetration (SPT) N-values within the stratum ranged from 6 to 19 blows per foot (bpf). The penetration values indicate firm to very stiff soil consistency. Soil plasticity tests (Atterberg limits) was performed on four soil samples indicated liquid limits ranging from 40 to 46 with plasticity indexes ranging from 20 to 32. Using these laboratory test and the USCS, we classified the soil samples as “CL” (a low to moderate plasticity clay).

Below the lean clay, a gray to grayish brown silt (Stratum 2) was encountered and extended to approximately 17 feet in borings B-1 and B-2. The silt gradually transitioned into a clayey silt to 36 feet in Boring B-1. SPT N-values within the stratum ranged from 3 to 13 bpf; indicating a soft to stiff consistency. Atterberg limits was performed on three soil samples indicated liquid limits ranging from 49 to 53 with plasticity indexes ranging from 24 to 28. Using these laboratory test and the USCS, we classified the soil samples as “CH” (moderate to high plasticity clay) at 10 feet and “CH/CL” (moderate plasticity clay) at 20 feet in our borings.

Below the silt, a brown with mottled gray lean clay (Stratum 3) was encountered and extended to 60 feet in Boring B-1. SPT N-values ranged from 8 to 13 bpf. Penetration values indicate firm to stiff soil consistency. The soil within the stratum was visually classified as “CL” (low to moderate plasticity clay), according to the USCS.

Beneath the clays at 33 feet in Boring B-1 and at 60 feet in B-2, a gray to brown, coarse sand (Stratum 4) was encountered and extended to 70 feet in our sampling. SPT N-values ranged from 10 to 25 bpf; indicating loose to very firm relative density. The sand was visually classified as “SW” (non-uniform grained sand), according to USCS. A very dense, fine sand was encountered at 70 feet in Boring B-1. Wash drilling took place at 70 feet and continued. Drilling was terminated at the predetermined termination depth of 80 feet without encountering refusal in borings B-1 and B-2.

Groundwater

Groundwater levels were observed at 34 feet in Boring B-1 and 23 feet in Boring B-2 by water on our drilling tools. Subsequent groundwater readings were unavailable due to charging the auger with water to continue drilling operations. Groundwater was not encountered in borings B-3 through B-8. The groundwater level will fluctuate depending on the rise or fall of the Ohio River and Salt River water levels.

DISCUSSION

Based on the results of our borings and our understanding of the proposed project, we believe the project site is suitable for construction of the water transmission pipeline, the pump station, and the meter vault.

Plastic Clays

The pump station site will require an additional 5 feet of fill to meet grade. Due to the silty nature of the site soils, we are anticipating that the soils will pump and rut during wet conditions. If grading operations for the pump station are performed during periods of wet weather, these materials will not perform satisfactory during proofrolling. If soft or wet soils are encountered during the proofrolling observations, we recommend that the area be undercut to firm native soils or stabilized in-place.

Additionally, we expect that weather will have a substantial impact on the stability of the soil subgrade of the pump station. It would be best to construct this project during the warm to hot, dry months of the year. Control of surface water will be imperative to prevent the soil subgrade from becoming saturated. Equipment moving on the silty/clayey soil subgrade can cause substantial damage if the soils that become wet. The contractor should be prepared to direct surface water away from the project area. Temporary drainage ditches or sump areas may be required.

LIMITATIONS OF RECOMMENDATIONS

This report has been prepared for the exclusive use of HDR Engineering for specific application to the project site. Our recommendations have been prepared using generally accepted standards of geotechnical engineering practice in the Commonwealth of Kentucky. No other warranty is expressed or implied. This company is not

responsible for the conclusions, opinions, or recommendations of others based on these data. Additionally, our conclusions and recommendations are based on the information provided to us, the data obtained from our subsurface exploration, and our past experience. They do not reflect variations in the subsurface conditions which are likely to exist between borings and in unexplored areas of the site. These variations result from geologic variability of the subsurface conditions. If conditions are different than those encountered in our exploration, it will be necessary for us to re-evaluate our conclusions and recommendations based upon on-site observation of the conditions.

If the overall design or location of the project is changed, the recommendations contained in this report must not be considered valid unless our firm reviews the changes and our recommendations are modified. When the design is finalized, we should be given the opportunity to provide the additional service of reviewing the grading plan, and applicable portions of the project specifications. This review will allow us to check whether these documents are consistent with the intent of our recommendations.

We may recommend that a supplementary exploration be performed when significant design changes such as movement of the project are incorporated in the final design after the geotechnical exploration has been completed. This supplementary exploration may include obtaining additional soil data along the new alignment to provide specific recommendations.

RECOMMENDATIONS

Our recommendations are based on the design information furnished to us, the data obtained from the previously described geotechnical exploration, and our past experience. They do not reflect variations in the subsurface conditions which may exist between our borings and in unexplored areas of the site. If such variations become apparent during construction, it will be necessary for us to re-evaluate our conclusions and recommendations based upon on-site observation of the conditions.

Earthwork for Transmission Main

Trenching

We understand water main will be placed at a minimum depth of 48 inches in or adjacent to paved shoulders, entrances, or parking areas. We recommend that the transmission line be founded on crushed stone or sand bedding to reduce the chance of movements of the pipeline due to differential bearing conditions. Based on the results of the unconfined compressive strength tests (Rimac) and the SPT N-values obtained from the borings, we have assigned a maximum allowable soil bearing capacity of 1,500 pounds per square foot (psf) for the soil encountered in our borings. This bearing capacity should be used for bearing seats or axial loads associated with the pipeline that are not specified below. If thrust blocks are to be used, we recommend using a horizontal bearing strength of the soil of 1,000 psf where firm soils are encountered. If soft soils are encountered (easily penetrated by ½ inch diameter probe rod), a lower soil bearing capacity should be used.

The recommendations presented are based on the information obtained from the boring locations. There is a high probability that the subsurface conditions between our borings are different and therefore our recommendations may not apply. If unexpected soil conditions are encountered, we should be consulted.

General Backfilling

We recommend pea gravel, manufactured sand, or flowable fill be used to backfill around the pipe; excluding the area of repaired slope failure south of Katherine Station Road. We recommend that the following placement methods be used:

1. Pea gravel or manufactured sand should be placed using lifts of no more than 12 inches.
2. Once the initial lift is placed against the pipe, a laborer should make sure that the backfill is placed and compacted under the pipeline haunches. This can be accomplished using either his or her foot to push the material under the pipe and/or using a spud bar or shovel.
3. The backfill against the pipe and above the pipe should be “probed” using a spud bar or similar or walked over to reduce any void space that may occur during end dumping.

We recommend that pea gravel, manufactured sand, or flowable fill be placed to a minimum of 18 inches above the top of the pipe. The excavated soils or structural fill can be used to backfill the remaining void to grade.

Transmission Main Layout

For the purpose of this geotechnical report, we focused on five specific areas within the proposed alignment. The following is our recommendations for each area. Also included is the previous slope failure.

Repaired Slope Failure

The transmission main will connect to the existing termination point at Katherine Station Road extending south towards Salt River. The 24 inch ductile iron pipe will run along the eastern side of Dixie Highway. A portion of the alignment is located where a slope failure had occurred in 2014. The slope failure has been repaired. Trenching operations should be performed as specified in this report or by KYTC. We recommend flowable fill be used to backfill within the section associated with the slope failure. Flowable fill should be placed a minimum of 18 inches above the top of pipe. Above the fill, structural fill can be used to backfill the remaining trench to ground surface. Areas not effected by the previous slope failure, can be backfilled with either pea gravel or manufactured sand following backfilling procedures in this report.

Salt River Crossing

We understand that a 15 feet deep bore pit will be used for the 750 feet of directional drilling. Based on our exploration of Boring B-1, we do not anticipate groundwater to be encountered (encountered at approximately 30 feet deep in our boring). However, as previously stated, the groundwater level will fluctuate based on the level of the river water. Soft lean clay was encountered around 17 feet. To prevent the risk of cave-ins, shoring will be required. Design of the shoring system is beyond the scope of this report.

We understand the directional boring will enter at station 29+25.00 at elevation 422.51 feet. Based on drawing C-11, provided, the directional drill will cross under the river channel at elevation 345.45 feet (approximately 77 feet difference). Our borings

encountered very stiff to very dense sand approximately 70 feet from the surface. Due to the sands encountered, we anticipate hard drilling may occur for the directional drill at 70 feet in depth and below. The directional drill will exit in Hardin County at station 36+75.00 at elevation 417.19 feet.

Dixie Highway Crossing

The 16 inch ductile iron pipe will cross Dixie Highway just south of Second Street. The alignment encounters a 16 inch by 24 inch reducer followed by two 45 degree bends (making a 90 degree angle) crossing under Dixie Highway via horizontal drilling. We recommend the 24 inch ductile iron pipe be encased to prevent damages that could occur from heavy loaded traffic. We understand that a 36 inch steel casing will be used during boring operations. The pipe exits the road making another 90 degree bend followed by a reducer under an asphalt parking lot.

Based on SPT N-values and Rimac unconfined compressive strength, firm to stiff consistency lean clay was encountered in borings B-3 and B-4, located east and west of Dixie Highway. This will support the vertical bearing capacity and horizontal bearing strength previously recommended.

Paducah and Louisville Railroad Track Crossing

Three 45 degree and one 22.5 degree bends along with a 24 inch by 16 inch reducer leads the water main to the existing Paducah and Louisville Railroad track. We understand that the 120 linear feet casing will be bored below the track using a 36 inch steel casing for the 24 inch iron pipe. Exiting under the track, the water main will have a 24 inch by 30 inch reducer, 30 inch adapter, and 30 inch 22½ degree bend.

Stiff lean clays were encountered in Boring B-5, near the railroad track. We assign a vertical bearing capacity of 2,000 psf and a horizontal bearing strength of 1,500 psf.

CSX Railroad Track Crossing

The 30 inch ductile iron pipe encounters a 45 degree bend connected to a ductile iron to HDPE adapter followed by a 24 inch by 30 inch reducer and finally a 45 degree

bend. We understand 90 linear feet will be bored below the railroad track using a 36 inch steel casing to protect the 24 inch ductile iron pipe. Exiting below the track, a 24 inch by 16 inch reducer is encountered followed by 20 linear feet PVC casing to accommodate for the HP gas line. 18 inch clearance is specified between the bottom of the gas main and the top of the PCV casing.

Boring B-6 encountered lean clay that ranged in consistency from firm to stiff. Based on the Rimac testing and SPT N-values, we designate a bearing capacity of 1,500 psf and horizontal bearing strength of 1,000 psf.

Main Street Crossing

The 16 inch ductile iron pipe runs west away from the Dixie Highway, following overhead electric transmission lines to Main Street. The water main crosses under Main Street after encountering a 24 inch by 16 inch reducer. A 110 linear feet 36 inch steel casing is proposed to be bored beneath the road. The proposed steel casing will protect the ductile iron pipe from loading issues caused by Main Street traffic. After crossing Main Street, the water main connects to an above ground pump station. Recommendations for the pump station are later in this report.

Boring B-8 and B-9 encountered stiff consistency lean clay around 5 feet in depth. Based on the SPT N-values and unconfined compressive tests, we designate a vertical bearing capacity of 2,000 psf and horizontal bearing strength of 1,500 psf.

Other

The 24 inch ductile iron pipe continues along the centerline of an existing concrete road, north of Salt River. Two 11¼ degree bends are made towards the end of the concrete pavement to accommodate a gas main.

South of Salt River, a 30 inch adapter and 30 inch by 24 inch reducer will be used followed by a package below grade meter vault. We recommend the design support a horizontal bearing strength of 1,000 psf and vertical bearing capacity of 1,500 psf. Design recommendations for the vault meter is specified later in the report. A 16 inch by 24 inch reducer is attached south of the vault meter. Recommendations for the meter vault are presented later in the report.

At three locations along the alignment, PVC casing is proposed to accommodate passing below the HP gas line. 18 inch clearance is specified between the bottom of the gas main and the top of the PCV casing by plans provided. If the pipe is required to make two bends to pass under the gas line, then thrust blocks should be used to support lateral forces using a lateral bearing capacity of 1,500 psf.

We recommend using a 1,000 psf horizontal bearing strength for the design of the restraining blocks.

Earthwork for Pump Station and Meter Vault

Based on the site plan provided for the pump station pad, we understand about 5 feet of fill will be required to achieve final grade of the pump station.

Stripping

Topsoil and debris should be stripped to prepare the site for construction. The stripping should extend 5 feet outside of the building areas. Abandoned buried utilities and utility trench backfill should also be removed. Vector representative should observe site stripping as previously unexplored or unknown conditions could become evident during these operations. Vector should be contacted if unusual or unexpected subsurface conditions (i.e. – such as buried underground structures) are encountered during stripping operations.

Subgrade Evaluation (Proofrolling)

After stripping, the subgrade should be evaluated by a geotechnical engineer by observing proofrolling. Proofrolling consists of applying repeated passes on the subgrade with a fully loaded dump truck or similar rubber tired vehicle. Any materials judged to deflect excessively under the wheel loads should be undercut to more stable soils or stabilized in-place before placing structural fill.

Structural Fill Placement

After subgrade evaluation, fill areas may be brought to the planned subgrade elevations with structural fill. Ideally, structural fill is defined as inorganic natural soil with maximum particle sizes of 3 inches and a maximum dry density of at least 95

pounds per cubic foot (pcf) when tested by the standard Proctor method (ASTM D698). Limit the fill materials to a Plasticity Index less than 35. The site soils are suitable for use as fill material.

Structural fill should be placed in relatively thin (6 to 8 inch) layers and compacted to at least 95 percent of the soil's maximum dry density as determined by the standard Proctor compaction test. Additionally, the moisture content of the fill material should be maintained within the required optimum moisture content as determined by the Proctor Compaction test. If any new fill will come from an off-site borrow source, the proposed soil fill should be tested and approved by a geotechnical engineer before it is allowed to be used as fill.

Field Density Testing

In-place density testing must be performed as a check that the previously recommended compaction criteria (density and moisture) have been achieved. This allows our project engineer to monitor the quality of the fill construction and verify that the design criterion is being achieved in the field. Performance of pump station slab-on-grade will depend directly on the quality of the fill construction. The testing frequency for density tests performed on a full-time basis can be determined by our personnel based on the area to be tested, the grading equipment used, and construction schedule. Tests should be performed at vertical intervals at each lift as the fill is being placed. If the floor slabs are founded on the existing soil, the subgrade should be proofrolled prior to placing stone sub-base. We recommend that an engineering technician working under the direction of our project geotechnical engineer perform the density tests and the project geotechnical engineer observe the proofroll.

Foundation for Pump Station

We understood that the pump station will contain metal floors on poured concrete trenches founded on a below grade concrete slab. We also understand that the grade will be founded approximately 5 feet above the elevation of the existing native soil. Based on the structural fill placement meeting the criteria explained in this report, we recommend that the pump station be supported on firm or better structural fill. We recommend using a maximum allowable soil bearing capacity of 2,000 pounds per square foot (psf). The 2,000 psf bearing capacity is based on settlement of about ½ to

1 inch. We recommend a k-value (modulus of subgrade reaction) of 75 pounds per inch (pci) be used in determining the slab thickness. The same k-value can be used for the 10 feet by 15 feet slab-on-grade concrete pad south of the pump station.

Between completion of grading and slab construction, slab subgrades are often disturbed by weather, footing and utility line installation, and other construction activities. For this reason, the subgrade should be evaluated by a geotechnical engineer immediately prior to constructing the slab. During this evaluation, the subgrade should be proofrolled with relatively heavy rubber-tired equipment. Areas judged by the geotechnical engineer to perform unacceptably under the moving load should be undercut and replaced with dense graded crushed stone compacted to at least 95 percent of its standard Proctor maximum dry density.

Below Grade Meter Vault Pad

We anticipate the existing soil will support the below grade meter vault pad. We recommend a k-value of 75 pci be used in determining the slab thickness. Based on the SPT N-values of the lean clay in Boring B-2, we assign a maximum allowable bearing capacity of 1,500 psf.

We recommend a 4-inch thick (minimum) layer of compacted, well-graded crushed stone directly beneath the slab to enhance support and provide a working base for construction of each pad. The crushed stone should be moist, but not wet, as the concrete is placed to reduce curling of the slab as the concrete cures.

Lateral Earth Pressures

The below grade meter vault should be designed for static or at-rest conditions. The table below lists our recommended earth pressure coefficients and equivalent lateral earth pressures. These values assume soil backfill and KYTC #57 stone. The backfill surface will be level; and no surcharge loads will be applied. The backfill material should be capped with at least 12 inches of structural fill (clay) to retard surface water infiltration from the backfilled zone.

Backfill Material	Effective Soil Friction Angle	Unit Weight (pcf)	At-Rest Lateral Earth Pressure Coefficient K_0	Equivalent Fluid Pressure (psf)
Soil Backfill	18°	125	0.7	90
#57	36°	115	0.4	50

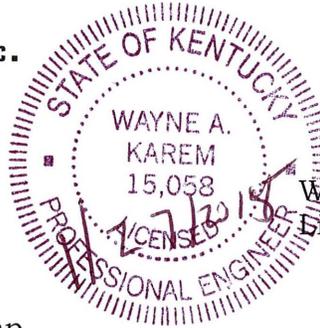
Valediction

Vector Engineers, Inc. appreciates the opportunity to provide you with these geotechnical services. Should you have questions or require any additional information, please contact us.

Respectfully submitted,
VECTOR ENGINEERS, INC.



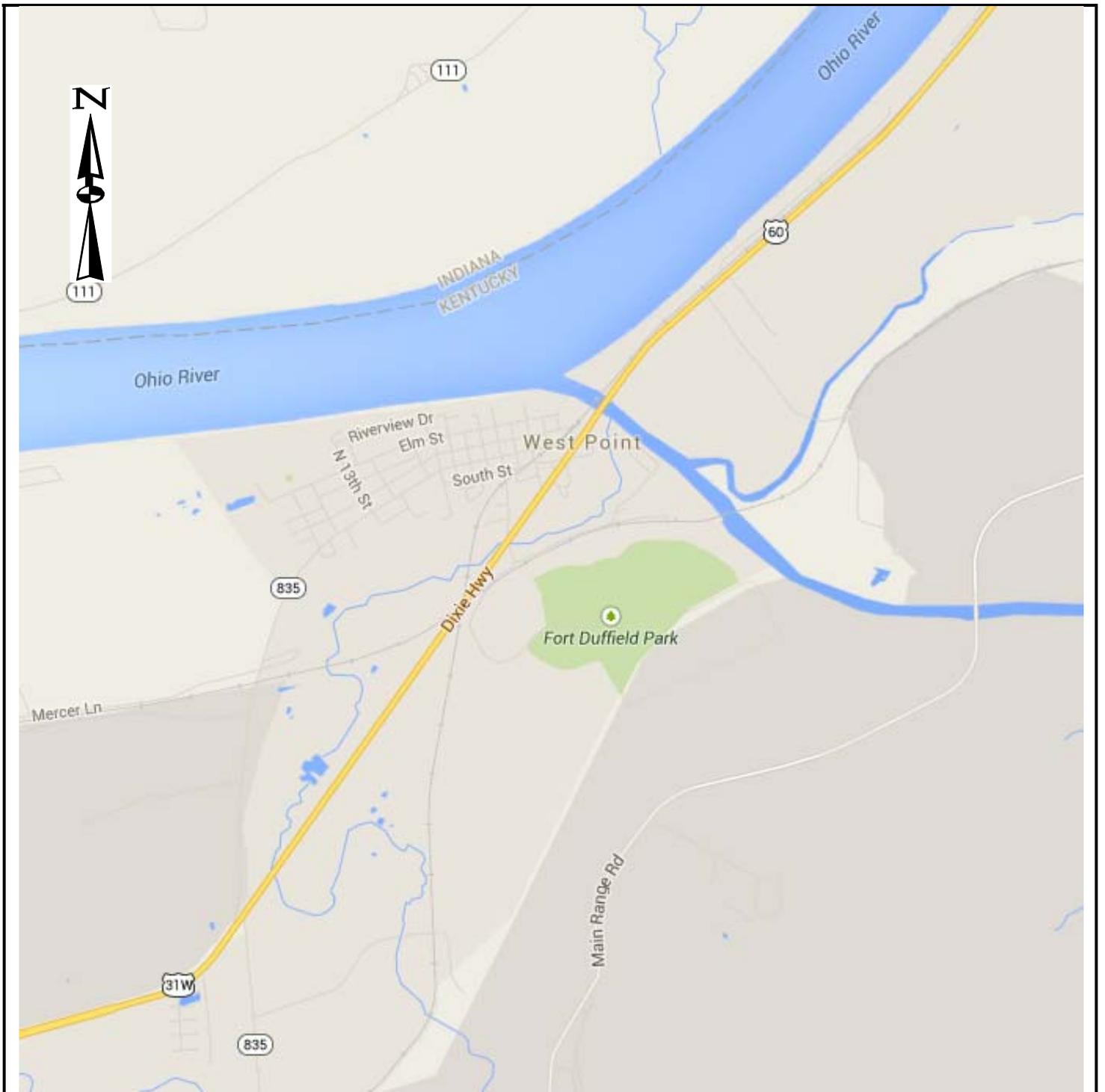
John Conway, EIT
Staff Engineer



Wayne A. Karem, PE, Ph.D., D.G.E.
Licensed KY 15058

Attachments:

- Figure 4: Site Location Map
- Figure 5: Aerial Photograph
- Figure 6: Boring Locations 1 & 2
- Figure 7: Boring Locations 3 & 4
- Figure 8: Boring Locations 5 & 6
- Figure 9: Boring Locations 7 & 8
- Boring Logs
- Field Testing Procedures
- Laboratory Data Summary
- Atterbergs Limits
- Laboratory Testing Procedures

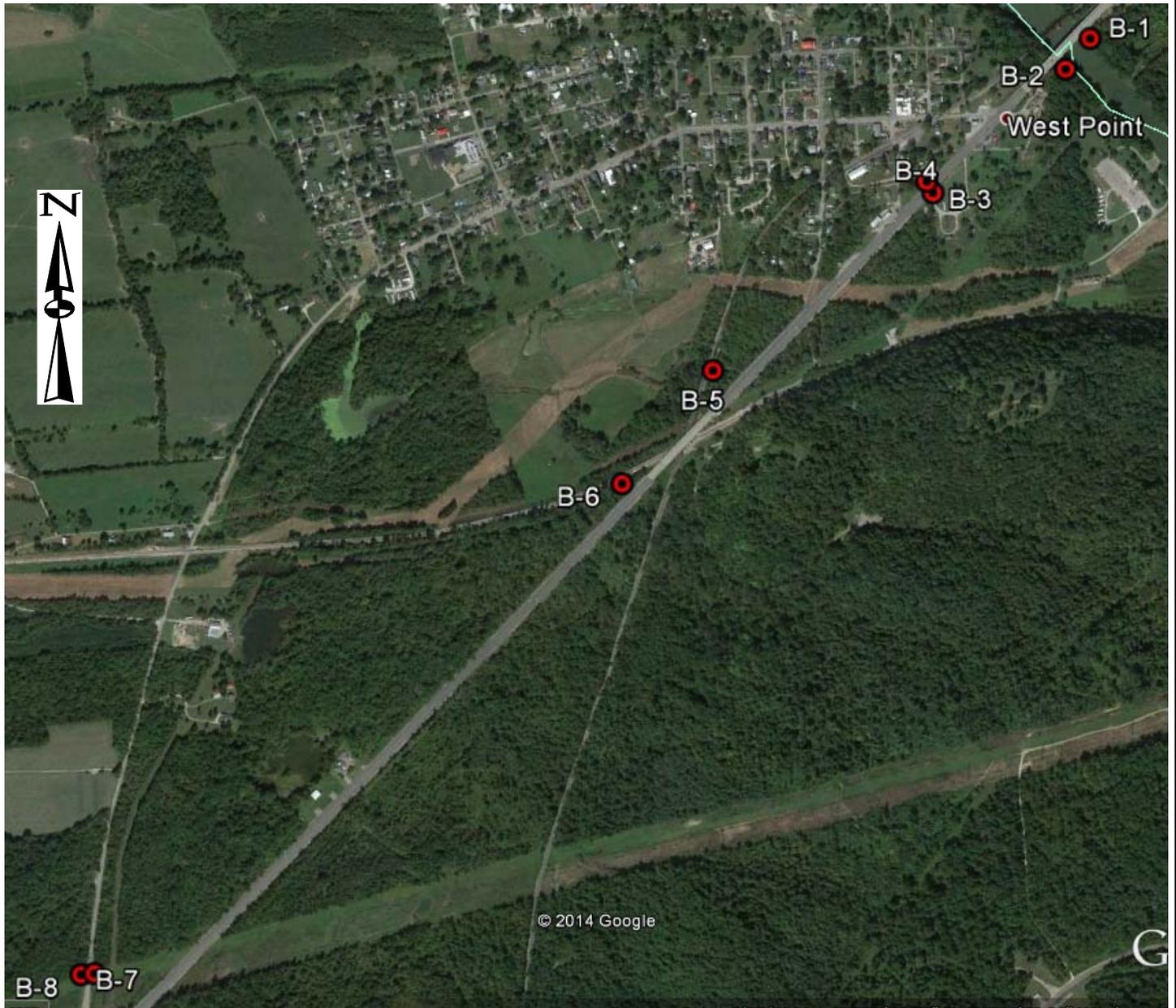


Source: Google Maps

Hardin County Transmission Main and Pump Station



Figure 4: Site Location Map
Hardin County Main
 West Point, Kentucky
 Vector Project 14-2387

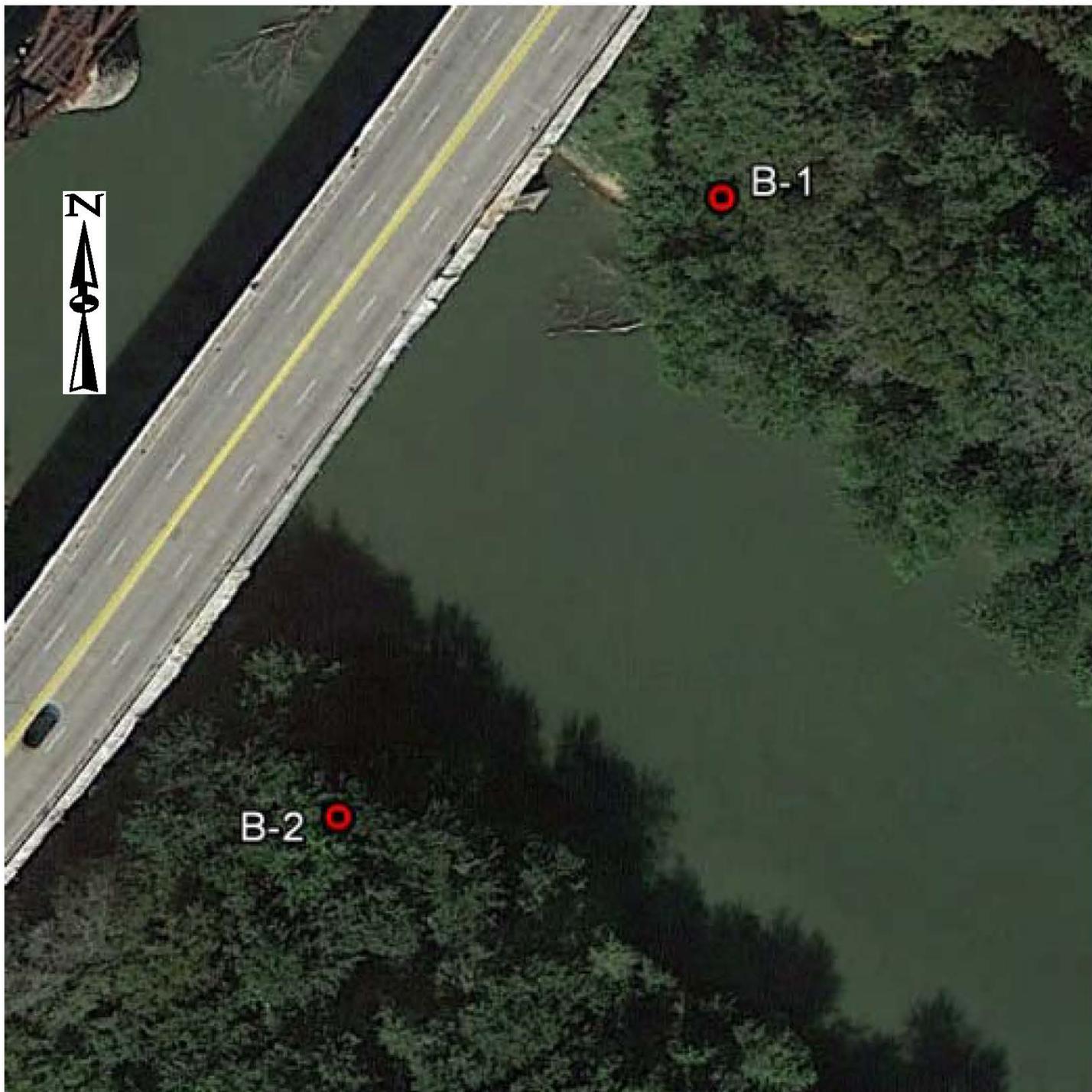


Source: Google Earth

Hardin County Transmission Main and
Pump Station



Figure 5: Aerial Photograph
Hardin County Main
West Point, Kentucky
Vector Project 14-2387



Source: Google Earth

Hardin County Transmission Main and
Pump Station

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**Figure 6: Boring Location Plan
Borings 1 & 2**

Hardin County Main
West Point, Kentucky
Vector Project 14-2387



Source: Google Earth

Hardin County Transmission Main and
Pump Station



Figure 7: Boring Location Plan
Borings 3 & 4

Hardin County Main

West Point, Kentucky

Vector Project 14-2387



Source: Google Earth

Hardin County Transmission Main and
Pump Station



Figure 8: Boring Location Plan
Borings 5 & 6
Hardin County Main
West Point, Kentucky
Vector Project 14-2387



Source: Google Earth

Hardin County Transmission Main and
Pump Station

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**Figure 9: Boring Location Plan
Borings 7 & 8**

Hardin County Main

West Point, Kentucky

Vector Project 14-2387

Field Testing Procedures

Vector Engineers performs field tests in general accordance with the American Society for Testing and Materials (ASTM). These procedures are generally recognized as the basis for uniformity and consistency of test results in the geotechnical engineering profession. All work is initiated and supervised by qualified geotechnical professionals.

Subsequent portions of this attachment present briefly describe of our field testing procedures. Where applicable, we have referenced these procedures to ASTM standards which contain specific descriptions of apparatus, procedures, reporting, etc.

SOIL TEST BORING, ASTM D-1586

The borings were made with a hollow-stem auger powered by a drill rig. At regular intervals, soil samples were obtained through the hollow augers with a standard 1.4-inch I.D., 2.0-inch O.D. split-tube sampler.

The sampler was initially seated 6 inches to penetrate any loose cuttings; then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot was recorded and is designated as the *standard penetration resistance (SPT N-value)*. Penetration resistance, when properly evaluated, is an index to soil consistency and strength.

In the field, our geotechnical professional logged and described the samples as they were obtained. Representative portions of each soil sample were labeled and sealed, then transported to our laboratory. The samples were examined by a graduate geotechnical engineer or geologist to visually check the field descriptions. Boring data, including sample intervals, penetration resistances, soil descriptions, and ground-water level are shown on the attached Test Boring Records.

SOIL TEST BORING, ASTM D-1586 (wash drilling)

The borings were made by rotary drilling in which a viscous bentonite drilling fluid is used to flush the cuttings and stabilize the hole. At regular intervals, the drilling tools were withdrawn from the borehole and soil samples obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-tube sampler.

The sampler was initially seated 6 inches to penetrate any loose cuttings; then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot was recorded and is designated as the *standard penetration resistance (SPT N-value)*. Penetration resistance, when properly evaluated, is an index to the soil's strength and density.

The samples were classified in the field by the driller as they were obtained. Representative portions of each soil sample were then sealed in labeled glass jars and

Field Testing Procedures

transported to our laboratory. The samples were examined by a graduate geotechnical engineer or engineering geologist to visually check the field classification. All boring data, including sampling intervals, penetration resistances, soil classifications, and groundwater level are shown on the attached Test Boring Records.

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE COMPACTNESS AND CONSISTENCY

Sand and Gravel

Standard Penetration Resistance

Blows/Foot

Relative Compactness

0-4	Very Loose
5-10	Loose
11-20	Firm
21-30	Very Firm
31-50	Dense
Over 50	Very Dense

Silt and Clay

Standard Penetration Resistance

Blows/Foot

Consistency

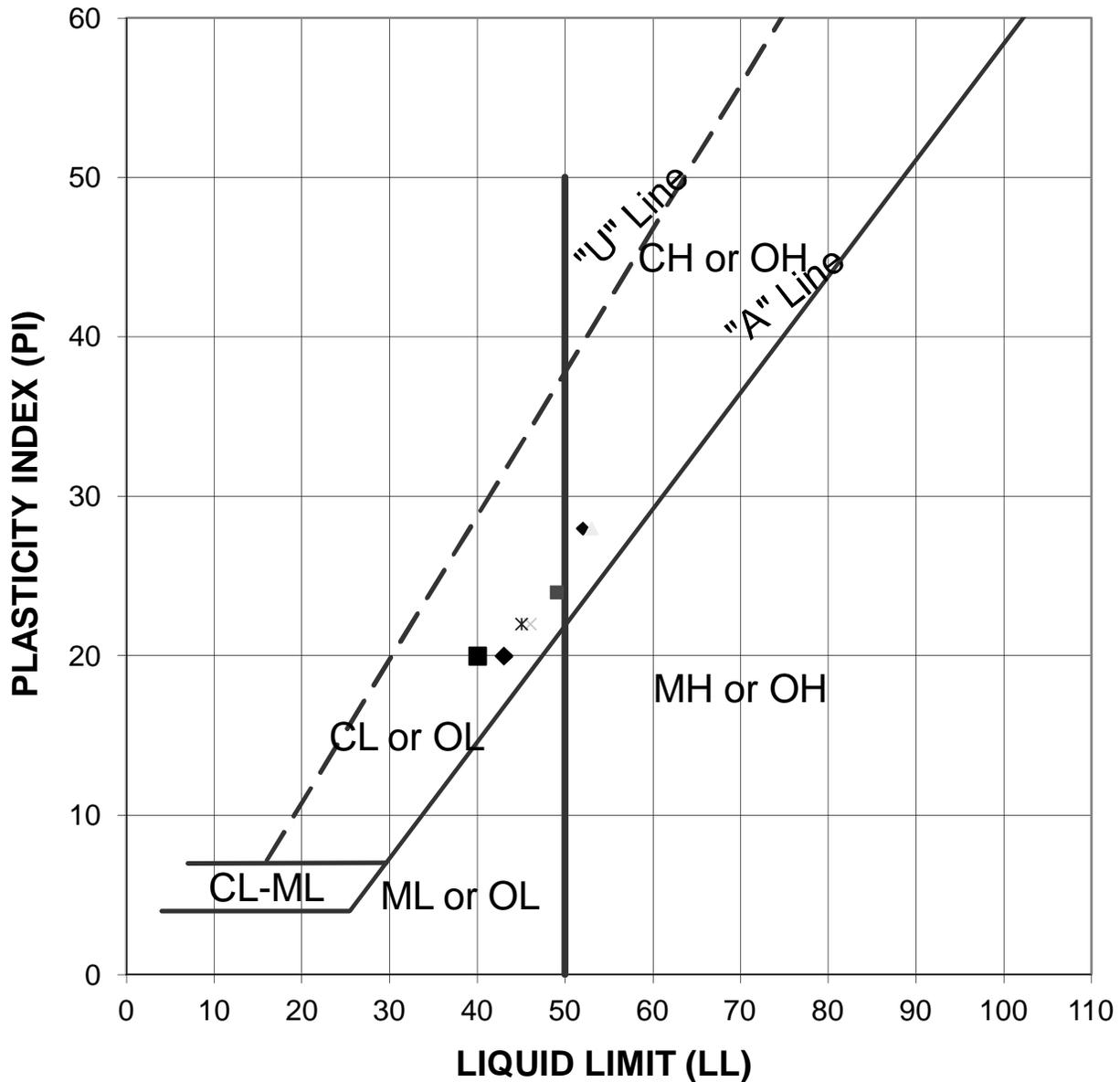
0-2	Very Soft
3-4	Soft
5-8	Firm
9-15	Stiff
16-30	Very Stiff
31-50	Hard
Over 50	Very Hard

Atterberg Limits (ASTM D4318)

PROJECT NAME: Hardin County Main
SAMPLE RECEIVED: 12/08/14
TEST DATE: 12/10/14
METHOD: Multipoint

PROJECT NO.: 14-2387
TECHNICIAN: EH
REVIEWED BY: _____
REPORT DATE: 12/12/14

Sample ID / Location	Depth	LL	PL	PI	Moist, %	Est. % retained on No. 40 sieve	Classification - Description
B1	10'	52	24	28	19.4	<5	Brown silty lean clay (CL)
B1	20'	49	25	24	31.3	<5	Brown silt (ML)
B2	10'	53	25	28	24.2	<5	Brown lean clay (CL)
B3	5'	46	24	22	21.8	<5	Brown silty lean clay (CL)
B4	5'	45	23	22	33.2	<5	Brown and gray silty lean clay (CL)
B8	5'	43	23	20	20.5	<5	Brown silty lean clay (CL)
B8	7 1/2'	40	20	20	20.6	<5	Brown silty lean clay (CL)



◆ B1 10' ■ B1 20' ▲ B2 10' × B3 5' * B4 5' ◇ B8 5' ■ B8 7 1/2'

Lab Testing Procedures

MOISTURE CONTENT DETERMINATION, ASTM D-2216

The moisture content of soils is an indicator of various physical properties, including strength and compressibility. Selected samples obtained during exploratory drilling were taken from their sealed containers. Each sample was weighed and then placed in an oven heated to $110^{\circ}\text{C} \pm 5^{\circ}$. The sample remained in the oven until the free moisture had evaporated. The dried sample was removed from the oven, allowed to cool, and re-weighed. The moisture content was computed by dividing the weight of evaporated water by the weight of the dry sample. The results, expressed as a percent.

ATTERBERG LIMITS DETERMINATION, ASTM D-4318

Representative samples were subjected to Atterberg limits testing to determine the soil's plasticity characteristics. The plasticity index (PI) is the range of moisture content through which the soil deforms as a plastic material. It is bracketed by the liquid limit (LL) and the plastic limit (PL). The liquid limit is the moisture content at which the soil becomes wet enough to flow as a viscous fluid. To determine the liquid limit, a soil specimen is first washed through a No. 40 sieve. The materials finer than the No. 40 sieve are retained and dried until the soil is in a viscous fluid state. A portion of this soil is then placed in a brass cup of standardized dimensions. A groove is cut through the middle of the soil specimen with a grooving tool of standard dimensions. The cup is attached to a cam that lifts the cup 10 mm, and then allows the cup to fall onto a hard rubber base. The cam is rotated at about 2 cps until the two halves of the soil specimen come in contact at the bottom of the groove for a distance of 1/2 inch. The number of blows required to achieve this 1/2 inch contact is recorded, and part of the specimen is subjected to a moisture content determination. The remainder of the specimen is allowed to air dry for a short time, and the grooving process and cam action repeated. This testing sequence is repeated until more than 25 blows is required to achieve the required groove contact. After the number of blows vs. moisture content for the various test points are plotted on arithmetic graph paper, the moisture content corresponding to 25 blows is designated the liquid limit.

The plastic limit (PL) is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into threads 1/8" in diameter. The plastic limit is determined by taking a pat of soil remaining from the liquid limit test, and repeatedly rolling, kneading, and air drying it until the soil breaks into threads about 1/8 inches in diameter and 3/8 inches long. The moisture content of these soil threads is then determined, and is designated the plastic limit.

Lab Testing Procedures

UNCONFINED COMPRESSION TEST (SPLIT-BARREL SOIL SAMPLE) RIMAX SAMPLES

An unconfined compression test was performed to determine the approximate soil shear strength (cohesion) parameter "C". An intact soil sample obtained with a split-barrel sampler was selected for testing. The sample was trimmed to 3 inches long and then placed in a compression testing machine. The sample was compressed at a constant rate of strain, and load measurements were made as the sample failed in undrained shear. The maximum load on the specimen was recorded, and the resultant stress calculated. This calculated stress is known as the unconfined compressive strength (q_u), and is divided by 2 to obtain "C", the shear strength or apparent cohesion.

APPENDIX B

PERMITS AND APPROVALS



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

August 12, 2015

Mr. Jim Bruce
Hardin County Water District No. 1
1400 Rogersville Rd
Radcliff, KY 40160

RE: Hardin Co Water District 1
AI # 1673, APE20150003
PWSID # 0470393-15-003
LWC Interconnect - Transmission main &
Pump Station Improvements
Hardin County, KY

Dear Mr. Bruce:

We have reviewed the plans and specifications for the above referenced project. The plans include the construction of approximately 19,950 feet of 16-inch DI; 2,510 feet of 24-inch DI and 1,820 feet of 30-inch DI Water Main; a Pump Station with 3 pumps each at 1,700 gpm with 427 feet TDH, a Master Meter Vault; Conversion of a Raw water main to Finished water main and installation of related appurtenances. This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of this date with the requirements contained in the attached construction permit.

If you have any questions concerning this project, please contact Mr. Mohammed Mohiuddin at 502-564-3410 extension 4827.

Sincerely,

A handwritten signature in black ink, appearing to read "Greg Goode".

Greg Goode, PE
Engineering Section
Water Infrastructure Branch
Division of Water

GG: MM

Enclosures

C: Jim Smith of Louisville Water Company (by email only)
Kevin Brian, HDR Engineering (by email only)
Hardin County Health Department
Public Service Commission (by email only)
Division of Plumbing (by email only)

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 1 of 9

PORT000000070 (Water main Extension)19,950 feet of 16-inch DI; 2,510 feet of 24-inch DI and 1,820 feet of 30-inch DI Water main:

Narrative Requirements:

Condition No.	Condition
T-1	Permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples on each side of the valve closest to the supply source for pipes crossing. [Recommended Standards for Water Works 8.9.2.c]
T-2	Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible, and not subject to flooding for pipes crossing underwater. [Recommended Standards for Water Works 8.9.2.b]
T-3	A minimum cover of five feet shall be provided over pipe crossing underwater. [Recommended Standards for Water Works 8.9.2]
T-4	New, cleaned and repaired water mains shall be disinfected in accordance with AWWA Standard C651. The specifications shall include detailed procedures for the adequate flushing, disinfection, and microbiological testing of all water mains. In an emergency or unusual situation, the disinfection procedure shall be discussed with the Division of Water. [Recommended Standards for Water Works 8.7.7]
T-5	Installed pipe shall be pressure tested and leakage tested in accordance with the appropriate AWWA Standards. [Recommended Standards for Water Works 8.7.6]
T-6	Water utilities shall have a cross connection program conforming to 401 KAR 8. [Recommended Standards for Water Works 8.10.1]
T-7	There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminating materials may be discharged or drawn into the system. [Recommended Standards for Water Works 8.10.1]
T-8	At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. [Recommended Standards for Water Works 8.8.3.b]
T-9	Water lines crossing sanitary, combined or storm sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sanitary, combined or storm sewer with preference to the water main located above the sanitary, combined or storm sewer. [Drinking Water General Design Criteria IV.3.c]
T-10	Water pipe shall be constructed with a lateral separation of 10 feet or more from any gravity sanitary or combined sewer measured edge to edge where practical. If not practical a variance may be requested to allow the water pipe to be installed closer to the gravity sanitary or combined sewer provided the water pipe is laid in a separate trench or undisturbed shelf located on one side of the sewer with the bottom of the pipe at least 18 inches above the top of the gravity sanitary or combined sewer pipe. [Drinking Water General Design Criteria IV.3.b]
T-11	Discharge piping from air relief valves shall not connect directly to any storm drain, storm sewer, or sanitary sewer. [Recommended Standards for Water Works 8.5.2.d]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 2 of 9

PORT000000070 (Water main Extension)19,950 feet of 16-inch DI; 2,510 feet of 24-inch DI and 1,820 feet of 30-inch DI Water main:

Narrative Requirements:

Condition No.	Condition
T-12	The open end of an air relief pipe from automatic valves shall be extended to at least one foot above grade and provided with a screened, downward-facing elbow. [Recommended Standards for Water Works 8.5.2.c]
T-13	Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur. [Recommended Standards for Water Works 8.5.1]
T-14	At high points in water mains where air can accumulate provisions shall be made to remove the air by means of air relief valves. [Recommended Standards for Water Works 8.5.1]
T-15	Wherever possible, chambers, pits or manholes containing valves, blow-offs, meters, or other such appurtenances to a distribution system, shall not be located in areas subject to flooding or in areas of high groundwater. Such chambers or pits should drain to the ground surface, or to absorption pits underground. The chambers, pits and manholes shall not connect directly to any storm drain or sanitary sewer. Blow-offs shall not connect directly to any storm drain or sanitary sewer. [Recommended Standards for Water Works 8.6]
T-16	A sufficient number of valves shall be provided on water mains to minimize inconvenience and sanitary hazards during repairs. [Recommended Standards for Water Works 8.3]
T-17	The hydrant lead shall be a minimum of six inches in diameter. Auxiliary valves shall be installed on all hydrant leads. [Recommended Standards for Water Works 8.4.3]
T-18	Dead end mains shall be equipped with a means to provide adequate flushing. [Recommended Standards for Water Works 8.2]
T-19	Pipe materials shall be selected to protect against both internal and external pipe corrosion. [Recommended Standards for Water Works 8.1]
T-20	Gaskets containing lead shall not be used. Repairs to lead-joint pipe shall be made using alternative methods. [Recommended Standards for Water Works 8.1]
T-21	Pipes and pipe fittings containing more than 8% lead shall not be used. All products shall comply with ANSI/NSF standards. [Recommended Standards for Water Works 8.1]
T-22	The minimum size of water main which provides for fire protection and serving fire hydrants shall be six-inch diameter. [Recommended Standards for Water Works 8.2, Drinking Water General Design Criteria IV.2.a]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 3 of 9

PORT000000070 (Water main Extension)19,950 feet of 16-inch DI; 2,510 feet of 24-inch DI and 1,820 feet of 30-inch DI Water main:

Narrative Requirements:

Condition No.	Condition
T-23	Manufacturer approved transition joints shall be used between dissimilar piping materials. [Recommended Standards for Water Works 8.1]
T-24	Water mains which have been used previously for conveying potable water may be reused provided they meet the above standards and have been restored practically to their original condition. [Recommended Standards for Water Works 8.1]
T-25	All materials including pipe, fittings, valves and fire hydrants shall conform to the latest standards issued by the ASTM, AWWA and ANSI/NSF, where such standards exist, and be acceptable to the Division of Water. [Recommended Standards for Water Works 8.1]
T-26	All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement. [Recommended Standards for Water Works 8.7]
T-27	Packing and jointing materials used in the joints of pipe shall meet the standards of AWWA and the reviewing authority. [Recommended Standards for Water Works 8.1]
T-28	All materials used for the rehabilitation of water mains shall meet ANSI/NSF standards. [Recommended Standards for Water Works 8.1]
T-29	Water line installation shall incorporate the provisions of the AWWA standards and/or manufacturer's recommended installation procedures. [Recommended Standards for Water Works 8.7]
T-30	A continuous and uniform bedding shall be provided in the trench for all buried pipe. Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones found in the trench shall be removed for a depth of at least six inches below the bottom of the pipe. [Recommended Standards for Water Works 8.7]
T-31	Water mains shall be covered with sufficient earth or other insulation to prevent freezing. [Recommended Standards for Water Works 8.7]
T-32	Pipe shall be constructed to a depth providing a minimum cover of 30 inches to top of pipe. [Drinking Water General Design Criteria IV.3.a]
T-33	No flushing device shall be directly connected to any sewer. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]
T-34	Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 4 of 9

PORT000000070 (Water main Extension)19,950 feet of 16-inch DI; 2,510 feet of 24-inch DI and 1,820 feet of 30-inch DI Water main:

Narrative Requirements:

Condition No.	Condition
T-35	Water mains not designed to carry fire-flows shall not have fire hydrants connected to them. [Recommended Standards for Water Works 8.4.1.b]
T-36	The minimum size of water main in the distribution system where fire protection is not to be provided should be a minimum of three (3) inch diameter. Any departure from minimum requirements shall be justified by hydraulic analysis and future water use, and can be considered only in special circumstances. [Recommended Standards for Water Works 8.2.2, Drinking Water General Design Criteria IV.2.b]
T-37	When static pressure exceeds 150 psi, pressure reducing devices shall be provided on mains or as part of the meter setting on individual service lines in the distribution system. [Drinking Water General Design Criteria IV.1.c]
T-38	The normal working pressure in the distribution system at the service connection shall not be less than 30 psi under peak demand flow conditions. Peak demand is defined as the maximum customer water usage rate, expressed in gallons per minute (gpm), in the pressure zone of interest during a 24 hour (diurnal) time period. [Drinking Water General Design Criteria IV.1.d]
T-39	Water lines should be hydraulically capable of a flow velocity of 2.5 ft/s while maintaining a pressure of at least 20 psi. [Drinking Water General Design Criteria IV.1.b]
T-40	The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]
T-41	Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]
T-42	Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]
T-43	During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]
T-44	A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]
T-45	The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

PORT000000070 (Water main Extension)19,950 feet of 16-inch DI; 2,510 feet of 24-inch DI and 1,820 feet of 30-inch DI Water main:

Narrative Requirements:

Condition	Condition
T-46	Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 6 of 9

PORT000000071 (Triplex Pump Station)a Pump Station with 3 pumps, each at 1,700 gpm with 427 feet TDH; a Master Meter Vault; Conversion of a Raw water main to Finished water main and installation of related Appurtenances:

Narrative Requirements:

Condition No.	Condition
T-1	Raw and finished pump stations shall have a floor elevation of at least six inches above finished grade. [Recommended Standards for Water Works 6.2.c]
T-2	All remote controlled stations shall be electrically operated and controlled and shall have signaling apparatus of proven performance. [Recommended Standards for Water Works 6.5]
T-3	All automatic pump stations should be provided with automatic signaling apparatus which will report when the station is out of service. [Recommended Standards for Water Works 6.5]
T-4	Booster pumps taking suction from ground storage tanks shall be equipped with automatic shutoffs or low pressure controllers. [Recommended Standards for Water Works 6.4.c]
T-5	Booster pumps shall controlled so that automatic shutoff or low pressure controllers maintain at least 20 psi in the suction line under all operating conditions. [Recommended Standards for Water Works 6.4.c]
T-6	Booster pumps taking suction from storage tanks shall be provided adequate net positive suction head. [Recommended Standards for Water Works 6.4.b]
T-7	Pump station piping shall be designed so that the friction losses will be minimized, not be subject to contamination, have watertight joints, be protected against surge or water hammer with suitable restraints when necessary, and be such that each pump has an individual suction line or the lines shall be manifolded that they will insure similar hydraulic and operating conditions. [Recommended Standards for Water Works 6.6.2]
T-8	Each pump shall have a positive?acting check valve on the discharge side between the pump and the shut?off valve. [Recommended Standards for Water Works 6.6.1]
T-9	Each pump must have an isolation valve on the intake and discharge side of the pump to permit satisfactory operation, maintenance and repair of the equipment. [Recommended Standards for Water Works 6.6.1]
T-10	Inline booster pumps shall be accessible for servicing and repairs. [Recommended Standards for Water Works 6.4.3]
T-11	All booster pumping stations shall be fitted with a flow rate indicating and totalizer meter. [Recommended Standards for Water Works 6.4.2]
T-12	Each booster pumping station shall contain not less than two pumps with capacities such that peak demand can be satisfied with the largest pump out of service. [Recommended Standards for Water Works 6.4.1]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 7 of 9

PORT000000071 (Triplex Pump Station)a Pump Station with 3 pumps, each at 1,700 gpm with 427 feet TDH; a Master Meter Vault; Conversion of a Raw water main to Finished water main and installation of related Appurtenances:

Narrative Requirements:

Condition No.	Condition
T-13	Booster pumps stations shall have a bypass available. [Recommended Standards for Water Works 6.4.e]
T-14	All lubricants which come into contact with the potable water shall be certified for conformance to ANSI/NSF Standard 60. [Recommended Standards for Water Works 6.6.8]
T-15	If standby power is provided by onsite generators or engines, the fuel storage and fuel line must be designed to protect the water supply from contamination. [Recommended Standards for Water Works 6.6.6]
T-16	Pump stations shall have a power supply provided from at least two independent sources or a standby or an auxiliary source. [Recommended Standards for Water Works 6.6.6]
T-17	Equipment shall be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation. [Recommended Standards for Water Works 6.6.5]
T-18	Electrical controls shall be located above grade. [Recommended Standards for Water Works 6.6.5]
T-19	Provisions shall be made to prevent energizing the pump motor in the event of a backspin cycle. [Recommended Standards for Water Works 6.6.5]
T-20	Where two or more pumps are installed, provision shall be made for alternation. [Recommended Standards for Water Works 6.6.5]
T-21	Each pump shall have a compound gauge on its suction line. [Recommended Standards for Water Works 6.6.3.b]
T-22	Each pump shall have a standard pressure gauge on its discharge line. [Recommended Standards for Water Works 6.6.3.a]
T-23	Pump stations shall have indicating, totalizing, and recording metering of the total water pumped. [Recommended Standards for Water Works 6.6.3]
T-24	Pumps shall be provided with readily available spare parts and tools. [Recommended Standards for Water Works 6.3.c]
T-25	Pumps shall be driven by prime movers able to meet the maximum horsepower condition of the pumps. [Recommended Standards for Water Works 6.3.b]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 8 of 9

PORT000000071 (Triplex Pump Station)a Pump Station with 3 pumps, each at 1,700 gpm with 427 feet TDH; a Master Meter Vault; Conversion of a Raw water main to Finished water main and installation of related Appurtenances:

Narrative Requirements:

Condition No.	Condition
T-26	Pumps shall have ample capacity to supply the peak demand against the required distribution system pressure without dangerous overloading, [Recommended Standards for Water Works 6.3.a]
T-27	At least two pumping units shall be provided. With any pump out of service, the remaining pump or pumps shall be capable of providing the maximum pumping demand of the system. [Recommended Standards for Water Works 6.3]
T-28	Raw and finished pump stations shall provide a suitable outlet for drainage from pump glands without discharging onto the floor. [Recommended Standards for Water Works 6.2.f]
T-29	Raw and finished pump stations shall have floors that slope to a suitable drain. [Recommended Standards for Water Works 6.2.e]
T-30	Raw and finished pump stations shall have adequate space for the installation of additional units if needed, and for the safe servicing of all equipment. [Recommended Standards for Water Works 6.2.a]
T-31	Pumping facilities shall be protected to prevent vandalism and entrance by animals or unauthorized persons. [Recommended Standards for Water Works 6.1.1.d]
T-32	Pumping facilities shall be graded around the station so as to lead surface drainage away from the station. [Recommended Standards for Water Works 6.1.1.c]
T-33	Pumping facilities shall be readily accessible at all times. [Recommended Standards for Water Works 6.1.1.b]
T-34	Pumping facilities shall be elevated to a minimum of three feet above the 100-year flood elevation, or three feet above the highest recorded flood elevation, whichever is higher, or protected to such elevations, [Recommended Standards for Water Works 6.1.1.a]
T-35	The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]
T-36	Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]
T-37	Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]

Distribution-Major Construction

Hardin Co Water District 1

Facility Requirements

Activity ID No.:APE20150003

Page 9 of 9

PORT000000071 (Triplex Pump Station)a Pump Station with 3 pumps, each at 1,700 gpm with 427 feet TDH; a Master Meter Vault; Conversion of a Raw water main to Finished water main and installation of related Appurtenances:

Narrative Requirements:

Condition No.	Condition
T-38	During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]
T-39	A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]
T-40	The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]
T-41	Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]



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

October 9, 2015

Hardin County Water District No. 1
Attention: JBruce@hcwd.com
1400 Rogersville Road
Radcliff, Kentucky 40160

Re: Nationwide Permit No.12
Louisville Water Company Interconnect
Transmission Main and Pump Station
Improvements Project
AI No.: 1673; Activity ID: APE20150005
Salt River, Bees Branch, Unnamed Tributary to
Bees Branch
Jefferson & Hardin Counties, Kentucky

Dear Mr. Bruce:

This letter transmits to you a copy of our General Water Quality Certification for Nationwide Permit # 12 for Utility Backfill and Bedding for impacts associated with the proposed project that involves the installation of 16- and 24-inch water transmission pipelines, a below grade master meter vault and a packaged above ground water booster pump station. An individual Water Quality Certification is not necessary for this activity provided that this project has received the appropriate Nationwide Permit from the U.S. Army Corps of Engineers and all conditions of the attached General Water Quality Certification are met.

Although an Individual WQC is not needed, other permits from the Division of Water may be required. If this activity occurs within a floodplain, a Permit to Construct Across or Along a Stream may be required. Please contact the Floodplains Supervisor (502-564-3410) for more information. If the project will disturb one acre or more of land, or is part of a larger common plan of development or sale that will ultimately disturb one acre or more of land, a Kentucky Pollution Discharge Elimination System (KPDES) stormwater permit shall be required from the Surface Water Permits Branch. This permit requires the development of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must include erosion prevention and sediment control measures. Contact: Surface Water Permits Branch (SWPB) Support (502-564-3410 or SWPBSupport@ky.gov)

All future correspondence on this project must reference **AI No. 1673**. If you should have any questions concerning this letter, please contact of me at Chloe.Brantley@ky.gov or (502) 564-3410 Extension 4863.

Sincerely,

Chloe Brantley, Project Manager
401 Water Quality Certification Section
Kentucky Division of Water

CB

Attachments

cc: Jane Archer, USACE: Louisville District (via email: Jane.E.Archer@usace.army.mil)
Hardin County Water District No. 1 (via email: JBruce@hcwd.com)
Kevin Brian, HDR Engineering (via email: kevin.brian@hdrinc.com)



ENERGY AND ENVIRONMENTAL PROTECTION CABINET

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

DIVISION OF WATER

200 FAIR OAKS LANE

FRANKFORT, KENTUCKY 40601

www.kentucky.gov

General Certification--Nationwide Permit # 12 Utility Line Backfill and Bedding

This General Certification is issued March 19, 2012, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33 U.S.C. §1341), as well as Kentucky Statute KRS 224.16-050.

For this and all nationwide permits, the definition of surface water is as per 401 KAR 10:001 Chapter 10, Section 1(80): Surface Waters means those waters having well-defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Lagoons used for waste treatment and effluent ditches that are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the commonwealth.

Agricultural operations, as defined by KRS 224.71-100(1) conducting activities pursuant to KRS 224.71-100 (3), (4), (5), (6), or 10 are deemed to have certification if they are implementing an Agriculture Water Quality Plan pursuant to KRS 224.71-145.

For all other operations, the Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 304, 306 and 307 of the CWA, will not be violated for the activity covered under NATIONWIDE PERMIT 12, namely Utility Line Backfill and Bedding, provided that the following conditions are met:

1. The activity will not occur within surface waters of the Commonwealth identified by the Kentucky Division of Water as Outstanding State or National Resource Water, Cold Water Aquatic Habitat, or Exceptional Waters.
2. The activity will not occur within surface waters of the Commonwealth identified as perpetually-protected (e.g. deed restriction, conservation easement) mitigation sites.
3. This general water quality certification is limited to the crossing of surface waters by utility lines. This document does not authorize the installation of utility lines in a linear manner within the stream channel or below the top of the stream bank.

General Certification--Nationwide Permit # 12
Utility Line Backfill and Bedding
Page 2

4. For a single crossing, impacts from the construction and maintenance corridor in surface waters shall not exceed 50 feet of bank disturbance.
5. This general certification shall not apply to nationwide permits issued for individual crossings which are part of a larger utility line project where the total cumulative impacts from a single and complete linear project exceed ½ acre of wetlands or 300 linear feet of surface waters. Cumulative impacts include utility line crossings, permanent or temporary access roads, headwalls, associated bank stabilization areas, substations, pole or tower foundations, maintenance corridor, and staging areas.
6. Stream impacts under Conditions 4 and 5 of this certification are defined as the length of bank disturbed. For the utility line crossing and roads, only one bank length is used in calculation of the totals.
7. Stream impacts covered under this General Water Quality Certification and undertaken by those persons defined as an agricultural operation under the Agricultural Water Quality Act must be completed in compliance with the Kentucky Agricultural Water Quality Plan (KWQP).
8. The Kentucky Division of Water may require submission of a formal application for an individual certification for any project if the project has been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.
9. Activities that do not meet the conditions of this General Water Quality Certification require an Individual Section 401 Water Quality Certification.
10. Blasting of stream channels, even under dry conditions, is not allowed under this general water quality certification.
11. Utility lines placed parallel to the stream shall be located at least 50 feet from an intermittent or perennial stream, measured from the top of the stream bank. The cabinet may allow construction within the 50 foot buffer if avoidance and minimization efforts are shown and adequate methods are utilized to prevent soil from entering the stream.
12. Utility line stream crossings shall be constructed by methods that maintain flow and allow for a dry excavation. Water pumped from the excavation shall be contained and allowed to settle prior to re-entering the stream. Excavation equipment and vehicles shall operate outside of the flowing portion of the stream. Spoil material from the excavation shall not be allowed to enter the flowing portion of the stream.

General Certification--Nationwide Permit # 12
Utility Line Backfill and Bedding
Page 3

13. The activities shall not result in any permanent changes in pre-construction elevation contours in surface waters or wetlands or stream dimension, pattern or profile.
14. Utility line activities which impact wetlands shall not result in conversion of the area to non-wetland status. Mechanized land clearing of forested wetlands for the installation or maintenance of utility lines is not authorized under this certification.
15. Activities qualifying for coverage under this General Water Quality Certification are subject to the following conditions:
 - 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.
 - Sediment and erosion control measures, such as check-dams constructed of any material, silt fencing, hay bales, etc., shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the activities.
 - Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
 - Removal of riparian vegetation shall be limited to that necessary for equipment access.
 - To the maximum extent practicable, all in-stream work under this certification shall be performed under low-flow conditions.
 - Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances in which such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation.

General Certification--Nationwide Permit # 12
Utility Line Backfill and Bedding
Page 4

- Any fill shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement.
- If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when such work will be done.
- Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the 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.



ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

ATTENTION APPLICANT

If your project involves one or more of the following activities, you may need more than one permit from the Kentucky Division of Water.

- *building in a floodplain**
- *road culvert in a stream**
- *streambank stabilization**
- *stream cleanout**
- *utility line crossing a stream**
- *construction sites greater than 1 acre**

- Construction sites greater than 1 acre will require the filing of a Notice of Intent to be covered under the KPDES General Stormwater Permit. This permit requires the creation of an erosion control plan.
Contact: Surface Water Permits Branch (SWPB) Support at (502) 564-3410 or SWPBsupport@ky.gov
- Projects that involve filling in the floodplain will require a floodplain construction permit from the Floodplain Management Section.
Contact: Ron Dutta
- Projects that involve work IN a stream, such as bank stabilization, road culverts, utility line crossings, and stream alteration will require a floodplain permit and a Water Quality Certification from the Division of Water.
Contact: Andrea Keatley

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 Goodmann by calling (502) 564-3410.

GENERAL CONDITIONS FOR WATER QUALITY CERTIFICATION

1. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
2. All dredged material shall be removed to an upland location and/or graded on adjacent areas (so long as such areas are not regulated wetlands), to obtain original streamside elevations, i.e. overbank flooding shall not be artificially obstructed.
3. In areas not riprapped or other wise stabilized, revegetation of stream banks and riparian zones shall occur concurrently with project progression. At a minimum, revegetation will approximate pre-disturbance conditions.
4. To the maximum extent practicable, all instream work under this certification shall be performed during low flow.
5. Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances where such instream work is unavoidable, then it shall be performed in such a manner and duration as to minimize resuspension of sediments and disturbance to substrates and bank or riparian vegetation.
6. Any fill or riprap including refuse fill, shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If riprap is utilized, it is to be of such weight and size that bank stress or slump conditions will not be created because of its placement.
7. If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when work will be done.
8. Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.
9. Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling 800/564-2380.



STEVEN L. BESHEAR
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

LEONARD K. PETERS
SECRETARY

STREAM CONSTRUCTION PERMIT

For Construction In Or Along A Stream

Issued to: **Hardin County Water District 1**
Address: **1400 Rogersville Rd**
Radcliff, KY 40160

Permit expires on
November 13, 2016

Permit No. **21776**

AI: **1673**

In accordance with KRS 151.250 and KRS 151.260, the Energy and Environment Cabinet approves the application dated **October 13, 2015** for installation of **16" & 24" water pipeline including subfluvial crossings, master meter vault and water booster pump station in the floodplain of Bee Branch at about stream mile 2.3, with coordinates 37.980834, -85.962363, in Hardin County.**

There shall be no deviation from the plans and specifications submitted and hereby approved unless the proposed change shall first have been submitted to and approved in writing by the Cabinet. This approval is subject to the attached limitations. **Please read these limitations carefully!** If you are unable to adhere to these limitations for any reason, please contact this office prior to construction.

This permit is valid from the standpoint of stream obstruction only. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal and local agencies. Specifically if the project involves work in a stream, such as bank stabilization, dredging, relocation, or in designated wetlands, a 401 Water Quality Certification from the Division of Water will be required.

This permit is nontransferable and is not valid unless actual construction of this authorized work is begun prior to the expiration date noted above. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990.

If you have any questions regarding this permit, please call Soheyl Bigdeli at (502) 564-3410.

Issued November 13, 2015.

Ron Dutta, P.E., Supervisor
Floodplain Management Section
Surface Water Permit Branch

RD/SB/kec

pc: Louisville Regional Office
Richard Ciresi – City of West Point Floodplain Coordinator
Kevain J Brian, PE (by email)
File

Stream Construction Permit

Hardin Co Water District 1

Facility Requirements

Permit Number: 21776

Activity ID No.:APE20150006

Page 1 of 3

STRC0000000015 (AI: 1673 - Water Line) installation of 16" & 24" water pipeline including subfluvial crossings, master meter vault and water booster pump station:

Submittal/Action Requirements:

Condition No.	Condition
S-1	Hardin County Water District No. 1 must submit final construction report: Due within 90 days after completion of construction Hardin County Water District No. 1 must notify in writing that the project has been completed in accordance with the approved plans and specifications. A Final Construction Report Form is enclosed. [401 KAR 4:060 Section 6]

Narrative Requirements:

Condition No.	Condition
T-1	The issuance of this permit by the cabinet does not convey any property rights of any kind or any exclusive privilege. [KRS 151.250 & 401 KAR 4:060]
T-2	This permit is issued from the standpoint of stream obstruction only and does not constitute certification of any other aspect of the proposed construction. The applicant is liable for any damage resulting from the construction, operation, or maintenance of this project. This permit has been issued under the provisions of KRS Chapter 151.250 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal and local agencies. [KRS 151.250]
T-3	A copy of this permit must be available at the construction site. [KRS 151.250]
T-4	Any work performed by or for Hardin County Water District No. 1 that does not fully conform to the submitted application or drawings and the limitations set forth in this permit, is subject to partial or total removal and enforcement actions pursuant to KRS 151.280 as directed by the Kentucky Department for Environmental Protection. [KRS 151.280]
T-5	Any design changes or amendments to the approved plans must be submitted to the Division of Water and approved in writing prior to implementation. [KRS 151.250]
T-6	Since Hardin County participates in the National Flood Insurance Program, a local floodplain permit must be obtained prior to beginning of construction. Upon completion of construction Hardin County Water District No. 1 must contact the local permitting agency for final approval of the construction for compliance with the requirements of the local floodplain ordinance. [401 KAR 4:060 Section 9(c)]

Stream Construction Permit

Hardin Co Water District 1

Facility Requirements

Permit Number: 21776

Activity ID No.:APE20150006

Page 2 of 3

STRC0000000015 (AI: 1673 - Water Line) installation of 16" & 24" water pipeline including subfluvial crossings, master meter vault and water booster pump station:

Narrative Requirements:

Condition No.	Condition
T-7	At no point below the base flood elevation 443 feet MSL shall the use of construction materials or the permanent storage of materials subject to flood damage, at the Booster Pump Station, be allowed. [401 KAR 4:060]
T-8	The permittee must obtain a Water Quality Certification (or a determination that none is required) through the Division of Water, Water Quality Branch before beginning construction. Contact the Water Quality Certification Supervisor at (502) 564-3410. [KRS 224.16-050 & Clean Water Act Section 401]
T-9	All major permanent electrical appliances at the Booster Pump Station and electric wiring below the base flood elevation, shall be protected with ground fault interrupting circuit breakers. [KRS 151.250]
T-10	Erosion prevention measures, sediment control measures, and other site management practices shall be designed, installed, and maintained in an effective operating condition to prevent migration of sediment off site. [KRS 224.70-110]
T-11	To avoid secondary adverse impacts, all materials used shall be stable and inert, free from pollutants and floatable objects, and shall meet all appropriate engineering standards. (Inert here means materials that are not chemically reactive and that will not rot or decompose, such as soil, rock, broken concrete or similar materials.). [401 KAR 4:060 Section 7]
T-12	All debris and excess material shall be removed for disposal outside of the base floodplain. [401 KAR 4:060]
T-13	The entry of mobile equipment into the stream channel shall be limited as much as reasonably possible to minimize degradation of the waters of the Commonwealth. [401 KAR 4:060]
T-14	Construction other than as authorized by this permit shall require written approval from the Division of Water. [401 KAR 4:060]
T-15	The existing stream flow shall be maintained at all times during construction using standard flow diversion or pump around methods. Cofferdams or other structures placed in the stream shall be removed immediately if adverse flooding conditions result or if a flooding event is imminent. [401 KAR 4:060 Section 4]

Stream Construction Permit

Hardin Co Water District 1

Facility Requirements

Permit Number: 21776

Activity ID No.:APE20150006

STRC0000000015 (AI: 1673 - Water Line) installation of 16" & 24" water pipeline including subfluvial crossings, master meter vault and water booster pump station:

Narrative Requirements:

Condition No.	Condition
T-16	A construction permit pursuant to KRS 151.250 shall not be required for a subfluvial utility or pipeline crossing provided that the construction of the crossing meets the following criteria: (1) During the construction of the crossing, no material may be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc., unless prior approval has been obtained from the cabinet. (2) The trench shall be backfilled as closely as possible to the original contour. All excess material from construction of the trench shall be disposed of outside of the flood plain unless the applicant has received prior approval from the cabinet to fill within the flood plain. (3) For subfluvial crossings of erodible channels, there shall be at least thirty (30) inches clear to the top of the pipe or conduit at all points. (4) For subfluvial crossings of nonerodible channels, there shall be at least six (6) inches of clear cover above the top of the pipe or conduit at all points, and the pipe or conduit shall be encased on all sides by at least six (6) inches of concrete. (5) The weight of a pipe and its contents during normal operating conditions at all points must exceed that of an equal volume of water, or the applicant must provide the division with sufficient information to show that the pipe and joints have sufficient strength. [401 KAR 4:050 Section 2]



ENCROACHMENT PERMIT

KEPTS No.: A04-2014-00190

Permittee: Hardin County Water District #1

Latitude: 38.001005

Longitude: -85.942418

Completion Date: 7/1/2015

Coordinates provided on the TC 99-1(B) are the approved location for this permit

Indemnities		
Type	Amount Required	Tracking Number
Performance Bond	0	
Payment Bond	0	
Liability Insurance	0	

This permit has been:

APPROVED **DENIED**

Kevin Blain _____ Permit Section Supervisor

NAME _____ **TITLE**

Kevin Blain _____ 6/19/2014

SIGNATURE _____ **DATE**

The TC 99-1(B), including the application TC-99 1(A) and all related and accompanying documents and drawings make up the permit. It is not a permit unless both the TC 99-1(A) and TC 99-1(B) are both present.



Kentucky Transportation Cabinet
 Department of Highways
 Permits Branch

TC 99-1 (A)
 8/2012
 Page 1 of 4

APPLICATION FOR ENCROACHMENT PERMIT

Permittee Information				KYTC No. <u>09-2014-00190</u>			
Name	Hardin County Water District No. 1			Permit Information			
Address	1400 Rogersville Rd			Address	Dixie Hwy		
				City	West Point		
City	Radcliff			State	KY	Zip	40177
State	KY	Zip	40160	County	Hardin		
Phone#	(270)351-3222			Route No.	US 31 W	Mile-Point	0 to 35.5 <u>37.303</u>
Contact	Daniel Clifford			Longitude (X)	38.001036, 37.979108		<u>-85.9424</u>
Phone	270-351-3222	Cell	270-268-4090	Latitude (Y)	-85.942426, -85.962022		<u>38.0010</u>
Email	DClifford@hcwd.com			Information below to be filled out by KYTC			
Contact				<input type="checkbox"/> Air Right	<input type="checkbox"/> Entrance		
Phone	Cell			<input checked="" type="checkbox"/> Utilities	<input type="checkbox"/> Other: _____		
Email				<u>Boer</u>			
				<input type="checkbox"/> Left	<input type="checkbox"/> Right	<input checked="" type="checkbox"/> X-ing	
				Access: <input type="checkbox"/> Full	<input type="checkbox"/> Partial	<input checked="" type="checkbox"/> by Permit	

General Description of Work:

Various perpendicular roadway crossings via bore and jack with steel encasement pipe and various parallel encroachments along right-of-way for the construction of 16"/20"/24" water main. Transmission main routes are located along Dixie Highway (US 31W) and Main Street (US 31W Business). See attached water main construction plans and maintenance of traffic control plans.

THE UNDERSIGNED PERMITTEE(s) (being duly authorized representative(s) or owner(s)) DO AGREE TO ALL TERMS AND CONDITIONS ON THE TC 99-1 (A).

Signature [Handwritten Signature] Date 3/28/14

This is not a permit unless and until the permittee(s) receives an approved TC 99-1(B) from KYTC. This application will become void if not approved by the cancellation date. The cancellation date will be one year from the date the permittee submits their application.



APPLICATION FOR ENCROACHMENT PERMIT

TERMS AND CONDITIONS

1. The permit, including this application and all related and accompanying documents and drawings making up the permit, remains in effect and is binding upon the Applicant/Permittee, its successors and assigns, as long as the encroachment(s) exists and also until the permittee is finally relieved by the Department of Highways from all its obligations.
2. Applicant shall meet all requirements of the Clean Water Act if the project will disturb one acre or more, the applicant shall obtain a KPDES KYR10 Permit from the Kentucky Division of Water. All disturbed areas shall meet the requirements of the Department of Highway's Standard Specifications, Sections 212 and 213, as amended.
3. **INDEMNITY:**
 - A. **PERFORMANCE BOND:** The permittee shall provide to the Department a performance bond according to the Permits Manual, Section PE-203 as a guarantee of conformance with the Department's Encroachment Permit requirements.
 - B. **PAYMENT BOND:** At the discretion of the department, a payment bond will be required of the permittee to ensure payment of liquidated damages assessed to the permittee.
 - C. **LIABILITY INSURANCE:** Liability insurance will be required of the permittee (in an amount approved by the department) to cover all liabilities associated with the encroachment.
 - D. It shall be the responsibility of the permittee, its successors and assigns, to maintain all indemnities in full force and effect until the permittee is authorized to release the indemnity by the Department.
4. A copy of this application and all related documents making up the approved permit will be given to the applicant and shall be made readily available for review at the work site at all times.
5. Perpetual maintenance of the encroachment is the responsibility of the permittee, its successors and assigns, with the approval of the Department as required, unless otherwise stated.
6. Permittee, its successors and assigns, shall comply with and agrees to be bound by the requirements and terms of (a) this application and all related documents making up the approved permit, (b) by the Department's Permits Manual, and (c) by the Manual on Uniform Traffic Control Devices, both manuals as revised to and in effect on the date of issuance of the permit, all of which documents are made a part thereof by this reference. Compliance by the permittee, its successors and assigns, with subsequent revisions to applicable provisions of either manual or other policy of the Department may be made a condition of allowing the encroachment to persist under the permit.
7. Permittee agrees that this and any encroachment may be ordered removed by the Department at any time, and for any reason, upon thirty days written notice to the last known address of the applicant or to the address at the location of the encroachment. The permittee agrees that the cost of removing and of restoring the associated right-of-way is the responsibility of the permittee, its successors and assigns.
8. Permittee, its successors and assigns, agree that if the Department determines that motor vehicular safety deficiencies develop as a result of the installation or use of the encroachment, the permittee, its successors and assigns, shall provide and bear the expenses to adjust, relocate, or reconstruct the facilities, and/or add signs, auxiliary lanes, or other corrective measures reasonably deemed necessary by the Department within a reasonable time after receipt of a written notice of such deficiency. The period within which such adjustments, relocations, additions, modifications, and/or other corrective measures must be completed will be specified in the notice.



APPLICATION FOR ENCROACHMENT PERMIT

9. Where traffic signals are required as a condition of granting the requested permit or are thereafter required to correct motor vehicular safety deficiencies, as determined by the Department, the costs for signal equipment and installation(s) shall be borne by the permittee, its successors and assigns, and/or the Department in its reasonable discretion and only in accordance with the Department’s current policy set forth in the Traffic Operations Manual and Permits Manual. Any modifications to the permittee’s entrance necessary to accommodate signalization (including necessary easement(s) on private property) shall be the responsibility of the permittee, its successors and assigns, at no expense to the Department.

10. The requested encroachment shall not infringe on the frontage rights of an abutting owner without their written consent as hereinafter described. Each abutting owner shall express their consent, which shall be binding on their successors and assigns, by the submission of a notarized statement as follows, “I (we), _____, hereby consent to the granting of the permit requested by the applicant along Route _____, which permit does affect frontage rights along my (our) adjacent real property.” By signature(s) _____, subscribed and sworn by _____, on this date _____.

11. The permit, if approved, is subject to the agreement that it shall not interfere with any similar rights or permit(s) previously granted to any other party, except as otherwise provided by law.

12. Permittee shall include documentation which describes the facilities to be constructed. Permittee, its successors and assigns, agrees as a condition of the granting of the permit to construct and maintain any and all permitted facilities or other encroachments in strict accordance with the submitted and approved permit documentation and the policies and procedures of the Department. Permittee, its successors and assigns, shall not use facilities authorized herein in any manner contrary to that prescribed by the approved permit. Only normal usage as contemplated by the parties and by this application and routine maintenance are authorized by the permit.

13. Permittee, its successors and assigns, at all times from the date permitted work is commenced until such time as all permitted facilities or other encroachments are removed from the right-of-way and the right-of-way restored, **shall defend, protect, indemnify and save harmless** the Department from any and all liability claims and demands arising out of the work, encroachment, maintenance, or other undertaking by the permittee, its successors and assigns, related or undertaken pursuant to the granted permit, due to any claimed act or omission by the permittee, its servants, agents, employees, or contractors. This provision shall not inure to the benefit of any third party nor operate to enlarge any liability of the Department beyond that existing at common law or otherwise if this right to indemnity did not exist.

14. Upon a violation of any provision of the permit, or otherwise in its reasonable discretion, the Department may require additional action by the permittee, its successors and assigns, up to and including the removal of the encroachment and restoration of the right-of-way. In the event additional actions required by the Department under the permit are not undertaken as ordered and within a reasonable time, the Department may in its discretion cause those or other additional corrective actions to be undertaken and the Department may and shall recover the reasonable costs of those corrective actions from the permittee, its successors and assigns.

15. Permittee, its successors and assigns, shall use the encroachment premises in compliance with all requirements of federal law and regulation, including those imposed pursuant to Title VI of the Civil Right Act of 1964 (42 U.S.C. § 2000d et seq.) and the related regulations of the U.S. Department of Transportation in Title 49 C.F.R. Part 21, all as amended.



APPLICATION FOR ENCROACHMENT PERMIT

16. Permittee, its successors and assigns, agree that if the Department determines it is necessary for the facilities or other encroachment authorized by the permit to be removed, relocated or reconstructed in connection with the reconstruction, relocation or improvement of a highway, the Department may revoke permission for the encroachment to remain under the permit and may order its removal, relocation or reconstruction by the permittee, its successors and assigns, at the expense of the permittee, except where the Department is required by law to pay any or all of those costs.

17. Permittee agrees that the authorized permit is personal to the permittee and shall remain in effect until such time as (a) the permittee's rights to the adjoining real property to have benefitted from the requested encroachment have been relinquished, (b) until all permit obligations have been assumed by appropriate successors and assigns, and (c) unless and until a written release from permit obligations has been granted by the Department. The permit and its requirements shall also bind the real property to have benefitted from the requested encroachment to the extent permitted by law. The permit and the related encroachment become the responsibility of the successors and assigns of the permittee and the successors and assigns of each property owner benefitting from the encroachment, or the encroachment may not otherwise permissibly continue to be maintained on the right-of-way. (Does not apply to utility encroachments serving the general public.)

18. If work authorized by the permit is within a highway construction project in the construction phase, it shall be the responsibility of the permittee to make personal contact with the Department's Engineer on the project in order to coordinate all permitted work with the Department's prime contractor on the project.

19. This permit is not intended to, nor shall it, affect, alter or alleviate any requirement imposed upon the permittee, its successors and assigns, by any other agency.

20. Permittee, its successors and assigns, agrees to contain and maintain all dirt, mud, and other debris emanating from the encroachment away from the surrounding right-of-way and the travel way of the highway hereafter and at all times that its obligations under the permit remain in effect.



May 27, 2014

Kentucky Transportation Cabinet
Department of Highways, District 4
634 East Dixie, P.O. Box 309
Elizabethtown, KY 42702

Attention: Mr. Charles E. Mason, Sr.
District Utilities Agent

Re: **LWC Interconnect Transmission Main
Encroachment Permit Package (Hardin County)**

Dear Charles,

Please find attached the following documents for your review and approval.

- Application for Encroachment Permit
- Water Main Construction Plans
- Traffic Control Plans
- Waterline Standard Details

Notes have been added to the transmission main plans and traffic control plans to address special requirements discussed at our review meeting. These notes address water main installation along the shoulder of Dixie Highway, restricted work hours and maintenance of traffic for lane and shoulder closures.

The encroachment permit and any special provisions issued by KYTC will be included with the Special Conditions of the Contract Documents.

Should you have any questions or need any additional information please give me a call at 502-909-3241.

Sincerely,

Kevin J. Brian, PE
Project Manager

Copy: Mr. Daniel Clifford/HCWD1
Mr. Robert Rogers/KYTC D5

From: [Mason, Charles \(KYTC-D04\)](#)
To: [Brian, Kevin](#)
Subject: Permit Entrance Request
Date: Monday, December 01, 2014 12:24:00 PM
Attachments: [westport_entrance.pdf](#)

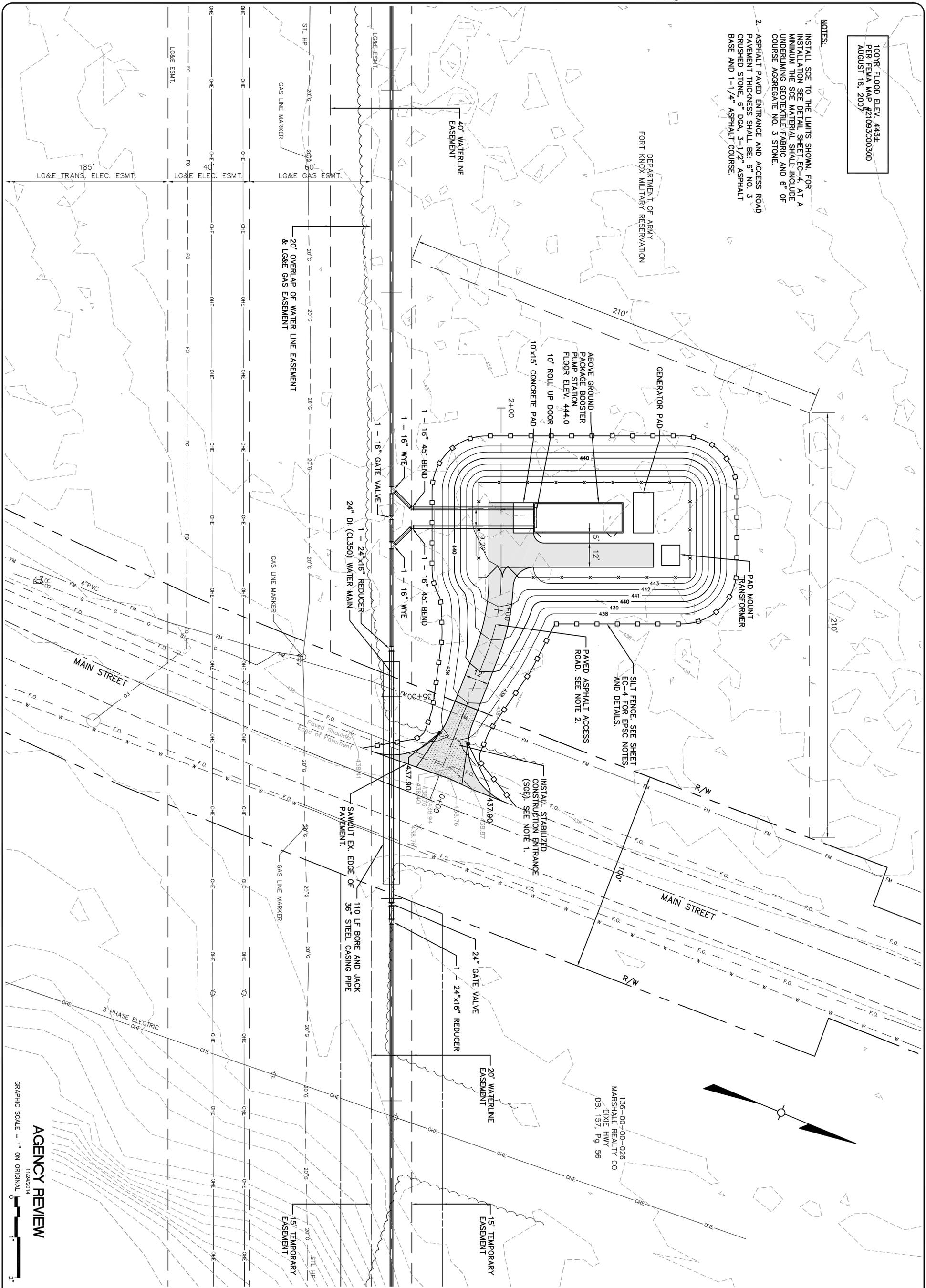
Mr. Brian – the entrance request submitted last week for LWC water line in Westpoint has been added to the existing permit for Hardin County Water.

Charles E. Mason Sr.
Utilities Agent
District 4 Permits
634 East Dixie
PO Box 309
Elizabethtown, Ky. 42702
270-766-5066 Ext 235

Humility is to make a right estimate of one's self - C.H. Spurgeon

100YR FLOOD ELEV. 443+
 PER FEMA MAP #21093C00030D
 AUGUST 16, 2007

- NOTES:
1. INSTALL SCE TO THE LIMITS SHOWN. FOR INSTALLATION SEE DETAIL SHEET EC-4. AT A MINIMUM, THE SCE MATERIAL SHALL INCLUDE UNDERLYING GEOTEXTILE FABRIC AND 6" OF COURSE AGGREGATE NO. 3 STONE.
 2. ASPHALT PAVED ENTRANCE AND ACCESS ROAD PAYEMENT THICKNESS SHALL BE: 6" NO. 3 CRUSHED STONE, 6" DGA, 3-1/2" ASPHALT BASE AND 1-1/4" ASPHALT COURSE.



MAIN STREET

MAIN STREET

3 PHASE ELECTRIC

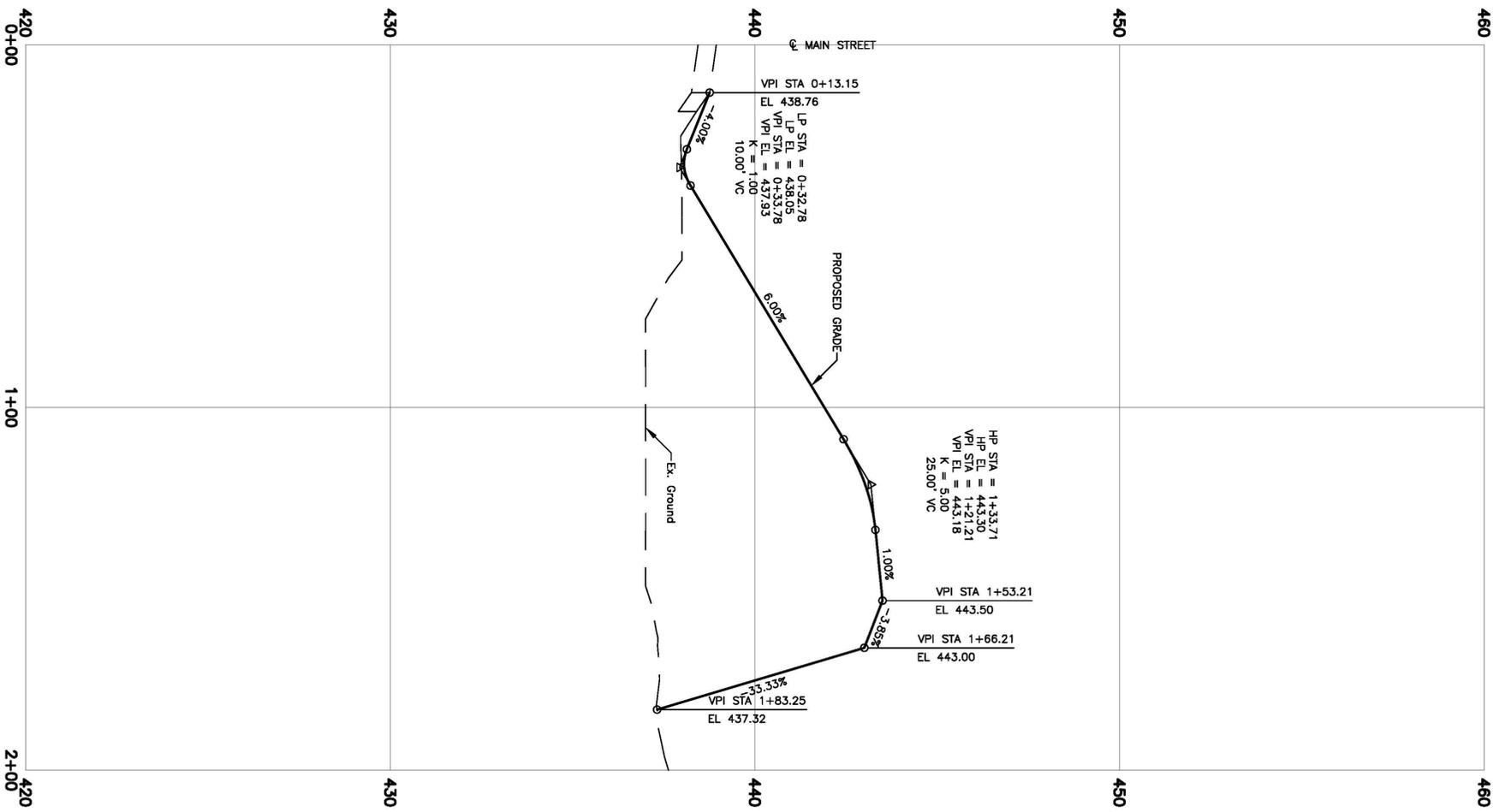
AGENCY REVIEW
 11/24/2014

C-18
 OF 30

SCALE: 1" = 20'
DATE: MAY 2014
JOB NO.: 74960
DESIGNED: KJB
DRAWN: WMG
CHECKED:
Q/C:
OWNER APPROVAL:
BY:
TITLE:
REVISIONS:
NO.:
DATE:

LWC INTERCONNECT - TRANSMISSION MAIN
 AND PUMP STATION IMPROVEMENTS
 HARDIN COUNTY WATER DISTRICT No. 1
 FORT KNOX, KENTUCKY
 BOOSTER PUMP STATION
 SITE PLAN

ONE RIVERFRONT PLAZA
 401 W. MAIN STREET, SUITE 500
 LOUISVILLE, KENTUCKY 40202
 PHONE: 502.909.3234
 FAX: 502.909.3235



ACCESS ROAD PROFILE
Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 2'

AGENCY REVIEW
11/24/2014
GRAPHIC SCALE = 1" ON ORIGINAL



LWC INTERCONNECT – TRANSMISSION MAIN AND PUMP STATION IMPROVEMENTS
HARDIN COUNTY WATER DISTRICT No. 1
FORT KNOX, KENTUCKY

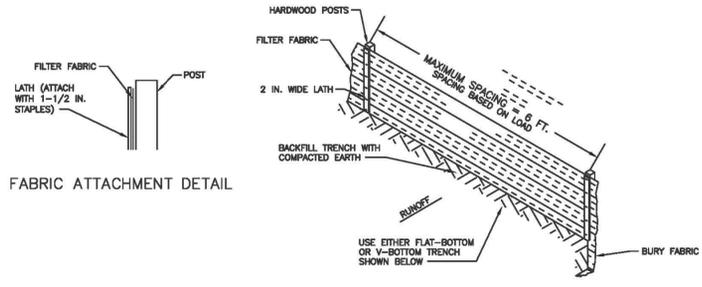
BOOSTER PUMP STATION
ACCESS ROAD PROFILE

ONE RIVERFRONT PLAZA
401 W. MAIN STREET, SUITE 500
LOUISVILLE, KENTUCKY 40202
PHONE: 502.909.3234
FAX: 502.909.3235

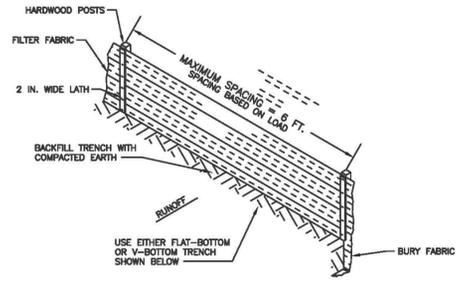
SCALE: 1"=20'H/1"=2'V
DATE: MAY 2014
JOB NO.: 74960
DESIGNED: KJB
DRAWN: WMC
CHECKED:
O/C:
OWNER APPROVAL:
BY:
TITLE:
REVISIONS:
NO.:
DATE:

DRAWING:
C-18A
30

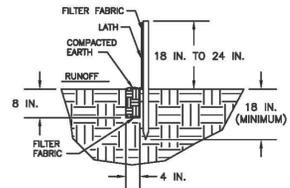
FILE NAME: L:\HDR Contracts 70000 Series\CON074860--HCWD Transmission and PSI13.00 CADD\Current Drawings\EC-1_EC-EPSC Plans.dwg
 PRINTED: 11/21/2014 @ 1:56PM



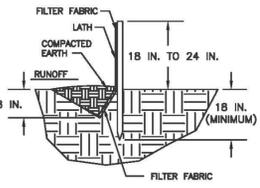
FABRIC ATTACHMENT DETAIL



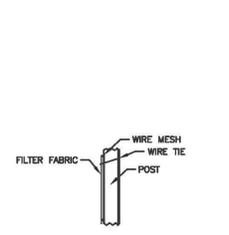
SILT FENCE INSTALLATION



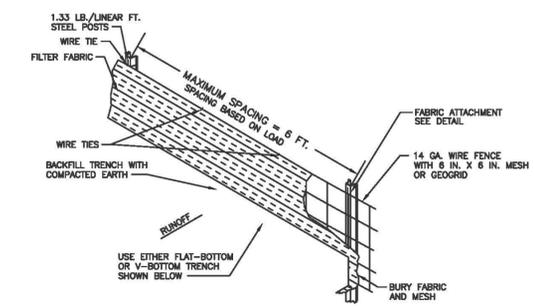
FLAT-BOTTOM TRENCH DETAIL



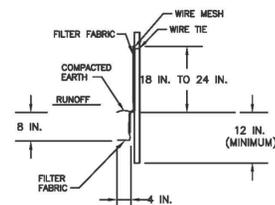
V-SHAPED TRENCH DETAIL



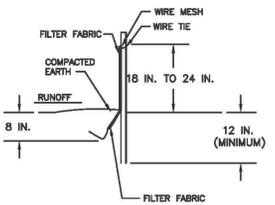
FABRIC ATTACHMENT DETAIL



SILT FENCE INSTALLATION



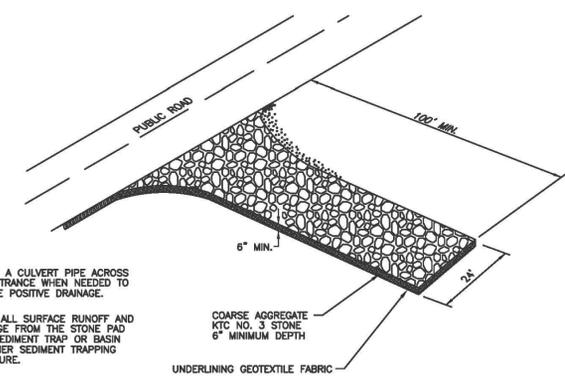
FLAT-BOTTOM TRENCH DETAIL



V-SHAPED TRENCH DETAIL

SILT FENCE

NTS



CONSTRUCTION ENTRANCE

NTS

SILT FENCE DETAIL

Installation:

The fence should be placed across the slope along a line of uniform elevation (perpendicular to the direction of flow). The fence should be located at least 10-feet from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.
 A flat-bottom trench approximately 4-inches wide and 8-inches deep, or a V-shaped trench 8-inches deep should be excavated. On the downslope side of the trench, drive the 2-in. X 2-in. wood posts at least 18-inches into the ground, spacing them no further than 6-feet apart.
 Posts should be installed, with 1- to 2-inches of the post protruding above the top of the fabric and no more than 3-feet of the post should protrude above the ground. The minimum fence height (height of filter fabric above grade) shall be 18-inches. The maximum fence height (height of filter fabric above grade) shall be 24-inches.

The filter fabric should be purchased in a continuous roll and cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth should be wrapped together only at a support post with both ends securely fastened to the post, with a minimum 5-inch overlap.
 Extra-strength filter cloth (50 pounds / linear inch minimum tensile strength) should be used. A 2-inch wide lath shall be stapled over the filter fabric to securely fasten it to the upslope side of the posts. The staples used should be 1.5-inch heavy-duty wire staples spaced a maximum of 8-inches apart.
 Place the bottom 12-inches of the filter fabric into the 8-inch deep trench, extending the remaining 4-inches towards the up-slope side of the trench and backfill the trench with soil or gravel and compact.

Inspection and Maintenance

Inspect silt fence every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inch or more of precipitation. Check for areas where runoff has eroded a channel beneath the fence, or where the fence was caused to sag or collapse by runoff overtopping the fence.
 If the fence fabric tears, begins to decompose, or in any way becomes ineffective, replace the affected section of fence immediately. Sediment must be removed when it reaches approximately 1/3 the height of the fence, especially if heavy rains are expected.
 Silt fence should be removed within 30 days after final site stabilization is achieved or after temporary BMPs are no longer needed. Trapped sediment should be removed or stabilized on site. Disturbed areas resulting from fence removal shall be permanently stabilized.

REINFORCED SILT FENCE

Installation:

The fence should be placed across the slope along a line of uniform elevation (perpendicular to the direction of flow). The fence should be located at least 10-feet from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.
 A flat-bottom trench approximately 4-inches wide and 8-inches deep, or a V-shaped trench 8-inches deep should be excavated. On the downslope side of the trench, drive the 1.33 lb./linear foot steel posts at least 12-inches into the ground, spacing them no further than 6-feet apart.
 Posts should be installed, with 1- to 2-inches of the post protruding above the top of the fabric and no more than 3-feet of the post should protrude above the ground. The minimum fence height (height of filter fabric) above grade shall be 18-inches. The maximum fence height (height of filter fabric) above grade shall be 24-inches.

Fasten the 6-inch by 6-inch 14 gage wire mesh to the upslope side of the posts using heavy duty wire staples at least 1-inch long, tie wires or hog rings. Extend the mesh 12-inches into the trench.
 The filter fabric should be purchased in a continuous roll and cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth should be wrapped together only at a support post with both ends securely fastened to the post, with a minimum 8-inch overlap.
 Extra-strength filter cloth (50 pounds / linear inch minimum tensile strength) should be used. Use plastic wire ties to attach the fabric to the post and wire. Extend 12-inches of the fabric into the trench.
 Place the bottom 12-inches of the filter fabric into the 8-inch deep trench, extending the remaining 4-inches towards the up-slope side of the trench and backfill the trench with soil or gravel and compact.

Inspection and Maintenance:

Inspect silt fence every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inch or more of precipitation. Check for areas where runoff has eroded a channel beneath the fence, or where the fence was caused to sag or collapse by runoff overtopping the fence.
 If the fence fabric tears, begins to decompose, or in any way becomes ineffective, replace the affected section of fence immediately.
 Sediment must be removed when it reaches approximately 1/3 the height of the fence, 1/2-inch or more or especially if heavy rains are expected.
 Reinforced silt fence should be removed 30 days after final site stabilization is achieved or after temporary BMPs are no longer needed. Trapped sediment should be removed or stabilized on site. Disturbed areas resulting from fence removal shall be permanently stabilized.

STONE BAG INLET PROTECTION

Installation:

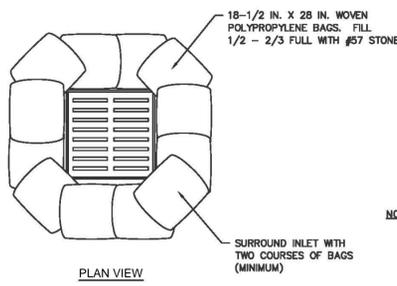
Stone fill bags shall be woven polypropylene bags with approximate dimensions of 18-1/2 inches by 28 inches. The bags shall be filled 1/2 to 2/3 full with KTC #57 stone. Tie the ends of filled bags using either draw strings or wire ties.
 Interweave the loose ends of the bags so that the gaps between bags are filled and the ends of the bags are sealed.
 Completely surround the inlet with a minimum of two (2) rows of bags to a minimum of 12 inches in height.

Inspection and Maintenance

Inspections should be made every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inch or more of precipitation. Any needed repairs should be handled immediately.
 If sediment accumulates, remove it from the face of the bags before it accumulates to a height equal to 1/3 the structure height. Any needed repairs should be handled immediately. Take care not to damage or undercut the bags when removing sediment.
 Remove and replace any damaged bags and dispose of them properly.
 Storm drain inlet protection structures should be removed only after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Use appropriate permanent stabilization methods to stabilize bare areas around the inlet.

NOTE:

These are BMP's. Ultimately, Contractor is responsible for keeping sediment on site, controlling erosion, and soil stabilization. Contractor must use BMP measures in quantity and quality to accomplish erosion control to the maximum extent practicable in accordance with the KYR10 General Permit for Stormwater Discharges Associated with Construction Activities.



STONE BAG INLET PROTECTION

NTS

CONSTRUCTION ENTRANCE

When and Where to Use It

Stabilized construction entrances should be used at all points where traffic will be leaving a construction site and moving directly onto a public road.

Important Considerations

If washing is used, provisions must be made to intercept the wash water and trap the sediment before it is carried offsite. Washdown facilities shall be required as directed by HCW01. Washdown areas in general must be established with crushed gravel and drain into a sediment trap or sediment basin. Construction entrances should be used in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by vehicles.

Installation:

Remove all vegetation and any objectionable material from the foundation area.
 Divert all surface runoff and drainage from stones to a sediment trap or basin.
 Install a geotextile fabric prior to placing any stone.
 Install a culvert pipe across the entrance when needed to provide positive drainage.

The entrance shall consist of KTC #57 Aggregate with a minimum thickness of 6-inches.

Minimum dimensions of the entrance shall be 24-feet wide by 100-feet long, and may be modified as necessary to accommodate site constraints.

Inspection and Maintenance:

Inspect entrances every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inch or more of precipitation, or after heavy use. Check for mud and sediment buildup and pad integrity. Make daily inspections during periods of wet weather. Maintenance is required more frequently in wet weather conditions. Reshape the stone pad as needed for drainage and runoff control.

Wash or replace stones as needed and as directed by the inspector. The stone in the entrance should be washed or replaced whenever the entrance fails to reduce mud being carried off-site by vehicles. Frequent washing will extend the useful life of stone.

Immediately remove mud and sediment tracked or washed onto public roads by brushing or sweeping. Flushing should only be used when the water can be discharged to a sediment trap or basin.

Repair any broken pavement immediately.

Inspect and clean sediment traps immediately following each rainfall.

Dispose of sediment in a suitable area in such a manner that it will not erode.

Remove stabilized construction entrances as soon as they are no longer needed to provide access to the site. Bring the disturbed area to grade, and stabilize it using appropriate permanent stabilization methods.

STONE BAG CHECK DAM IN SMALL DITCH

Installation:

stone fill bags shall be woven polypropylene bags with approximate dimensions of 18-1/2 inches by 28 inches. The bags shall be filled with KTC No. 57 stone. Tie the ends of filled bags using either draw strings or wire ties.

Stone bag check dams shall span the banks of the ditch or swale.

The height of the dam at the stream centerline shall equal the height noted on the plans, or equal the approximate stage for normal storm flows.

Place bags at the banks to a height at least 6 inches above the center of the check.

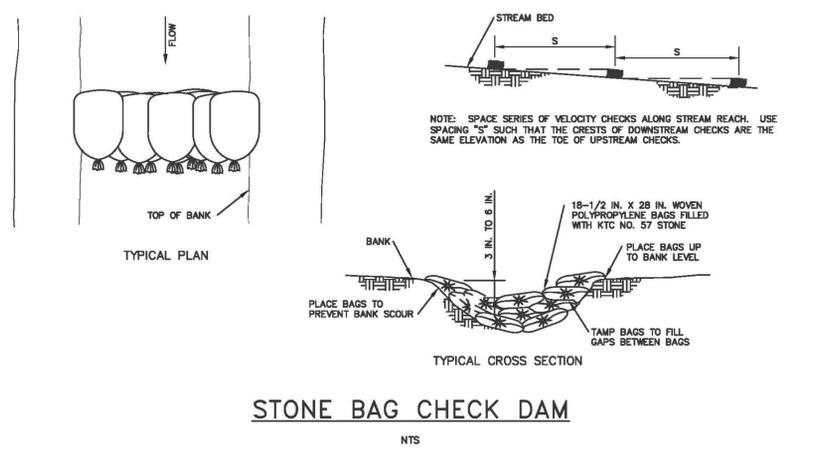
Space stone bag ditch checks as shown on the plans, or such that the crest of the downstream check is at the same elevation as the toe of the check located immediately upstream.

Inspection and Maintenance

Inspect checks every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inch or more of precipitation. Check for structural damage, channel erosion and sediment deposition. If sediment accumulates, remove it from the upstream face of the check before it accumulates to a height equal to 1/3 the structure height. Make all necessary repairs immediately.

Split the spacing between existing checks with an additional check if stream erosion problems persist within a reach.

Reinforce checks with additional stone bags as required to maintain integrity. Remove and replace any damaged bags and dispose of them properly. Do not leave damaged or empty bags in the ditch at any time. Remove checks as soon as they are no longer required to control flow velocities and the ditch can be stabilized according to the appropriate stabilization schedule or is taken out of service.



STONE BAG CHECK DAM

NTS

ONE RIVERFRONT PLAZA
 401 W. MAIN STREET, SUITE 500
 LOUISVILLE, KENTUCKY 40202
 PHONE: 502.969.3234
 FAX: 502.969.3235

LWC INTERCONNECT - TRANSMISSION MAIN
 AND PUMP STATION IMPROVEMENTS
 HARDIN COUNTY WATER DISTRICT No. 1
 FORT KNOX, KENTUCKY

EPSC NOTES AND DETAILS

SCALE:	1" = 100'
DATE:	MAY 2014
JOB NO.:	74960
DESIGNED:	KJB
DRAWN:	JGD
CHECKED:	
Q/C:	
OWNER APPROVAL:	
BY:	
TITLE:	

REVISIONS:	
NO.:	DATE:

DRAWING:
EC-4

11/21/2014

GRAPHIC SCALE = 1" ON ORIGINAL

30 OF 30

AGENCY REVIEW



TRANSPORTATION CABINET

Department of Highways District 5 Office
8310 Westport Road
Louisville, KY 40242-3042
(502) 210-5400

Steven L. Beshear
Governor

Mike Hancock
Secretary

December 17, 2014

Louisville Water Company
550 S. 3rd Street
Louisville, KY 40202
Attn: Andy Williams, Jim Smith

Permit #05-2014-00914, 05-2014-00585

Your application for an encroachment permit has been approved by the Department of Highways. We are returning two (2) copies of the approved permit. One copy of the permit is for your record and files, the other is to be on the work site at all times. Failure to have this permit at the site could result in a stop-work order by the Department of Highways.

The "Manual on Uniform Traffic Control Devices" (MUTCD) is the accepted national standard for all traffic control. All traffic control measures used must be in compliance with the MUTCD.

Please contact this office if you have any questions.

Sincerely,

Jason Richardson
District 5 Permits Supervisor



An Equal Opportunity Employer M/F/D

NOTICE OF COMPLETION OF ENCROACHMENT PERMIT WORK

Please return this form to the District Office when work is completed and ready for final inspection.

Applicant Identification

Project Identification

Name: Louisville Water Company

Permit: 05-2014-00585

Contact: Jim Smith

County: Jefferson

Address: 550 S. 3rd Street

Route# US31W

City: Louisville

Name: US31W

State: KY

Milepoint: 0.6

Zip: 40202

Telephone: 502-569-3600

I wish to notify the Department of Highways that the above mentioned permit work and any necessary right of way restoration have been completed and are ready for final inspection.

Applicant

Please Return To:

Department of Highways
District 5 Louisville
8310 WESTPORT RD
Louisville, Ky. 40242

Attention:

Traffic Engineering and Permits



Kentucky Transportation Cabinet
Department of Highways
Permits Branch

TC 99-1 (A)
8/2012
Page 1 of 4

APPLICATION FOR ENCROACHMENT PERMIT

Permittee Information				KYTC No. 05-2014-00585			
Name	Louisville Water Company			Permit Information			
Address	550 South Third Street			Address	Katherine Station Rd & Dixie Hwy		
City	Louisville			City	Louisville		
State	KY	Zip	40202	State	KY	Zip	40272
Phone#	(502) 569-3600			Route No.	US 31 W	Mile-Point	0 to 0.6
Contact	Jim Smith			Longitude (X)	-85.93697 ~ -85.93921		
Phone	502-569-3600	Cell		Latitude (Y)	38.00579 ~ 38.00421		
Email	jsmith@lwcky.com			<i>Information below to be filled out by KYTC</i>			
Contact				<input type="checkbox"/> Air Right	<input type="checkbox"/> Entrance		
Phone				<input checked="" type="checkbox"/> Utilities	<input type="checkbox"/> Other: _____		
Email				<input type="checkbox"/> Left	<input checked="" type="checkbox"/> Right	<input type="checkbox"/> X-ing	
				Access:	<input type="checkbox"/> Full	<input type="checkbox"/> Partial	<input checked="" type="checkbox"/> by Permit

RECEIVED

JUL 16 2014

D-5
Traffic & Permits

General Description of Work:

Parallel encroachments along right-of-way for the construction of 24" water main and undercrossing of Salt River. Transmission main route is located along Dixie Highway (US 31W). See attached water main construction plans, traffic control plan and undercrossing of Salt River.

-85.94122 38.00188

THE UNDERSIGNED PERMITTEE(S) (being duly authorized representative(s) or owner(s)) DO AGREE TO ALL TERMS AND CONDITIONS ON THE TC 99-1 (A).

Signature

Date

is not a permit unless and until the permittee(s) receives an approved TC 99-1(B) from KYTC. This application will become void approved by the cancellation date. The cancellation date will be one year from the date the permittee submits their



APPLICATION FOR ENCROACHMENT PERMIT

TERMS AND CONDITIONS

1. The permit, including this application and all related and accompanying documents and drawings making up the permit, remains in effect and is binding upon the Applicant/Permittee, its successors and assigns, as long as the encroachment(s) exists and also until the permittee is finally relieved by the Department of Highways from all its obligations.
2. Applicant shall meet all requirements of the Clean Water Act if the project will disturb one acre or more, the applicant shall obtain a KPDES KYR10 Permit from the Kentucky Division of Water. All disturbed areas shall meet the requirements of the Department of Highway's Standard Specifications, Sections 212 and 213, as amended.
3. **INDEMNITY:**
 - A. **PERFORMANCE BOND:** The permittee shall provide to the Department a performance bond according to the Permits Manual, Section PE-203 as a guarantee of conformance with the Department's Encroachment Permit requirements.
 - B. **PAYMENT BOND:** At the discretion of the department, a payment bond will be required of the permittee to ensure payment of liquidated damages assessed to the permittee.
 - C. **LIABILITY INSURANCE:** Liability insurance will be required of the permittee (in an amount approved by the department) to cover all liabilities associated with the encroachment.
 - D. It shall be the responsibility of the permittee, its successors and assigns, to maintain all indemnities in full force and effect until the permittee is authorized to release the indemnity by the Department.
4. A copy of this application and all related documents making up the approved permit will be given to the applicant and shall be made readily available for review at the work site at all times.
5. Perpetual maintenance of the encroachment is the responsibility of the permittee, its successors and assigns, with the approval of the Department as required, unless otherwise stated.
6. Permittee, its successors and assigns, shall comply with and agrees to be bound by the requirements and terms of (a) this application and all related documents making up the approved permit, (b) by the Department's Permits Manual, and (c) by the Manual on Uniform Traffic Control Devices, both manuals as revised to and in effect on the date of issuance of the permit, all of which documents are made a part thereof by this reference. Compliance by the permittee, its successors and assigns, with subsequent revisions to applicable provisions of either manual or other policy of the Department may be made a condition of allowing the encroachment to persist under the permit.
7. Permittee agrees that this and any encroachment may be ordered removed by the Department at any time, and for any reason, upon thirty days written notice to the last known address of the applicant or to the address at the location of the encroachment. The permittee agrees that the cost of removing and of restoring the associated right-of-way is the responsibility of the permittee, its successors and assigns.
8. Permittee, its successors and assigns, agree that if the Department determines that motor vehicular safety deficiencies develop as a result of the installation or use of the encroachment, the permittee, its successors and assigns, shall provide and bear the expenses to adjust, relocate, or reconstruct the facilities, and/or add signs, auxiliary lanes, or other corrective measures reasonably deemed necessary by the Department within a reasonable time after receipt of a written notice of such deficiency. The period within which such adjustments, relocations, additions, modifications, and/or other corrective measures must be completed will be specified in the notice.



APPLICATION FOR ENCROACHMENT PERMIT

9. Where traffic signals are required as a condition of granting the requested permit or are thereafter required to correct motor vehicular safety deficiencies, as determined by the Department, the costs for signal equipment and installation(s) shall be borne by the permittee, its successors and assigns, and/or the Department in its reasonable discretion and only in accordance with the Department's current policy set forth in the Traffic Operations Manual and Permits Manual. Any modifications to the permittee's entrance necessary to accommodate signalization (including necessary easement(s) on private property) shall be the responsibility of the permittee, its successors and assigns, at no expense to the Department.

10. The requested encroachment shall not infringe on the frontage rights of an abutting owner without their written consent as hereinafter described. Each abutting owner shall express their consent, which shall be binding on their successors and assigns, by the submission of a notarized statement as follows, "I (we), _____, hereby consent to the granting of the permit requested by the applicant along Route _____, which permit does affect frontage rights along my (our) adjacent real property." By signature(s) _____ subscribed and sworn by _____, on this date _____.

11. The permit, if approved, is subject to the agreement that it shall not interfere with any similar rights or permit(s) previously granted to any other party, except as otherwise provided by law.

12. Permittee shall include documentation which describes the facilities to be constructed. Permittee, its successors and assigns, agrees as a condition of the granting of the permit to construct and maintain any and all permitted facilities or other encroachments in strict accordance with the submitted and approved permit documentation and the policies and procedures of the Department. Permittee, its successors and assigns, shall not use facilities authorized herein in any manner contrary to that prescribed by the approved permit. Only normal usage as contemplated by the parties and by this application and routine maintenance are authorized by the permit.

13. Permittee, its successors and assigns, at all times from the date permitted work is commenced until such time as all permitted facilities or other encroachments are removed from the right-of-way and the right-of-way restored, shall defend, protect, indemnify and save harmless the Department from any and all liability claims and demands arising out of the work, encroachment, maintenance, or other undertaking by the permittee, its successors and assigns, related or undertaken pursuant to the granted permit, due to any claimed act or omission by the permittee, its servants, agents, employees, or contractors. This provision shall not inure to the benefit of any third party nor operate to enlarge any liability of the Department beyond that existing at common law or otherwise if this right to indemnity did not exist.

14. Upon a violation of any provision of the permit, or otherwise in its reasonable discretion, the Department may require additional action by the permittee, its successors and assigns, up to and including the removal of the encroachment and restoration of the right-of-way. In the event additional actions required by the Department under the permit are not undertaken as ordered and within a reasonable time, the Department may in its discretion cause those or other additional corrective actions to be undertaken and the Department may and shall recover the reasonable costs of those corrective actions from the permittee, its successors and assigns.

15. Permittee, its successors and assigns, shall use the encroachment premises in compliance with all requirements of federal law and regulation, including those imposed pursuant to Title VI of the Civil Right Act of 1964 (42 U.S.C. § 2000d et seq.) and the related regulations of the U.S. Department of Transportation in Title 49 C.F.R. Part 21, all as amended.



APPLICATION FOR ENCROACHMENT PERMIT

16. Permittee, its successors and assigns, agree that if the Department determines it is necessary for the facilities or other encroachment authorized by the permit to be removed, relocated or reconstructed in connection with the reconstruction, relocation or improvement of a highway, the Department may revoke permission for the encroachment to remain under the permit and may order its removal, relocation or reconstruction by the permittee, its successors and assigns, at the expense of the permittee, except where the Department is required by law to pay any or all of those costs.

17. Permittee agrees that the authorized permit is personal to the permittee and shall remain in effect until such time as (a) the permittee's rights to the adjoining real property to have benefitted from the requested encroachment have been relinquished, (b) until all permit obligations have been assumed by appropriate successors and assigns, and (c) unless and until a written release from permit obligations has been granted by the Department. The permit and its requirements shall also bind the real property to have benefitted from the requested encroachment to the extent permitted by law. The permit and the related encroachment become the responsibility of the successors and assigns of the permittee and the successors and assigns of each property owner benefitting from the encroachment, or the encroachment may not otherwise permissibly continue to be maintained on the right-of-way. (Does not apply to utility encroachments serving the general public.)

18. If work authorized by the permit is within a highway construction project in the construction phase, it shall be the responsibility of the permittee to make personal contact with the Department's Engineer on the project in order to coordinate all permitted work with the Department's prime contractor on the project.

19. This permit is not intended to, nor shall it, affect, alter or alleviate any requirement imposed upon the permittee, its successors and assigns, by any other agency.

20. Permittee, its successors and assigns, agrees to contain and maintain all dirt, mud, and other debris emanating from the encroachment away from the surrounding right-of-way and the travel way of the highway hereafter and at all times that its obligations under the permit remain in effect.



Kentucky Transportation Cabinet
 Department of Highways
 Permits Branch

ENCROACHMENT PERMIT

KEPTS No.: 05-2014-00585

Permittee: LOUISVILLE WATER CO.(JIM SMITH)

Latitude: SEE FRONT PAGE OF PERMIT

Longitude: SEE FRONT PAGE OF PERMIT

Completion Date: 1/1/2016

Coordinates provided on the TC 99-1(B) are the approved location for this permit.

Indemnities		
Type	Amount Required	Tracking Number
Performance Bond	\$3,000.00	
Payment Bond		
Liability Insurance		

Handwritten notes:
 11/18/2014

This permit has been:

APPROVED DENIED

Jason R. Lambert TE Supervisor
 NAME TITLE

Jason R. Lambert 11/20/14
 SIGNATURE DATE

The TC 99-1(B), including the application TC-99 1(A) and all related and accompanying documents and drawings make up the permit. It is not a permit unless both the TC 99-1(A) and TC 99-1(B) are both present.



ENCROACHMENT PERMIT GENERAL NOTES & SPECIFICATIONS

Permit No. _____

I. SAFETY

A. General Provisions

- All signs and control of traffic shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition, Part VI, and safety requirements shall comply with the Permits Manual.
- All work necessary in shoulder or ditch line areas of a state highway shall be scheduled to be promptly completed so that hazards adjacent to the traveled way are kept to an absolute minimum.
- No more than one (1) traveled-lane shall be blocked or obstructed during normal working hours. All signs and flaggers during lane closure shall conform to the Manual on Uniform Traffic Control Devices.
- When necessary to block one (1) traveled-lane of a state highway, the normal working hours shall be as directed by the Department. No lanes shall be blocked or obstructed during adverse weather conditions (rain, snow, fog, etc.) without specific permission from the Department. Working hours shall be between 9:00 am and 3:00 pm
- The traveled-way and shoulders shall be kept clear of mud and other construction debris at all times during construction of the permitted facility.
- No nonconstruction equipment or vehicles or office trailers shall be allowed on the right of way during working hours.
- The right of way shall be left free and clear of equipment, material, and vehicles during non-working hours.

B. Explosives

- No explosive devices or explosive material shall be used within state right of way without proper license and approval of the Kentucky Department of Mines and Minerals, Explosive Division.

C. Other Safety Requirements

- All pavement cuts shall be plated during non-working hours (See pg. 6 of 6). Permit does not relieve the applicant of the obligations of item 6, TC 99-1 page 2 or item A TC 99-21, page 1 of 6. Any Traffic Loops damaged during installation shall be repaired by the contractor immediately.

II. UTILITIES * Applies to Fully Controlled Access Highways ONLY

- *All work necessary within the right of way shall be performed behind a temporary fence erected prior to a boring operation.
- *The temporary woven wire fence shall be removed immediately upon completion of work on the right of way, and the control of access immediately restored to original condition, in accordance with applicable Kentucky Department of Highways Standard Drawings.
- *All vents, valves, manholes, etc., shall be located outside of the right-of-way.
- *Encasement pipe shall extend from right-of-way line to right-of-way line and shall be one continuous run of pipe. The encasement pipe shall be welded at all joints.
- The boring pit and tail ditch shall extend past the existing toe of slope or bottom of ditch line and shall be a minimum of 42 inches deep.

Permit No. _____ - _____

II. UTILITIES (Continued)

- Encasement pipe shall conform to current standards for highway crossings in accordance with the Permits Manual.
- Parallel lines shall be constructed between back slope of ditch line and right-of-way line and shall have a minimum of 30-inch cover above top of pipe or conduit.
- All pavement cuts shall be restored per Kentucky Transportation Cabinet form TC 99-13.
- Aerial crossing of this utility line shall have a minimum clearance of _____ feet from the high point of the roadway to the low point of the line (calculated at the coefficient for expansion of 120 degrees Fahrenheit).
- The 30-foot clear zone requirement shall be met to the extent possible in accordance with the Permits Manual.
- Special requirements:

Compaction and grading of backfill shall be to Kentucky Transportation Cabinet Standard Specifications. The entire project area shall be restored to original or better conditions. Seal all joints formed by pavement repair with Kentucky Transportation Cabinet approved sealant.

III. GENERAL

A. OSHA

- Kentucky Occupational Safety and Health Standards for the construction industry, which has the effect of law, states in part: (Page 52, 1926.651, Specific Excavation Requirements) "Prior to opening an excavation, effort shall be made to determine whether underground installations, (sewer, telephone, water, fuel, electric lines, etc.) will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined, and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation."

B. Archaeological

- Whenever materials of an archaeological nature are discovered during the course of construction work or maintenance operations, contact shall be made immediately with the Division of Environmental Analysis, which maintains an archaeologist on staff, or with the Office of the State Archaeologist located at the University of Kentucky. Following this consultation, further action shall be decided on a case-by-case basis by the State Highway Engineer or the Transportation Planning Engineer or their designated representative.

C. Utilities in the Work Areas

- The permittee shall be responsible for any damage to existing utilities, and any utility modifications or relocations within state right of way necessary, as determined by the Department or by the owner of the utility, shall be at the expense of the permittee and subject to the approval of the Department.
- All existing manholes and valve boxes shall be adjusted to be flush with finished grade.

D. Environmental

- If the activity to which this permit relates disturbs one acre or more of land, you must obtain a KPDES KYR10 permit.

Websites

<http://www.water.ky.gov/permitting/wastewaterpermitting/KPDES/storm/>

Inspectors for KPDES KYR10 at www.KEPSC.org

Permit No. _____

VI. Paving

- No bituminous pavement shall be installed within the right of way between November 15 and April 1, nor when the temperature is below 40 degrees Farenheit, without the express consent of the Department. No bituminous pavement shall be installed when the underlying course is wet.
- Paving within the right of way shall be as follows:
 - Base (Type) _____ (Thickness) _____
 - Surface Base (Type) _____ (Thickness) _____
 - Finished Surface (Type) _____ (Thickness) _____
- Existing pavement and shoulder material shall be removed to accomodate the above paving specifications.
- The finished surface of all new pavement within the right of way shall be true to the required slope and grade, uniform in density and texture, free of irregularities, and equivalent in riding qualities to the adjacent highway pavement or as determined by the Department of Highways.
- All materials and methods of construction, including base and subgrade preparation, shall be in accordance with Kentucky Department of Highways Standard Specifications for Road and Bridge Construction (latest edition).
- 24 hours notice to the Department is required prior to beginning paving operations.
Phone: _____ Name: _____
- To ensure proper surface drainage, the new pavement shall be flush with the edge of existing highway pavement and shall slope away from the existing edge of the pavement as specified in drawings.
- Existing edge of pavement shall be saw-cut to provide a straight and uniform joint for new pavement. An approved joint sealer, in accordance with Kentucky Department of Highways Standard Specifications (latest edition), shall be applied between new and existing pavements.

VII. SIDEWALKS SPECIFICATIONS *This dimension should be equal to the width of the sidewalk.

A. New Sidewalks

- Sidewalks shall be constructed of Class A concrete (3,500 p.s.i. test), shall be * _____ feet in width, 6 inches in thickness across the bituminous entrance, and 4 inches in thickness across the remaining sections.
- Sidewalks shall have tooled joints not less than 1 inch in depth at four foot intervals*, and 1/2 premolded expansion joints extending entirely through the sidewalk at intervals not to exceed 50 feet.
- All materials and methods of construction, including curing, shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction (latest edition).

B. Existing Sidewalks

- (Applicable if existing sidewalks are being relocated) Use of the sidewalk shall not be blocked or obstructed, and a usable walkway shall be maintained across the construction area at all times.
- All damaged sections of the sidewalks shall be entirely replaced to match existing sections.

Permit No. _____

VIII. DENSE GRADED SHOULDERS

- Any existing dense-graded aggregate shoulders in the entire frontage within the construction area, which have been disturbed or damaged or on which dirt has been placed or mud has been deposited or tracked, shall be restored to original condition by removal of all contaminated material and replaced to proper grade with new dense-graded aggregate.
- All new aggregate shoulders as specified in the plan shall consist of 5 inches of compacted dense-graded aggregate, 2^{1/2} pounds per square yard of calcium chloride.
- All dense-graded aggregate shoulders shall slope away from the new edge of pavement at the rate of 3/4 inch per foot.

IX. CURBING

A. Bituminous Curbs

- Bituminous concrete curbs shall be given a paint coat of asphalt emulsion.
- The surface under the bituminous concrete curb shall be tacked with asphalt emulsion.
- All bituminous concrete curbs shall be constructed of a Class I bituminous concrete mixture as specified by official Department of Highways specifications.
- All bituminous curbs shall be rolled curb, with a minimum base width of 8 inches and a minimum height of _____ inches. The top of the curb shall be constructed in such a manner as to guarantee a uniform rolled effect throughout the entire run.

B. Concrete Curbs

- All curbs or curb and gutter shall be constructed of Class A concrete (3,500 p.s.i. test) and shall be uniform in height, width, and alignment, true to grade, and satisfactory in finish and appearance as determined by the Department. All materials and methods of construction, including curing, shall be in accordance with Department of Highways Standard Specifications for Road and Bridge Construction (latest edition).
- All concrete curbs shall be 6 inches in width, extend _____ inches above finished grade and 12 inches below finished grade, with all visible edge rounded to 1/2 inch radii.
- All concrete curbs shall have expansion joints constructed at intervals of not more than 30 feet, and 1/2 inch premolded expansion joint material (cut to conform to the curb or to the curb and gutter section) shall be used in each expansion joint.
- The last _____ feet of all concrete curbs are to be tapered down to finished grade.

Permit No. _____

X. RIGHT-OF-WAY FENCE REPLACEMENT

- The replacement fence shall be a height of at least 48 inches and shall be of sufficient density to contain all animals (if applicable).
- The replacement fence shall be a minimum of 1 foot and a maximum of 2 feet outside the right-of-way line.
- The fence materials and design shall meet accepted industry standards and be treated as paintable.
- The permittee shall be required to maintain the fence in a high state of repair.
- The existing fence shall be removed by permittee and stored at the Department's maintenance storage yard for future reuse by the Department.
- The control of access shall not be diminished as a result of replacement of the fence.

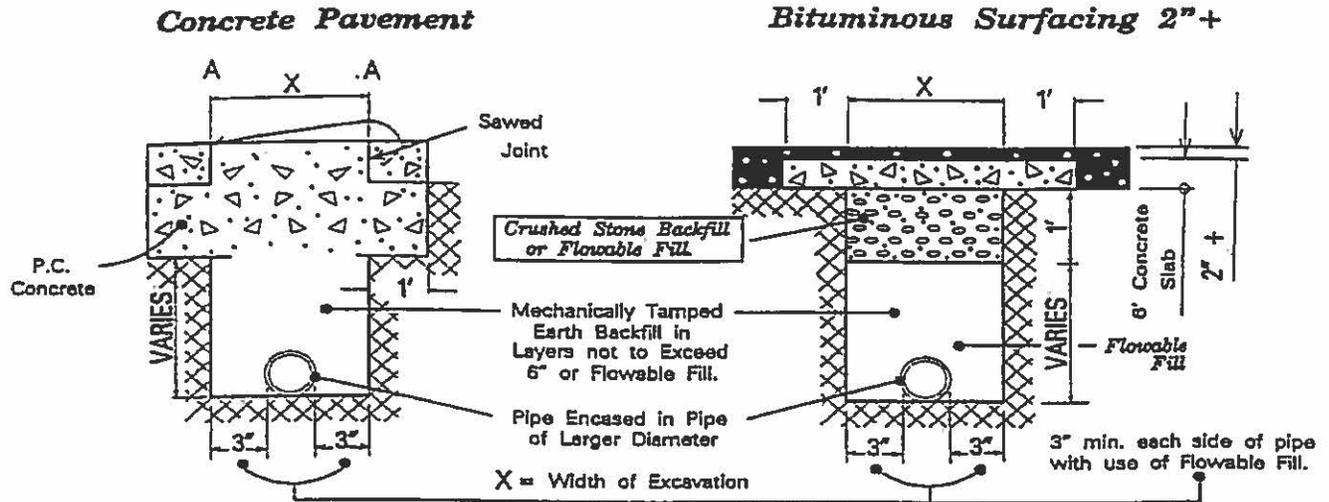
Miscellaneous:

Plates for pavement cuts shall be recessed from November 1 through April 1. Any plates not recessed during this time period must be reported to this office, so as to alert the snow crews.

NOTICE TO PERMITTEE

THE PERMITTEE AGREES THAT ALL WORK WITHIN THE EXISTING RIGHT OF WAY SHALL BE DONE IN ACCORDANCE WITH THE PLANS AS APPROVED AND PERMITTED BY AN ENCROACHMENT PERMIT. ANY CHANGES OR VARIANCES MADE AT THE TIME OF CONSTRUCTION WITHOUT WRITTEN APPROVAL FROM THE DEPARTMENT OF HIGHWAYS SHALL BE REMOVED BY THE PERMITTEE AT NO EXPENSE TO THE DEPARTMENT OF HIGHWAYS AND SHALL BE REDONE BY THE PERMITTEE TO CONFORM WITH THE APPROVED PLANS.

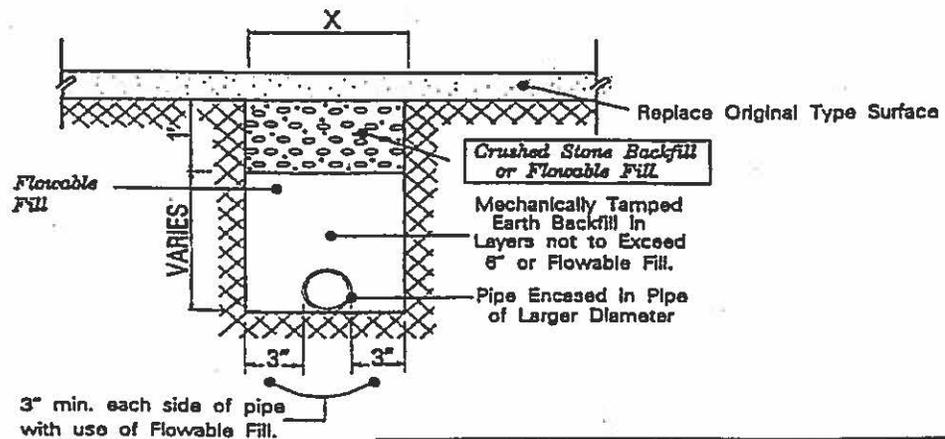
SURFACE RESTORATION METHODS



Replace Concrete Pavement with new pavement same thickness of existing pavement.

Replace Bituminous Pavement with same type and depth as existing pavement.

Bituminous Surface Less Than 2" & Traffic Bound Macadam



NOTE:

1. Distance From points "A" (Concrete Pavement) to nearest joint or break in pavement must be six (6) feet or more. If less than six (6) feet, remove pavement to joint or break and replace entire slab.
2. Concrete slab under Bituminous Surface to extend twelve (12) inches on each side of trench.
3. An approved joint sealer to be applied between new and existing pavement.

KENTUCKY TRANSPORTATION CABINET

Department of Highways

Methods of Surface Restoration Due to
 Open trench Pipe Installation

APPENDIX C
RAILWAY AGREEMENTS



Jessica Braig
Contract Specialist

6737 Southpoint Drive South, Bldg 1
Jacksonville, FL 32216
904-279-3881
Jessica_Braig@csx.com

November 5, 2015

Mr. Daniel Clifford
Hardin County Water District No. 1
1400 Rogersville Road
Radcliff, KY 40160

Agreement No.: CSX788710

Dated: August 12, 2015

Dear Mr. Daniel Clifford,

Attached is the fully-executed Agreement of the above reference file.

In accordance with this Agreement, Agreement Holder is responsible for paying the actual cost of CSXT flagging and/or support services, including all applicable surcharges (collectively "Fees").

No work is to be performed on CSXT property without Roadmaster's authorization.

It is your responsibility to schedule any work on CSXT property with CSXT Outside Services. To schedule the work, complete and follow the instructions on the attached Outside Party Number Request Form.

It was a pleasure assisting you with this project and we look forward to working with you in the future.

Should there be any questions, please feel free to give us a call at the above referenced number.

Sincerely,

Jessica Braig

Attachement



Instructions:

Please fill out sections 2-4 then submit to the Flagging Coordinator via email or fax.

Flagging Coordinator

E-Mail: op_request@csx.com

Fax: 904.245.3692

Telephone: 904.279.3805

Flagging/Inspection (Responsibility of Agreement Holder)

Estimated Average Cost

Flagging: \$1,000 per day (minimum 8 hours)

Inspection: \$1,500 per day

1. Important Information

The estimated flagging and inspection cost is based on average cost for 8 hours regular time on CSX work days. Overtime rates will apply for hours beyond 8 hours per day or beyond 40 hours per week for railroad personnel. Inspection costs will include inspector's project time, travel time, expenses, per diem, project management cost for scheduling, means and methods review, coordinating, and general account administration. Other railroad costs may include signal locates, material, rental equipment, burden and tax. The above references flagging and inspection costs are estimates only and will be billed after the project commencement.

In the event local flagging services are not available at the time of your request, flagging resources from outside the geographical area of your project may be assigned at extra cost to the Agreement Holder/Project Owner. The cost of flagging services vary based on factors including but not limited to, type of project, duration of project, utilization of local or out-of-town flagging personnel, etc.

2. Project Contact Information

Contact Name: _____
Company Name: _____
Address: _____
City_State_Zip: _____
Phone: _____
Email: _____

3. Billing Contact Information (Agreement Holder/Facility Owner)

Contact Name: _____
Company Name: Hardin County Water District No. 1
Billing Address: _____
City_State_Zip: _____
Phone: _____
Email: _____

4. Project Information

Agreement Number: CSX788710 Agreement Date: 8/12/2015
City/County/ST/Mile: West Point, Hardin County, Kentucky, Milepost OHR-22.73

Request Start Date: _____

Duration in Days: _____

Project Description: _____

Jack and bore 36" steel casing for 24" water line. and 160 ft parallel occupancy. located at MP OHR-22.73 val sta 897+34

5. CSX Use Only:

Road Master (RM): _____ Signal Manager: _____
RM Email: _____ Signal Mgr. Email: _____
RM Phone: _____ Signal Mgr. Phone: _____
Division: _____ Subdivision: _____

Additional Documents Needed _____

Special Billing Instructions _____

Contractor Must Provide CGL: No CGL Expiration Date: 9/30/2015

RPL Insurance: _____ Contractor Must Provide RPL: Yes

Inspector Required? Yes Proj. Cord. Fee Paid? No OP# _____ Valid Thru _____

Please send RPL payment to Jessica

FACILITY ENCROACHMENT AGREEMENT

THIS AGREEMENT, made and effective as of August 12, 2015, by and between CSX TRANSPORTATION, INC., a Virginia corporation, whose mailing address is 500 Water Street, Jacksonville, Florida 32202, hereinafter called "Licensor," and HARDIN COUNTY WATER DISTRICT 1, a municipal corporation, political subdivision or state agency, under the laws of the Commonwealth of Kentucky, whose mailing address is 1400 Rogersville Road, Radcliff, Kentucky 40160, hereinafter called "Licensee," WITNESSETH:

WHEREAS, Licensee desires to construct (unless previously constructed and designated as existing herein), use and maintain the below described facility(ies), hereinafter called "Facilities," over, under or across property owned or controlled by Licensor, at the below described location(s):

1. One (1) twenty-four inch (24") diameter pipeline crossing, solely for the conveyance of potable water, located at or near West Point, Hardin County, Kentucky, Louisville Division, L H & Stl Subdivision, Valuation Station 897, Milepost 0HR-22.73, Latitude N37:59:29.65, Longitude W85:57:05.14;
2. One (1) thirty inch (30") diameter pipeline parallel, solely for the conveyance of potable water, located at or near West Point, Hardin County, Kentucky, Louisville Division, L H & Stl Subdivision, beginning at Valuation Station 897, Milepost 0HR-22.73, Latitude N37:59:29.65, Longitude W85:57:05.14, and ending at Milepost 0HR-22.70;

hereinafter, called the "Encroachment," as shown on print(s) labeled Exhibit "A," attached hereto and made a part hereof;

NOW, THEREFORE, in consideration of the mutual covenants, conditions, terms and agreements herein contained, the parties hereto agree and covenant as follows:

1. LICENSE:

1.1 Subject to Article 17, Licensor, insofar as it has the legal right, power and authority to do so, and its present title permits, and subject to:

- (A) Licensor's present and future right to occupy, possess and use its property within the area of the Encroachment for any and all purposes;
- (B) All encumbrances, conditions, covenants, easements, and limitations applicable to Licensor's title to or rights in the subject property; and
- (C) Compliance by Licensee with the terms and conditions herein contained;

does hereby license and permit Licensee to construct, maintain, repair, renew, operate, use, alter or change the Facilities at the Encroachment above for the term herein stated, and to remove same upon termination.

1.2 The term Facilities, as used herein, shall include only those structures and ancillary facilities devoted exclusively to the transmission usage above within the Encroachment, and as shown on attached Exhibit A.

1.3 No additional structures or other facilities shall be placed, allowed, or maintained by Licensee in, upon or on the Encroachment except upon prior separate written consent of Licensor.

2. ENCROACHMENT FEE; TERM:

2.1 Licensee shall pay Licensor a one-time nonrefundable Encroachment Fee of EIGHT THOUSAND AND 00/100 U.S. DOLLARS (\$8,000.00) upon execution of this Agreement. Licensee agrees that the Encroachment Fee applies only to the original Licensee under this Agreement. In the event of a successor (by merger, consolidation, reorganization and/or assignment) or if the original Licensee changes its name, then Licensee shall be subject to payment of Licensor's current administrative and document preparation fees for the cost incurred by Licensor in preparing and maintaining this Agreement on a current basis.

2.2 However, Licensee assumes sole responsibility for, and shall pay directly (or reimburse Licensor), any additional annual taxes and/or periodic assessments levied against Licensor or Licensor's property solely on account of said Facilities or Encroachment.

2.3 This Agreement shall terminate as herein provided, but shall also terminate upon: (a) Licensee's cessation of use of the Facilities or Encroachment for the purpose(s) above; (b) removal of the Facilities; (c) subsequent mutual consent; and/or (d) failure of Licensee to complete installation within five (5) years from the effective date of this Agreement.

2.4 In further consideration for the license or right hereby granted, Licensee hereby agrees that Licensor shall not be charged or assessed, directly or indirectly, with any part of the cost of the installation of said Facilities and appurtenances, and/or maintenance thereof, or for any public works project of which said Facilities is a part.

3. CONSTRUCTION, MAINTENANCE AND REPAIRS:

3.1 Licensee shall construct, maintain, relocate, repair, renew, alter, and/or remove the Facilities, in a prudent, workmanlike manner, using quality materials and complying with any applicable standard(s) or regulation(s) of Licensor (CSXT Specifications), or Licensee's particular industry, National Electrical Safety Code, or any governmental or regulatory body having jurisdiction over the Encroachment.

3.2 Location and construction of Facilities shall be made strictly in accordance with design(s) and specifications furnished to and approved by Licensor and of material(s) and size(s) appropriate for the purpose(s) above recited.

3.3 All of Licensee's work, and exercise of rights hereunder, shall be undertaken at time(s) satisfactory to Licensor, and so as to eliminate or minimize any impact on or interference with the safe use and operation of Licensor's property and appurtenances thereto.

3.4 In the installation, maintenance, repair and/or removal of said Facilities, Licensee shall not use explosives of any type or perform or cause any blasting without the separate express written consent of Licensor. As a condition to such consent, a representative will be assigned by Licensor to monitor blasting, and Licensee shall reimburse Licensor for the entire cost and/or expense of furnishing said monitor.

3.5 Any repairs or maintenance to the Facilities, whether resulting from acts of Licensee, or natural or weather events, which are necessary to protect or facilitate Licensor's use of its property, shall be made by Licensee promptly, but in no event later than thirty (30) days after Licensee has notice as to the need for such repairs or maintenance.

3.6 Licensor, in order to protect or safeguard its property, rail operations, equipment and/or employees from damage or injury, may request immediate repair or renewal of the Facilities, and if the same is not performed, may make or contract to make such repairs or renewals, at the sole risk, cost and expense of Licensee.

3.7 Neither the failure of Licensor to object to any work done, material used, or method of construction or maintenance of said Encroachment, nor any approval given or supervision exercised by Licensor, shall be construed as an admission of liability or responsibility by Licensor, or as a waiver by Licensor of any of the obligations, liability and/or responsibility of Licensee under this Agreement.

3.8 All work on the Encroachment shall be conducted in accordance with Licensor's safety rules and regulations.

3.9 Licensee hereby agrees to reimburse Licensor any loss, cost or expense (including losses resulting from train delays and/or inability to meet train schedules) arising from any failure of Licensee to make repairs or conduct maintenance as required by Section 3.5 above or from improper or incomplete repairs or maintenance to the Facilities or Encroachment.

4. PERMITS, LICENSES:

4.1 Before any work hereunder is performed, or before use of the Encroachment for the contracted purpose, Licensee, at its sole cost and expense, shall obtain all necessary permit(s) (including but not limited to zoning, building, construction, health, safety or environmental matters), letter(s) or certificate(s) of approval. Licensee expressly agrees and warrants that it shall conform and limit its activities to the terms of such permit(s), approval(s) and authorization(s), and shall comply with all applicable ordinances, rules, regulations,

requirements and laws of any governmental authority (State, Federal or Local) having jurisdiction over Licensee's activities, including the location, contact, excavation and protection regulations of the Occupational Safety and Health Act (OSHA) (29 CFR 1926.651(b)), et al., and State "One Call" - "Call Before You Dig" requirements.

4.2 Licensee assumes sole responsibility for failure to obtain such permit(s) or approval(s), for any violations thereof, or for costs or expenses of compliance or remedy.

5. MARKING AND SUPPORT:

5.1 With respect to any subsurface installation or maintenance upon Licensor's property, Licensee, at its sole cost and expense, shall:

(A) support track(s) and roadbed in a manner satisfactory to Licensor;

(B) backfill with satisfactory material and thoroughly tamp all trenches to prevent settling of surface of land and roadbed of Licensor; and

(C) either remove any surplus earth or material from Licensor's property or cause said surplus earth or material to be placed and distributed at location(s) and in such manner Licensor may approve.

5.2 After construction or maintenance of the Facilities, Licensee shall:

(A) Restore any track(s), roadbed and other disturbed property; and

(B) Erect, maintain and periodically verify the accuracy of aboveground markers, in a form approved by Licensor, indicating the location, depth and ownership of any underground Facilities or related facilities.

5.3 Licensee shall be solely responsible for any subsidence or failure of lateral or subjacent support in the Encroachment area for a period of three (3) years after completion of installation.

6. TRACK CHANGES:

6.1 In the event that rail operations and/or track maintenance result in changes in grade or alignment of, additions to, or relocation of track(s) or other facilities, or in the event future use of Licensor's rail corridor or property necessitate any change of location, height or depth in the Facilities or Encroachment, Licensee, at its sole cost and expense and within thirty (30) days after notice in writing from Licensor, shall make changes in the Facilities or Encroachment to accommodate such track(s) or operations.

6.2 If Licensee fails to do so, Licensor may make or contract to make such changes at Licensee's cost.

7. FACILITY CHANGES:

7.1 Licensee shall periodically monitor and verify the depth or height of the Facilities or Encroachment in relation to the existing tracks and facilities, and shall relocate the Facilities or change the Encroachment, at Licensee's expense, should such relocation or change be necessary to comply with the minimum clearance requirements of Licensor.

7.2 If Licensee undertakes to revise, renew, relocate or change in any manner whatsoever all or any part of the Facilities (including any change in voltage or gauge of wire or any change in circumference, diameter or radius of pipe or change in materials transmitted in and through said pipe), or is required by any public agency or court order to do so, plans therefor shall be submitted to Licensor for approval before such change. After approval, the terms and conditions of this Agreement shall apply thereto.

8. INTERFERENCE WITH RAIL FACILITIES:

8.1 Although the Facilities/Encroachment herein permitted may not presently interfere with Licensor's railroad or facilities, in the event that the operation, existence or maintenance of said Facilities, in the sole judgment of Licensor, causes: (a) interference (including, but not limited to, physical or interference from an electromagnetic induction, or interference from stray or other currents) with Licensor's power lines, communication, signal or other wires, train control system, or electrical or electronic apparatus; or (b) interference in any manner, with the operation, maintenance or use of the rail corridor, track(s), structures, pole line(s), devices, other property, or any appurtenances thereto; then and in either event, Licensee, upon receipt of written notice from Licensor of any such interference, and at Licensee's sole risk, cost and expense, shall promptly make such changes in its Facilities or installation, as may be required in the reasonable judgment of the Licensor to eliminate all such interference. Upon Licensee's failure to remedy or change, Licensor may do so or contract to do so at Licensee's sole cost.

8.2 Without assuming any duty hereunder to inspect the Facilities, Licensor hereby reserves the right to inspect same and to require Licensee to undertake repairs, maintenance or adjustments to the Facilities, which Licensee hereby agrees to make promptly, at Licensee's sole cost and expense.

9. RISK, LIABILITY, INDEMNITY:

With respect to the relative risk and liabilities of the parties, it is hereby agreed that:

9.1 To the fullest extent permitted by State law (constitutional or statutory, as amended), Licensee hereby agrees to, defend, indemnify, and hold Licensor harmless from and against any and all liability, loss, claim, suit, damage, charge or expense which Licensor may suffer, sustain, incur or in any way be subjected to, on account of death of or injury to any person whomsoever (including officers, agents, employees or invitees of Licensor), and for damage to or loss of or destruction of any property whatsoever, arising out of, resulting from, or in any way connected with the construction, repair, maintenance, replacement, presence, existence,

operations, use or removal of the Facilities or any structure in connection therewith, or restoration of premises of Licensor to good order or condition after removal, EXCEPT when proven to have been caused solely by the willful misconduct or gross negligence of Licensor. HOWEVER, to the fullest extent permitted by State law, during any period of actual construction, repair, maintenance, replacement or removal of the Facilities, wherein agents, equipment or personnel of Licensee are on the railroad rail corridor, Licensee's liability hereunder shall be absolute, irrespective of any joint, sole or contributory fault or negligence of Licensor.

9.2 Use of Licensor's rail corridor involves certain risks of loss or damage as a result of the rail operations. Notwithstanding Section 9.1, Licensee expressly assumes all risk of loss and damage to Licensee's Property or the Facilities in, on, over or under the Encroachment, including loss of or any interference with use or service thereof, regardless of cause, including electrical field creation, fire or derailment resulting from rail operations. For this Section, the term "Licensee's Property" shall include property of third parties situated or placed upon Licensor's rail corridor by Licensee or by such third parties at request of or for benefit of Licensee.

9.3 To the fullest extent permitted by State law, as above, Licensee assumes all responsibility for, and agrees to defend, indemnify and hold Licensor harmless from: (a) all claims, costs and expenses, including reasonable attorneys' fees, as a consequence of any sudden or nonsudden pollution of air, water, land and/or ground water on or off the Encroachment area, arising from or in connection with the use of this Encroachment or resulting from leaking, bursting, spilling, or any escape of the material transmitted in or through the Facilities; (b) any claim or liability arising under federal or state law dealing with either such sudden or nonsudden pollution of air, water, land and/or ground water arising therefrom or the remedy thereof; and (c) any subsidence or failure of lateral or subjacent support of the tracks arising from such Facilities leakage.

9.4 Notwithstanding Section 9.1, Licensee also expressly assumes all risk of loss which in any way may result from Licensee's failure to maintain either required clearances for any overhead Facilities or the required depth and encasement for any underground Facilities, whether or not such loss(es) result(s) in whole or part from Licensor's contributory negligence or joint fault.

9.5 Obligations of Licensee hereunder to release, indemnify and hold Licensor harmless shall also extend to companies and other legal entities that control, are controlled by, subsidiaries of, or are affiliated with Licensor, as well as any railroad that operates over the rail corridor on which the Encroachment is located, and the officers, employees and agents of each.

9.6 If a claim is made or action is brought against Licensor, and/or its operating lessee, for which Licensee may be responsible hereunder, in whole or in part, Licensee shall be notified to assume the handling or defense of such claim or action; but Licensor may participate in such handling or defense.

9.7 Notwithstanding anything contained in this Agreement, the limitation of liability contained in the state statutes, as amended from time to time, shall not limit Licensor's ability to collect under the insurance policies required to be maintained under this Agreement.

10. INSURANCE:

10.1 Prior to commencement of surveys, installation or occupation of premises pursuant to this Agreement, Licensee shall procure and shall maintain during the continuance of this Agreement, at its sole cost and expense, a policy of

(i) Statutory Worker's Compensation and Employers Liability Insurance with available limits of not less than ONE MILLION AND 00/100 U.S. DOLLARS (\$1,000,000.00), which must contain a waiver of subrogation against CSXT and its Affiliates;

(ii) Commercial General Liability coverage (inclusive of contractual liability) with available limits of not less than FIVE MILLION AND 00/100 U.S. DOLLARS (\$5,000,000.00), naming Licensor, and/or its designee, as additional insured and in combined single limits for bodily injury and property damage and covering the contractual liabilities assumed under this Agreement. The evidence of insurance coverage shall be endorsed to provide for thirty (30) days' notice to Licensor, or its designee, prior to cancellation or modification of any policy. Mail CGL certificate, along with agreement, to CSX Transportation, Inc., Speed Code J180, 500 Water Street, Jacksonville, FL 32202. On each successive year, send certificate to RenewalCOI@csx.com.

(iii) Business automobile liability insurance with available limits of not less than ONE MILLION AND 00/100 U.S. DOLLARS (\$1,000,000.00) combined single limit for bodily injury and/or property damage per occurrence;

(iv) Such other insurance as Licensor may reasonably require.

10.2 If Licensee's existing CGL policy(ies) do(es) not automatically cover Licensee's contractual liability during periods of survey, installation, maintenance and continued occupation, a specific endorsement adding such coverage shall be purchased by Licensee. If said CGL policy is written on a "claims made" basis instead of a "per occurrence" basis, Licensee shall arrange for adequate time for reporting losses. Failure to do so shall be at Licensee's sole risk.

10.3 Licensor, or its designee, may at any time request evidence of insurance purchased by Licensee to comply with this Agreement. Failure of Licensee to comply with Licensor's request shall be considered a default by Licensee.

10.4 Securing such insurance shall not limit Licensee's liability under this Agreement, but shall be security therefor.

10.5 (A) In the event Licensee finds it necessary to perform construction or demolition operations within fifty feet (50') of any operated railroad track(s) or affecting any

railroad bridge, trestle, tunnel, track(s), roadbed, overpass or underpass, Licensee shall: (a) notify Licensor; and (b) require its contractor(s) performing such operations to procure and maintain during the period of construction or demolition operations, at no cost to Licensor, Railroad Protective Liability (RPL) Insurance, naming Licensor, and/or its designee, as Named Insured, written on the current ISO/RIMA Form (ISO Form No. CG 00 35 01 96) with limits of FIVE MILLION AND 00/100 U.S. DOLLARS (\$5,000,000.00) per occurrence for bodily injury and property damage, with at least TEN MILLION AND 00/100 U.S. DOLLARS (\$10,000,000.00) aggregate limit per annual policy period, with Pollution Exclusion Amendment (ISO CG 28 31 11 85) if an older ISO Form CG 00 35 is used. The original of such RPL policy shall be sent to and approved by Licensor prior to commencement of such construction or demolition. Licensor reserves the right to demand higher limits.

(B) At Licensor's option, in lieu of purchasing RPL insurance from an insurance company (but not CGL insurance), Licensee may pay Licensor, at Licensor's current rate at time of request, the cost of adding this Encroachment, or additional construction and/or demolition activities, to Licensor's Railroad Protective Liability (RPL) Policy for the period of actual construction. This coverage is offered at Licensor's discretion and may not be available under all circumstances.

10.6 Notwithstanding the provisions of Sections 10.1 and 10.2, Licensee, pursuant to State Statute(s), may self-insure or self-assume, in any amount(s), any contracted liability arising under this Agreement, under a funded program of self-insurance, which fund will respond to liability of Licensee imposed by and in accordance with the procedures established by law.

11. GRADE CROSSINGS; FLAGGING:

11.1 Nothing herein contained shall be construed to permit Licensee or Licensee's contractor to move any vehicles or equipment over the track(s), except at public road crossing(s), without separate prior written approval of Licensor.

11.2 If Licensor deems it advisable, during any construction, maintenance, repair, renewal, alteration, change or removal of said Facilities, to place watchmen, flagmen, inspectors or supervisors for protection of operations of Licensor or others on Licensor's rail corridor at the Encroachment, and to keep persons, equipment or materials away from the track(s), Licensor shall have the right to do so at the expense of Licensee, but Licensor shall not be liable for failure to do so.

11.3 Subject to Licensor's consent and to Licensor's Railroad Operating Rules and labor agreements, Licensee may provide flagmen, watchmen, inspectors or supervisors during all times of construction, repair, maintenance, replacement or removal, at Licensee's sole risk and expense; and in such event, Licensor shall not be liable for the failure or neglect of such watchmen, flagmen, inspectors or supervisors.

12. LICENSOR'S COSTS:

12.1 Any additional or alternative costs or expenses incurred by Licensor to accommodate Licensee's continued use of Licensor's property as a result of track changes or wire changes shall also be paid by Licensee.

12.2 Licensor's expense for wages ("force account" charges) and materials for any work performed at the expense of Licensee pursuant hereto shall be paid by Licensee within thirty (30) days after receipt of Licensor's bill therefor. Licensor may, at its discretion, request an advance deposit for estimated Licensor costs and expenses.

12.3 Such expense shall include, but not be limited to, cost of railroad labor and supervision under "force account" rules, plus current applicable overhead percentages, the actual cost of materials, and insurance, freight and handling charges on all material used. Equipment rentals shall be in accordance with Licensor's applicable fixed rate. Licensor may, at its discretion, require advance deposits for estimated costs of such expenses and costs.

13. DEFAULT, BREACH, WAIVER:

13.1 The proper and complete performance of each covenant of this Agreement shall be deemed of the essence thereof, and in the event Licensee fails or refuses to fully and completely perform any of said covenants or remedy any breach within thirty (30) days after receiving written notice from Licensor to do so (or within forty-eight (48) hours in the event of notice of a railroad emergency), Licensor shall have the option of immediately revoking this Agreement and the privileges and powers hereby conferred, regardless of encroachment fee(s) having been paid in advance for any annual or other period. Upon such revocation, Licensee shall make removal in accordance with Article 14.

13.2 No waiver by Licensor of its rights as to any breach of covenant or condition herein contained shall be construed as a permanent waiver of such covenant or condition, or any subsequent breach thereof, unless such covenant or condition is permanently waived in writing by Licensor.

13.3 Neither the failure of Licensor to object to any work done, material used, or method of construction or maintenance of said Encroachment, nor any approval given or supervision exercised by Licensor, shall be construed as an admission of liability or responsibility by Licensor, or as a waiver by Licensor of any of the obligations, liability and/or responsibility of Licensee under this Agreement.

14. TERMINATION, REMOVAL:

14.1 All rights which Licensee may have hereunder shall cease upon the date of (a) termination, (b) revocation, or (c) subsequent agreement, or (d) Licensee's removal of the Facility from the Encroachment. However, neither termination nor revocation of this Agreement shall affect any claims and liabilities which have arisen or accrued hereunder, and which at the

time of termination or revocation have not been satisfied; neither party, however, waiving any third party defenses or actions.

14.2 Within thirty (30) days after revocation or termination, Licensee, at its sole risk and expense, shall (a) remove the Facilities from the rail corridor of Licensor, unless the parties hereto agree otherwise, (b) restore the rail corridor of Licensor in a manner satisfactory to Licensor, and (c) reimburse Licensor any loss, cost or expense of Licensor resulting from such removal.

15. NOTICE:

15.1 Licensee shall give Licensor at least thirty (30) days written notice before doing any work on Licensor's rail corridor, except that in cases of emergency shorter notice may be given. Licensee shall provide proper notification as follows:

a. For non-emergencies, Licensee shall complete and submit Licensor's Outside Party Number Request Form (Form # OP) by facsimile, to facsimile numbers: (904) 245-3692. Licensee may also scan and email a completed form to email address: OP_Request@csx.com. A blank form, as well as additional instructions and information, can be obtained from Licensor's web site, via web link:
http://www.csx.com/share/wwwcsx_mura/assets/File/Customers/Non-freight_Services/Property_Real_Estate/Outside_Party_Number_Request_Form.pdf.

b. For emergencies, Licensee shall complete all of the steps outlined in Section 15.1 a. above, and shall also include detailed information of the emergency. Licensee shall also call and report details of the emergency to Licensor's Rail Operations Emergency Telephone Number: 1-800-232-0144. In the event Licensor needs to contact Licensee concerning an emergency involving Licensee's Facility(ies), the emergency phone number for Licensee is: 270-766-9477.

15.2 All other notices and communications concerning this Agreement shall be addressed to Licensee at the address above, and to Licensor at the address shown on Page 1, c/o CSXT Contract Management, J180; or at such other address as either party may designate in writing to the other.

15.3 Unless otherwise expressly stated herein, all such notices shall be in writing and sent via Certified or Registered Mail, Return Receipt Requested, or by courier, and shall be considered delivered upon: (a) actual receipt, or (b) date of refusal of such delivery.

16. ASSIGNMENT:

16.1 The rights herein conferred are the privileges of Licensee only, and Licensee shall obtain Licensor's prior written consent to any assignment of Licensee's interest herein; said consent shall not be unreasonably withheld.

16.2 Subject to Sections 2 and 16.1, this Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors or assigns.

16.3 Licensee shall give Licensor written notice of any legal succession (by merger, consolidation, reorganization, etc.) or other change of legal existence or status of Licensee, with a copy of all documents attesting to such change or legal succession, within thirty (30) days thereof.

16.4 Licensor expressly reserves the right to assign this Agreement, in whole or in part, to any grantee, lessee, or vendee of Licensor's underlying property interests in the Encroachment, upon written notice thereof to Licensee.

16.5 In the event of any unauthorized sale, transfer, assignment, sublicense or encumbrance of this Agreement, or any of the rights and privileges hereunder, Licensor, at its option, may revoke this Agreement by giving Licensee or any such assignee written notice of such revocation; and Licensee shall reimburse Licensor for any loss, cost or expense Licensor may incur as a result of Licensee's failure to obtain said consent.

17. TITLE:

17.1 Licensee understands that Licensor occupies, uses and possesses lands, rights-of-way and rail corridors under all forms and qualities of ownership rights or facts, from full fee simple absolute to bare occupation. Accordingly, nothing in this Agreement shall act as or be deemed to act as any warranty, guaranty or representation of the quality of Licensor's title for any particular Encroachment or segment of Rail Corridor occupied, used or enjoyed in any manner by Licensee under any rights created in this Agreement. It is expressly understood that Licensor does not warrant title to any Rail Corridor and Licensee will accept the grants and privileges contained herein, subject to all lawful outstanding existing liens, mortgages and superior rights in and to the Rail Corridor, and all leases, licenses and easements or other interests previously granted to others therein.

17.2 The term "license," as used herein, shall mean with regard to any portion of the Rail Corridor which is owned by Licensor in fee simple absolute, or where the applicable law of the State where the Encroachment is located otherwise permits Licensor to make such grants to Licensee, a "permission to use" the Rail Corridor, with dominion and control over such portion of the Rail Corridor remaining with Licensor, and no interest in or exclusive right to possess being otherwise granted to Licensee. With regard to any other portion of Rail Corridor occupied, used or controlled by Licensor under any other facts or rights, Licensor merely waives its exclusive right to occupy the Rail Corridor and grants no other rights whatsoever under this Agreement, such waiver continuing only so long as Licensor continues its own occupation, use or control. Licensor does not warrant or guarantee that the license granted hereunder provides Licensee with all of the rights necessary to occupy any portion of the Rail Corridor. Licensee further acknowledges that it does not have the right to occupy any portion of the Rail Corridor held by Licensor in less than fee simple absolute without also receiving the consent of the owner(s) of the fee simple absolute estate. Further, Licensee shall not obtain, exercise or claim any interest in the Rail Corridor that would impair Licensor's existing rights therein.

17.3 Licensee agrees it shall not have nor shall it make, and hereby completely and absolutely waives its right to, any claim against Licensor for damages on account of any deficiencies in title to the Rail Corridor in the event of failure or insufficiency of Licensor's title to any portion thereof arising from Licensee's use or occupancy thereof.

17.4 Licensee agrees to fully and completely indemnify and defend all claims or litigation for slander of title, overburden of easement, or similar claims arising out of or based upon the Facilities placement, or the presence of the Facilities in, on or along any Encroachment(s), including claims for punitive or special damages.

17.5 Licensee shall not at any time own or claim any right, title or interest in or to Licensor's property occupied by the Encroachments, nor shall the exercise of this Agreement for any length of time give rise to any right, title or interest in Licensee to said property other than the license herein created.

17.6 Nothing in this Agreement shall be deemed to give, and Licensor hereby expressly waives, any claim of ownership in and to any part of the Facilities.

17.7 Licensee shall not create or permit any mortgage, pledge, security, interest, lien or encumbrances, including without limitation, tax liens and liens or encumbrances with respect to work performed or equipment furnished in connection with the construction, installation, repair, maintenance or operation of the Facilities in or on any portion of the Encroachment (collectively, "Liens or Encumbrances"), to be established or remain against the Encroachment or any portion thereof or any other Licensor property.

17.8 In the event that any property of Licensor becomes subject to such Liens or Encumbrances, Licensee agrees to pay, discharge or remove the same promptly upon Licensee's receipt of notice that such Liens or Encumbrances have been filed or docketed against the Encroachment or any other property of Licensor; however, Licensee reserves the right to challenge, at its sole expense, the validity and/or enforceability of any such Liens or Encumbrances.

18. GENERAL PROVISIONS:

18.1 This Agreement, and the attached specifications, contains the entire understanding between the parties hereto.

18.2 Neither this Agreement, any provision hereof, nor any agreement or provision included herein by reference, shall operate or be construed as being for the benefit of any third person.

18.3 Except as otherwise provided herein, or in any Rider attached hereto, neither the form of this Agreement, nor any language herein, shall be interpreted or construed in favor of or against either party hereto as the sole drafter thereof.

18.4 This Agreement is executed under current interpretation of applicable Federal, State, County, Municipal or other local statute, ordinance or law(s). However, each separate division (paragraph, clause, item, term, condition, covenant or agreement) herein shall have independent and severable status for the determination of legality, so that if any separate division is determined to be void or unenforceable for any reason, such determination shall have no effect upon the validity or enforceability of each other separate division, or any combination thereof.

18.5 This Agreement shall be construed and governed by the laws of the state in which the Facilities and Encroachment are located.

18.6 If any amount due pursuant to the terms of this Agreement is not paid by the due date, it will be subject to Licensor's standard late charge and will also accrue interest at eighteen percent (18%) per annum, unless limited by local law, and then at the highest rate so permitted.

18.7 Licensee agrees to reimburse Licensor for all reasonable costs (including attorney's fees) incurred by Licensor for collecting any amount due under the Agreement.

18.8 The provisions of this License are considered confidential and may not be disclosed to a third party without the consent of the other party(s), except: (a) as required by statute, regulation or court order, (b) to a parent, affiliate or subsidiary company, (c) to an auditing firm or legal counsel that are agreeable to the confidentiality provisions, or (d) to Lessees of Licensor's land and/or track who are affected by the terms and conditions of this Agreement and will maintain the confidentiality of this Agreement.

18.9 Licensor shall refund to Licensee any overpayments collected, plus any taxes paid in advance; PROVIDED, however, such refund shall not be made when the cumulative total involved is less than One Hundred Dollars (\$100.00).

19. **RESERVED:**

20. **RESERVED:**



VIA ELECTRONIC MAIL

September 2, 2015

Mr. Kevin Brian
HDR Engineering, Inc.
401 W. Main Street
Suite 500
Louisville, KY 40202

**RE: Paducah & Louisville Railway
License Agreement No. PL-HC-012
For your client: Hardin County Water District No. 1**

Dear Kevin:

The agreement for the Hardin County Water District No. 1's planned water pipeline occupation to be placed approximately 1,600 feet southwest of Mile Post L-21 and 2,428.6 feet south of the centerline of 6th Street at or near West Point, Hardin County, Commonwealth of Kentucky on Paducah and Louisville property can be released when we receive the following:

1. The selected Contractor's certificate of insurance evidencing Statutory Workers' Compensation and Employer's Liability,
2. An Occurrence Form Railroad Protective Policy with limits not less than Two Million (\$2,000,000.00) Dollars per occurrence for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property, with Six Million (\$6,000,000.00) Dollars aggregate for the term of the policy with respect to Bodily Injury, Liability, Property Damage Liability and Physical Damage to Property naming Paducah & Louisville Railway, Inc. as the Insured.

In lieu of purchasing the above noted Railroad Protective Policy, Licensee or Contractor may choose to pay a fee of Two Thousand Two Hundred Fifty and No/100 Dollars (\$2,250.00) to Railroad in order to procure coverage for Licensee's Pipeline project under Railroad's blanket Protective Policy.

3. Satisfaction of the certification of encroachments, which includes documentation of the two undocumented reported encroachments and assignment of agreement PL-HC1-01.

If you have any questions or concerns, I can be reached (800) 990-1961 or tfarris@omegarail.com. As always, thank you for your assistance with these matters.

Yours truly,

Taylor Farris

Taylor Farris
Contracts Administrator

Enc.

CC: Susan Sacharnoski - PAL
Kim A. Williams - ORM

Innovative Property Management Solutions

**LICENSE AGREEMENT FOR UNDERGROUND
PIPELINES, CABLES AND CONDUITS**

THIS AGREEMENT is made and entered into as of the ___ day of _____, 20__ by and between PADUCAH & LOUISVILLE RAILWAY, INC., (hereinafter "Railroad") and HARDIN COUNTY WATER DISTRICT NO. 1, a Kentucky corporation (hereinafter "Licensee");

WITNESSETH:

1. Upon execution of this Agreement, the Licensee shall pay the sum of Seven Hundred Fifty and No/100 Dollars (\$750.00) as a one-time document processing fee and the further sum of Nine Hundred Fifty and No/100 Dollars (\$950.00) annually on August 1st for the term of this Agreement, beginning upon execution hereof, for the period of August 1, 2015 through July 31, 2016 (annual fees to be adjusted as follows). Railroad reserves the right to make adjustments in these charges.

The annual license fee specified above shall be adjusted annually (beginning with the payment due August 1, 2016) and shall be changed by the same percentage increase as reflected in the "Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) (1967=100)" specified for "All Items - United States" compiled by the Bureau of Labor Statistics of the United States Department of Labor (the "Index"). In no event shall the rent be less than the base rent payable as of the effective date of this License.

The current base rent payable shall be changed in accordance with the following:

- (a) The current base rent shall be adjusted annually, commencing August 1, 2016.
- (b) Each adjustment shall be made with reference to the price index for the fourth month immediately preceding the effective date of each adjustment (Current Price Index).
- (c) Each such adjustment shall be made by determining the percentage change of the then Current Price Index over the price index for the full calendar month of the effective date of this License ("Base Price Index").
- (d) Such percentage shall be computed by (i) obtaining the difference between the Current Price Index and the Base Price Index and (ii) dividing such difference by the Base Price Index.
- (e) The percentage thus determined shall be multiplied by the then applicable current base rent hereinabove set forth, and the product thus determined shall represent the change payable in addition to the current base rent until a subsequent adjustment shall be made under this section.

In the event the Index shall hereafter be converted to a different standard of reference base or otherwise revised, the determination of the percentage change shall be made with the use of such conversion factor, formula, or table for converting the Index as may be published by the Bureau of Labor Statistics or, if said Bureau shall not publish the same, then as shall be reasonably determined by Railroad. Railroad shall provide prior notice to Licensee of all increases in rent and, upon request from Licensee, shall provide the calculation used to determine the current base rent.

2. In consideration of the license fees to be paid by the Licensee and in further consideration of the faithful performance by the Licensee of the covenants herein contained, the Railroad, insofar as it lawfully may, hereby grants to the Licensee license and permission to construct and maintain one buried 36-inch steel pipeline containing one 24-inch ductile iron pipeline across, along and underneath the property of the Railroad at a location approximately 1,600 feet southwest of Mile Post L-21 and 2428.6 feet south of the centerline of 6th Street (hereinafter "Pipeline"), at or near West Point, Hardin County, Kentucky, as set forth AND subject to the specifications set forth on Exhibit A, attached hereto and made a part hereof.

3. This Agreement shall commence as of the date first herein written and shall continue in full force and effect for as long as the same shall be used for conveying potable water in exact accordance with attached construction plans and for no other purposes whatsoever or until terminated by the provisions set forth herein.

That either party may terminate this agreement at any time hereafter by serving upon the other thirty (30) days' notice, in writing, of the election to terminate this Agreement. When this Agreement shall be terminated, Licensee within thirty (30) days after the expiration of the time stated in said notice, agrees at its own risk and expense to remove said facilities from the property of Railroad, or such portion thereof as Railroad shall require removed, and to restore the Railroad premises to a neat and safe condition, and if Licensee shall fail to do so within said time, Railroad shall have the right, but not the duty, to remove and restore the same, at the risk and expense of Licensee. Nothing herein contained shall be construed as conferring any property right on Licensee.

4. The license and permission herein granted to Licensee are subject and subordinate, however, to the rights in Railroad, its successors and assigns, its grantees, lessees and licensees, to construct, reconstruct, operate, use, maintain, repair and renew on, beneath or above the property covered hereby, and structures, improvements or facilities of similar or different character as are now or in the future may be located on, beneath or above said properties.

5. Licensee shall, except in emergencies, give not less than seventy-two (72) hours written notice to Railroad of the day, hour and location that it proposes to undertake any construction or maintenance work and in the event of an emergency shall notify Railroad as soon as possible.

Licensee shall require each of its contractors and subcontractors to observe and conform to the conditions and requirements specified herein; and for the purposes of the safety, protective and indemnification provisions hereof, such contractors and subcontractors, their agents, servants and employees, and other persons on the Railroad property at the invitation of the Licensee, its contractors or subcontractors, shall be deemed the agents or employees of the Licensee.

6. Licensee shall, at no expense to Railroad, obtain all permits and approvals required to exercise this license and Licensee shall install, maintain and operate its facilities in accordance with all requirements of lawful public authority. Licensee shall be responsible for any taxes, assessments and charges made against the pipeline or other of Licensee's facilities on Railroad's property or the operation of any of them.

7. The pipeline shall be installed at least six (6) feet below the tracks of the Railroad, measured from the base of rail to top of pipeline or, if no tracks are located on the property, at least six (6) feet below the natural ground, measured from the top of ground to top of the pipeline. Said pipeline shall be constructed of such material and in such a manner as will assure the safety of Railroad. Railroad's authorized representative shall have the right, but not the duty, to require certain material or procedures to be used or to supervise the construction, maintenance, restoration or other work on Railroad's property at Licensee's expense. If in the opinion of Railroad's authorized representative casing of the pipeline is required at the time of installation or at any time subsequent thereto, Licensee shall promptly arrange for such casing at its own risk and expense.

8. If, in the opinion of the authorized representative of Railroad the work to be done by the Licensee pursuant to this Agreement will make necessary or desirable any change in the Railroad's facilities, or those of the Railroad's tenants or licensee's, on the Railroad property, the Railroad shall have the right, but not the duty, to make such changes, the expense thereof to be borne by the Licensee.

Railroad shall have the right, but not the duty, to furnish flagging or other protection or to perform work to support its tracks or otherwise protect its property or facilities at any time, at Licensee's sole risk and expense.

9. Licensee agrees at any time, or from time to time, at its own risk and expense, upon the request of the authorized representative of Railroad, to make such change or changes as may be necessary in the opinion of said representative to accommodate any change or improvement which Railroad may desire to make in or upon its property. In case Licensee shall fail within thirty (30) days after notice from the Railroad to make such change or changes, Railroad shall have the right, but not the duty, to make such change or changes, or remove Licensee's facilities from said property at the risk and expense of Licensee.

10. Licensee shall at its expense take such measures as may be necessary and adequate in connection with its property or the property of Railroad to protect facilities of Railroad and those of others using Railroad's property from interference by induction, conduction, physical contact or otherwise attributable to the exercise by Licensee of the license granted to it.

In the event Railroad advises Licensee to take any action to protect Railroad, its facilities or facilities on Railroad's property, Licensee shall promptly take the indicated action, including, but not limited to, stopping the operation of the pipeline. If Licensee fails to do so, Railroad shall have the right, but not the duty, to perform on behalf of Licensee at the sole risk and expense of Licensee.

Licensee shall undertake to locate all prior installations on Railroad property in the vicinity of said pipeline and shall be solely responsible to insure that such installations are protected.

11. In the event Railroad elects to renew, replace, repair or alter any tracks or other facilities or to construct new facilities or to make other use of the property covered by this license, and in connection therewith requires the removal of any facilities placed by Licensee on Railroad's property or should any facilities or Licensee need renewal or repair, Licensee shall, within thirty (30) days of receipt of notice, arrange for such removal, renewal or repair at Licensee's risk and expense. In the event removal is required, the facilities shall be relocated at such location on Railroad's property as is designated by Railroad, provided that Railroad's authorized representative determines that a location is reasonable available. Renewal or repair shall be to such condition as is indicated by Railroad's authorized representative. If Licensee fails to comply with the foregoing, Railroad shall have the right, but not the duty, to remove, renew or repair such facilities at the sole risk and expense of Licensee.

12. Cost and expense for work performed by the Railroad pursuant to this Agreement shall consist of the direct cost of labor and material plus Railroad's standard additives in effect at the time the work is performed. All payments required of Licensee under this Agreement shall be made promptly upon presentation of a bill.

13. Licensee, as a further consideration and as a condition without which this license would not have been granted, agrees to indemnify and save harmless Railroad, its officers, employees and agents and to assume all risk, responsibility and liability for death of, or injury to, any persons, including, but not limited to, officers, employees, agents, patrons and licensees of the parties hereto, and for loss, damage or injury to any property, including but not limited to, that belonging to the parties hereto (together with all liability for any expense, attorney's fees and costs incurred or sustained by the Railroad, whether in defense of any such claims, demands, actions and causes of action or in the enforcement of the indemnification rights hereby conferred) arising from, growing out of, or in any manner or degree directly or indirectly caused by, attributable to, or resulting from the grant or exercise of this license or the construction,

maintenance, repair, renewal, alteration, change, relocation, existence, presence, use, operation, or removal of any structure incident thereto, or from any activity conducted on or occurrence originating on the area covered by the license regardless of the negligence of Railroad, its officers, employees and agents. Licensee further agrees to release and indemnify and save harmless Railroad, its officers, employees, agents or patrons, resulting from Railroad operations at or near the area in which the license is to be granted whether or not the death, injury or damage resulting therefrom may be due to the negligence of the Railroad, its officers, employees or agents or otherwise. At the election of Railroad, the Licensee, upon receipt of notice to that effect, shall assume or join in the defense of any claim based upon allegations purporting to bring said claim within the coverage of this section.

14. It is expressly understood Railroad does not warrant title to the premises and Licensee accepts the grant of privileges contained herein subject to all lawful outstanding liens, superior rights, and prior licenses, grants and easements. Licensee agrees it shall not have or make any claim against Railroad for damages on account of any deficiency in title and agrees that in the event of failure or insufficiency of such title the sole remedy of Licensee shall be the right to return of the consideration paid in advance, provided for herein, or a proportionate part thereof in the event of a partial deficiency or insufficiency of title. Licensee further agrees to indemnify and save harmless the Railroad and to assume all risk, responsibility and liability (including any expenses, attorney's fees and costs incurred or sustained by Railroad) arising from, growing out of, or in any manner or degree directly or indirectly attributable to or resulting from any deficiency or insufficiency of its title affecting the right of the Railroad to make this grant.

15. In case Railroad shall at any time, or from time to time, require the relocation of only a portion of said pipeline, this Agreement shall continue in full force and be applicable to the portion or portions of said pipeline and other facilities remaining from time to time until said pipeline has been relocated.

16. Nothing in this Agreement shall be construed to place any responsibility on Railroad for the quality of the construction, maintenance or other work performed on behalf of Licensee hereunder or for the condition of any of Licensee's facilities.

Any approval given or supervision exercised by Railroad hereunder, or failure of Railroad to object to any work done, material used or method of construction, reconstruction or maintenance, shall not be construed to relieve Licensee of its obligation under this Agreement.

17. This Agreement shall not be binding on either party hereto until all parties have executed the space provided below.

18. Licensee shall provide the Insurance coverage as set forth in the Insurance Requirements attachment hereto. Proof of satisfactory insurance pursuant to the Insurance Requirements is necessary prior to the execution of this Agreement by Railroad.

19. This Agreement shall be binding on the successors and assigns of the parties hereto, but no assignment hereof by the Licensee, its successors, legal representatives or assigns, shall be binding upon the Railroad without its written consent in each instance.

20. Any Notice required or permitted to be served under the terms of this Agreement shall be sent by certified mail, postage fully prepaid, and return receipt requested, to the parties at the following addresses:

To Railroad: Paducah & Louisville Railway, Inc.
200 Clark Street
Paducah, KY 42003
Attn: Manager - Real Estate

To Licensee: Hardin County Water District No. 1
1400 Rogersville Road
Radcliff, KY 40160
Attn: Daniel Clifford

or at such other address as the respective parties may from time to time give notice of.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed in duplicate, the day and year first above written.

PADUCAH & LOUISVILLE RAILWAY, INC.
(as Railroad)

HARDIN COUNTY WATER DISTRICT NO. 1
(as Licensee)

By: _____
Name: Kim A. Williams
Title: Manager – Real Estate

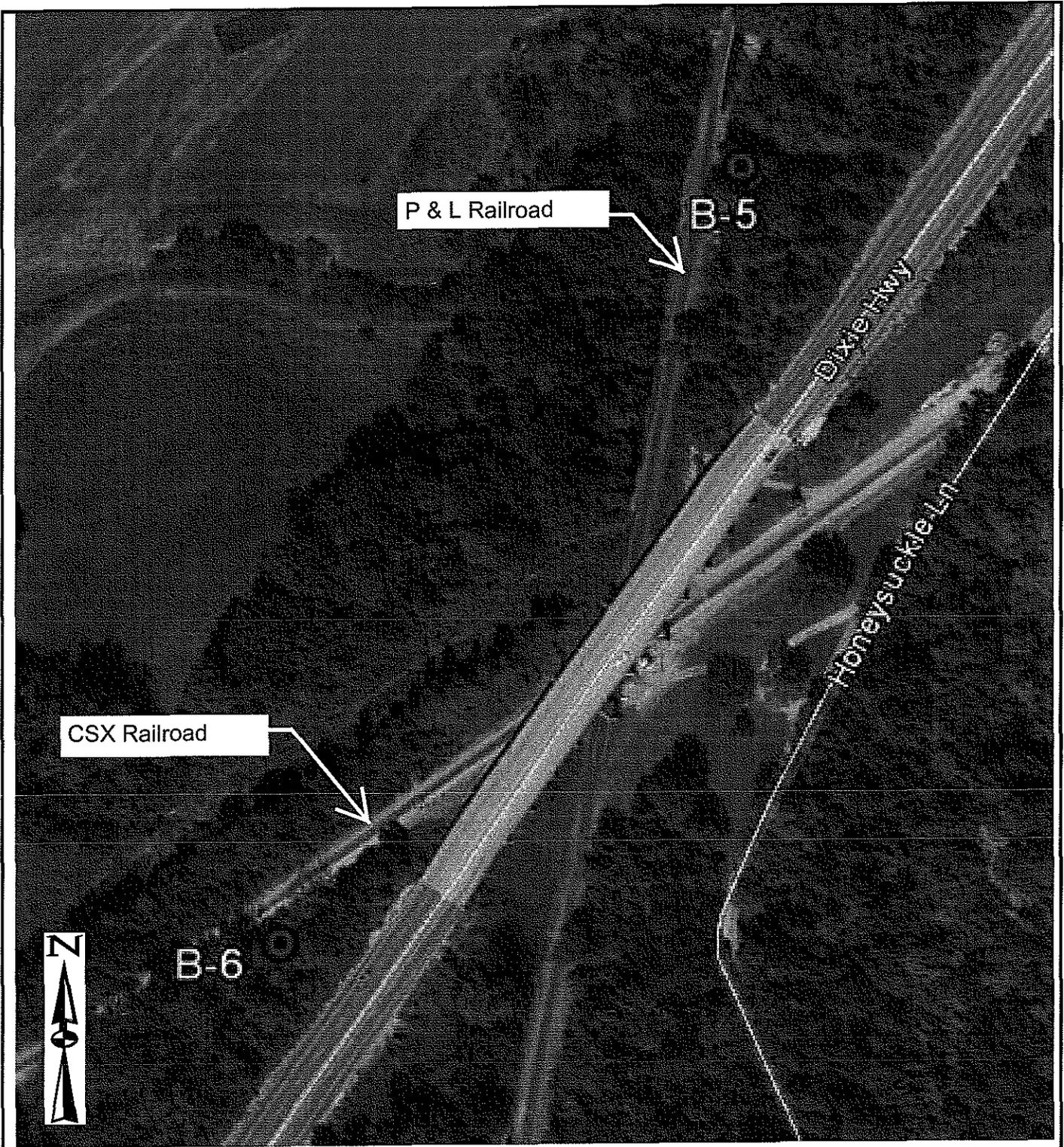
By: _____
Name: _____
Title: _____

Witness as to Railroad

Witness as to Licensee

Name: Andrea Couch

Name: _____



Source: Google Earth

Hardin County Transmission Main and Pump Station

VECTOR ENGINEERS, INC
 GEOTECHNICAL • MATERIALS • GEOSCIENCES

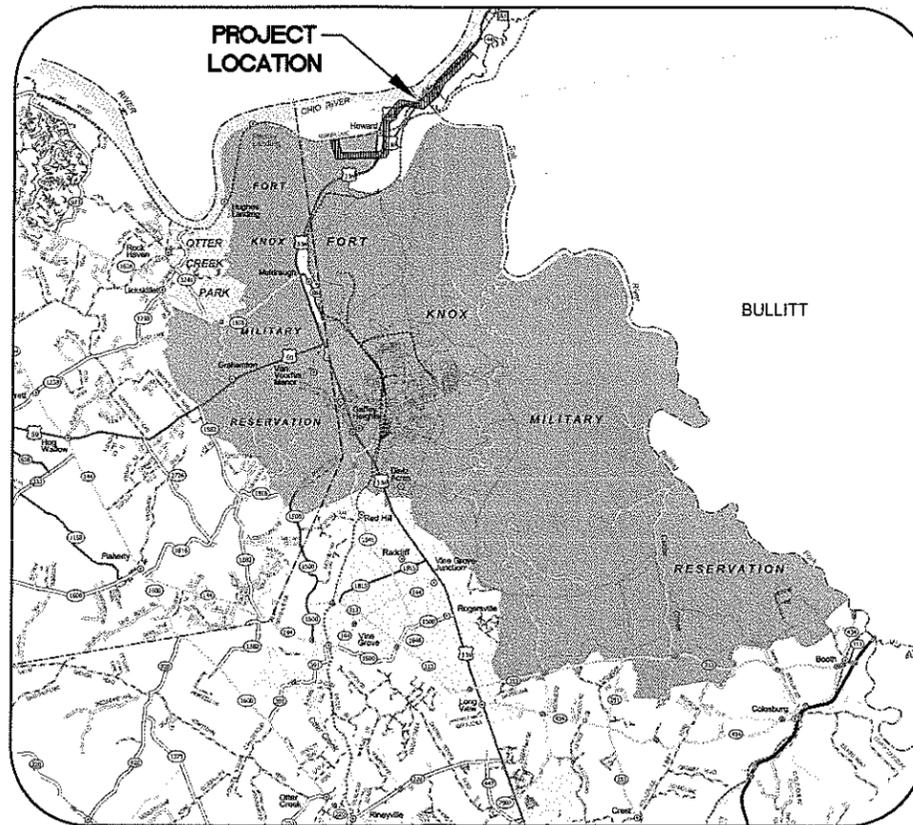
Figure 8: Boring Location Plan
Borings 5 & 6

Hardin County Main
 West Point, Kentucky
 Vector Project 14-2387

EXHIBIT A
 LICENSE #PL-HC-012
 One buried 36" steel pipe crx cont.
 one 24" DIP for conveying potable water
 1,600' SW MP L-21 & 2428.6' S c/1 6th St.

LWC INTERCONNECT - TRANSMISSION MAIN AND PUMP STATION IMPROVEMENTS

HARDIN COUNTY, KENTUCKY
 MAY, 2014



LOCATION MAP
 NOT TO SCALE



Kevin J. Brian
 11/30/15



INDEX OF DRAWINGS

DWG. NO.	DESCRIPTION
G-1	COVER AND LOCATION MAP
G-2	GENERAL NOTES AND LEGEND
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C-11	SALT RIVER CROSSING PROFILE
C-12	RAILROAD AND ROADWAY CROSSING PROFILES
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C-18	PUMP STATION SITE PLAN
C-19	PUMP STATION PLAN AND SECTION
T-1	TRAFFIC CONTROL PLAN
T-2	TRAFFIC CONTROL PLAN
SD-1	WATER LINE STANDARD DETAILS
SD-2	WATER LINE STANDARD DETAILS
EC-1	EPSC PLAN
EC-2	EPSC PLAN
EC-3	EPSC PLAN
EC-4	EPSC NOTES AND DETAILS



UTILITY PROTECTION NOTE

ALL UTILITIES ON THESE PLANS ARE APPROXIMATE. INDIVIDUAL SERVICE LINES ARE NOT SHOWN. THE CONTRACTOR OR SUBCONTRACTOR SHALL NOTIFY "KENTUCKY 811" UTILITY PROTECTION CENTER BY DIALING 811 OR (TOLL FREE PHONE NO. 1-800-752-6007) FORTY-EIGHT HOURS IN ADVANCE OF ANY CONSTRUCTION ON THIS PROJECT. THIS NUMBER WAS ESTABLISHED TO PROVIDE ACCURATE LOCATION OF EXISTING BELOW GROUND UTILITIES (I.E. CABLES, ELECTRIC WIRES, GAS, AND WATERLINES.) THE CONTRACTOR SHALL BE RESPONSIBLE FOR BECOMING FAMILIAR WITH ALL UTILITY REQUIREMENTS SET FORTH ON THE PLANS IN THE TECHNICAL SPECIFICATIONS AND SPECIAL PROVISIONS. IF ANY UTILITY LINES ARE ENCOUNTERED DURING CONSTRUCTION, EXTREME CAUTION SHOULD BE EXERCISED AND THE UTILITY COMPANY NOTIFIED IMMEDIATELY. ANY DAMAGES SHALL BE REPAIRED IMMEDIATELY AT THE DIRECTION OF THE UTILITY COMPANY, INCLUDING TEMPORARY AND PERMANENT WORK.

HARDIN COUNTY WATER DISTRICT No. 1

AGENCY REVIEW



HDR Engineering, Inc.
 One Riverfront Plaza
 401 West Main Street, Suite 600
 Louisville, Kentucky 40202
 PHONE (502)264-4118 FAX (502)264-3000

GENERAL NOTES

- Sizes and materials of water and sewer lines were determined from GIS data as-built records and city maps. Contractor to verify during initial inspection and exploratory excavation work. Report discrepancies to the Engineer.
- Contractor to maintain continuous sewer service at all times during construction. A plan for bypass pumping and flow control shall be provided by Contractor for Engineer review prior to any bypass operations.
- Contractor to maintain continuous water service at all times during construction. Temporary water services may be required. Scheduled shutdowns may be allowed for tie-ins only. Approval of shutdowns must be approved by HCWD1 and Louisville Water Company 48 hours in advance of scheduled work.
- All permits required by the Contractor in the specifications shall be obtained and paid for before start of work.
- Contractor shall obtain written rights-of-entry from private property owners prior to entering private property. Copies of these rights-of-entry shall be delivered to HCWD1.
- MH invert elevations shown on the drawings represent the approximate center of the manhole.
- Erosion Prevention and Sediment Control shall be implemented prior to any land-disturbing activity on the construction site. Best Management Practices (BMP), silt fences, stone bag check dams in drainage ditches and stone bags at all catch basins or drainage structures shall be utilized to control siltation from the construction site. See Drawing EC-1 for minimum requirements of EPSC details and notes. The Contractor is responsible for installing and maintaining all silt control. All BMP's shall be in accordance with MSC, Hardin County Department of Engineering ordinance and KPDES General Permit for Stormwater Discharges Associated with Construction Activities (KYR10).
- The Contractor shall be responsible for any damage to pavement/concrete outside excavation areas. Restoration of damaged areas shall be by Contractor at his own cost, to the satisfaction of HCWD1, Hardin County, The City of West Point and/or KYTC.
- Contractor shall be responsible for an 18 month maintenance period on all pavement/concrete and seeding/sodding restoration, initiated upon final completion acceptance.
- All disturbed earthen areas shall be restored using seed and coconut straw. All roadside ditches and swales shall be restored with coconut straw matting.
- Given location of reconstruction, Contractor shall make provisions for property owners to have continued access to and from homes.
Contractor shall supply any agreements made outside contract in regards to stage/storage areas. Owner has not designed any such areas and shall be the sole responsibility of Contractor to acquire. Copies of these agreements shall be delivered to HCWD1.
- All plugs for abandoned water mains shall be the Mechanical Joint (MJ Plug) type.

UTILITY NOTES

- Locations of existing underground utilities shown on these drawings are based upon available information and are approximate. No responsibility is assumed for the accuracy or completeness of the information. The Contractor shall be responsible for determining the exact location of all utilities before commencing work and for any damages which occur by his failure to locate or preserve these underground utilities. If during construction operations the contractor should encounter utilities other than those shown on the plans, He shall immediately notify the Engineer and take necessary and proper steps to protect the facility and assure the continuance of service.
- The cost for working around any utilities, whether shown on these drawings or otherwise, is the responsibility of the Contractor.
- The Contractor shall notify "Kentucky 811" at 1-800-752-6007 and all non-member utility companies 48 hours prior to any construction in the vicinity of their utilities, unless otherwise noted. The Contractor shall verify the exact location, size, type and elevation of all existing utilities prior to construction. The Contractor shall individually consult with each of the following utility agencies, listed below.
- Utility agencies shall be contacted by the Contractor to coordinate open-cut construction and protection of the utility's facility or for an emergency involving the utility's facilities.

SAFETY ADVISORY

- The Contractor shall be safely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.
- All confined space entry work shall comply with State and Federal OSHA and District requirements and the Veolia safety plan.
- The Contractor shall comply with applicable laws and regulations relating to the safety of persons or property or the protection of persons or property from damage, injury or loss.
- A job site accident plan shall be prepared by the contractor for review and approval by HCWD1.
- The owner reserves the right to stop work on the project if unsafe conditions are being exhibited by the Contractor.

UTILITY INFORMATION

WATER:	HARDIN COUNTY WATER DISTRICT NO. 1 (HCWD1) CONTACT BRETT PYLES LOUISVILLE WATER CO. CONTACT TED NIEMANN	(270) 351-3222 (502) 569-3600
SEWER:	CITY OF WEST POINT CONTACT STEVE SANDERS	(502) 795-9930
ELECTRIC:	NOLIN RURAL ELECTRIC CO-OP	(270) 765-6153
CABLE:	INSIGHT COMMUNICATIONS/TIME WARNER CABLE LEVEL 3 COMMUNICATIONS	(305) 265-0136 (720) 888-1000
TELEPHONE:	AT&T DISTRIBUTION	(770) 335-8255
GAS:	LOUISVILLE GAS AND ELECTRIC LG&E MULDRACH GAS TRANSMISSION TEXAS GAS TRANSMISSION CONTACT KEVIN MURPHY	(502) 627-2484 (502) 627-2484 (502) 396-4216
STATE:	KYTC DISTRICT #4 CONTACT CHARLES MASON	(270) 766-5066
	KYTC DISTRICT #5 CONTACT ROBERT ROGERS	(502) 210-5400
CITY:	CITY OF WEST POINT CONTACT WILLIAM ASH	(502) 922-4260
	METRO LOUISVILLE PUBLIC WORKS DEPARTMENT CONTACT AL ANDREWS	(502) 574-3958

TRANSPORTATION

STATE:	KYTC DISTRICT #4 CONTACT CHARLES MASON	(270) 766-5066
	KYTC DISTRICT #5 CONTACT ROBERT ROGERS	(502) 210-5400
CITY:	CITY OF WEST POINT CONTACT WILLIAM ASH	(502) 922-4260
	METRO LOUISVILLE PUBLIC WORKS DEPARTMENT CONTACT AL ANDREWS	(502) 574-3958

ABBREVIATIONS

ASPHALT PAVEMENT DRIVE	PA
AVENUE	AVE
CLEAN OUT	CO
CONCRETE PAVEMENT DRIVE	CONC
COURT	CT
CURED-IN-PLACE MANHOLE	CIPM
CURED-IN-PLACE PIPE	CIPP
DRIVE	DR
EDGE OF PAVEMENT	EOP
	G
MANHOLE	MH
POLYVINYL CHLORIDE PIPE	PVC
ROAD	RD
SANITARY SEWER	SS
STREET	ST
VITRIFIED CLAY PIPE	VCP
WATER	W
WATER VALVE	WV
CONTROL POINT	CPT

LEGEND

PROPOSED	EXISTING	
DI WATER MAIN	EXIST. WATER MAIN	WATER LINE
		GATE VALVE & BOX
		FLUSHING HYDRANT ASSEMBLY (INCLUDES VALVE)
		AIR RELEASE VALVE
		PRESSURE REDUCING VALVE (PRV)
		REDUCER
		LEAK DETECTION ASSEMBLY
		PROPOSED EASEMENT
		BORE AND JACK/OPEN CUT
		LINE MARKER
		GAS METER
		BORE AND JACK
		CREEK
		RIGHT-OF-WAY
		PROPERTY LINE
		FIBER OPTIC CABLE
		GAS MAIN
		UNDERGROUND UTILITIES/TELEPHONE
		EDGE OF PAVEMENT
		EDGE OF GRAVEL
		GRAVEL DRIVE
		ASPHALT PAVEMENT DRIVE
		CONCRETE PAVEMENT DRIVE
		NOT IN CONTRACT
		HIGH PRESSURE GAS MAIN

ONE RIVERFRONT PLAZA
 401 W. MAIN STREET, SUITE 500
 LEXINGTON, KY 40502
 PHONE: 502.400.3334
 FAX: 502.400.3335

LWC INTERCONNECT - TRANSMISSION MAIN
 AND PUMP STATION IMPROVEMENTS
 HARDIN COUNTY WATER DISTRICT No. 1
 FORT KNOX, KENTUCKY

GENERAL NOTES
 AND LEGEND

SCALE: 1" = 1000'
 DATE: MAY 2014
 JOB NO.: 74960
 DESIGNED: KJB
 DRAWN: JGD
 CHECKED:
 O/C:
 OWNER APPROVAL:
 BY:
 TITLE:
 REVISIONS:
 NO.: DATE:

DRAWING:
 G-2
 2 OF 30



[Handwritten Signature]
 11/30/15

AGENCY REVIEW
 10/21/2014

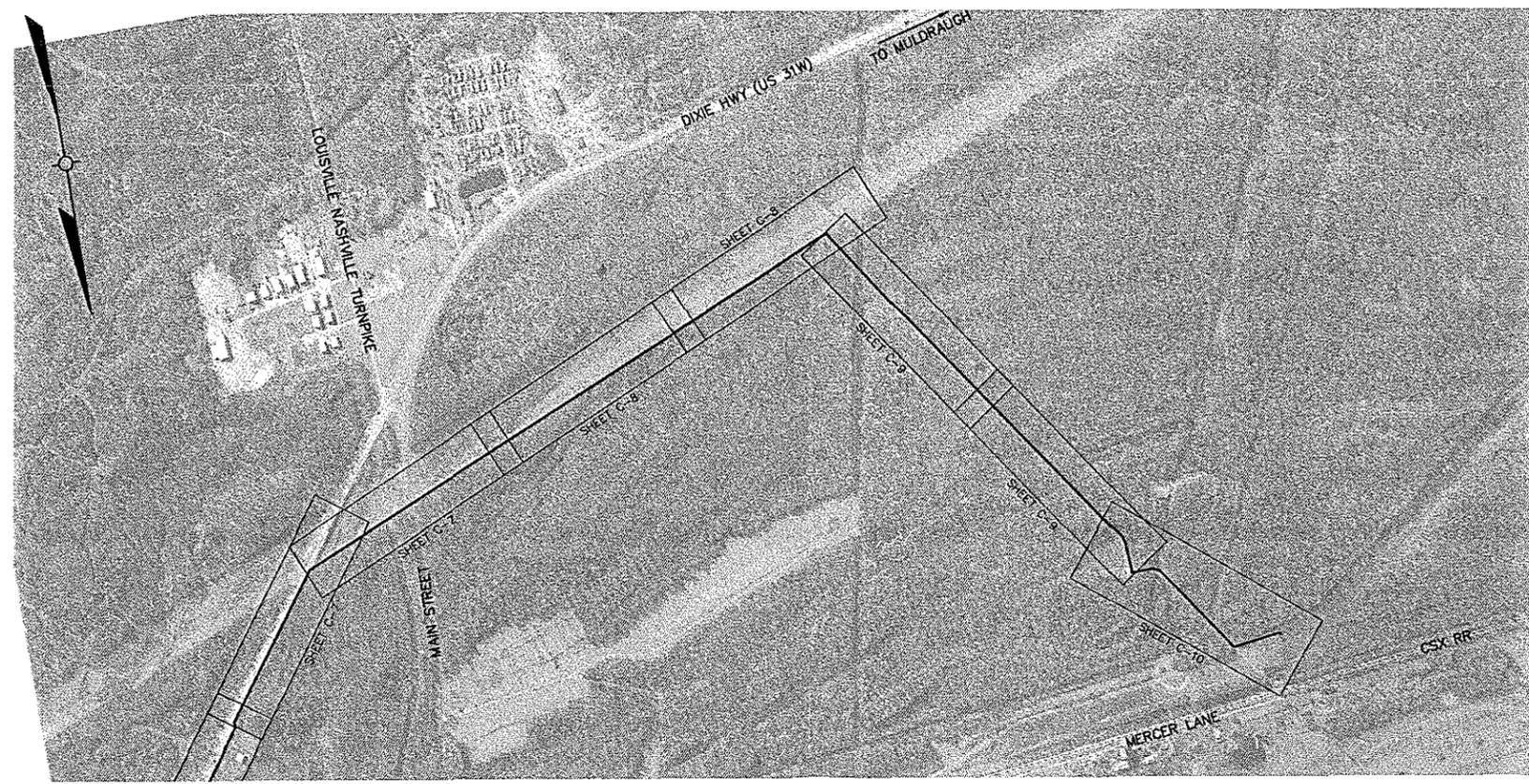
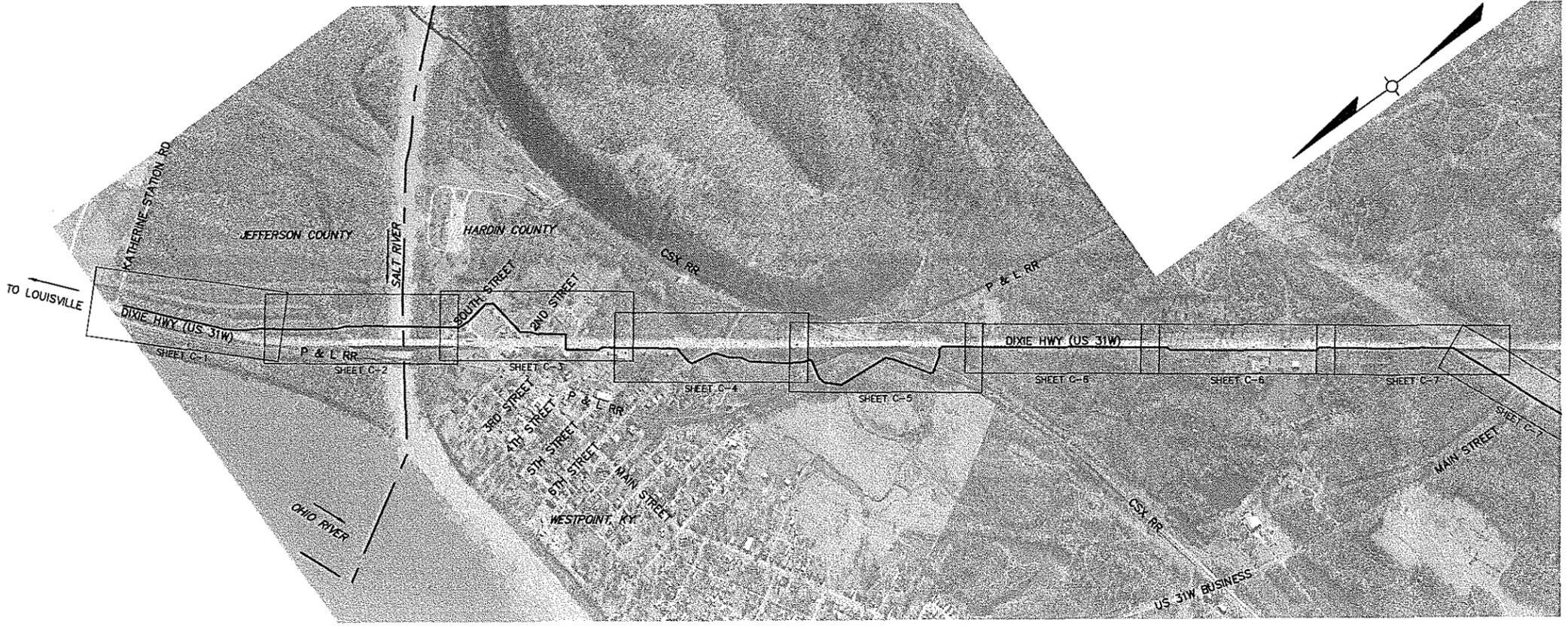
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PRINTED: 10/21/2014 @ 1:57PM
 FILE NAME: L:\HCR\Contract\70000 Series\CON\74960-HCWD\Transmission and P\B13.00 CAD\Drawings\3-HCWD\General Notes & Legend.dwg

EXHIBIT A
 LICENSE #PL-HC-012
 One buried 36" steel pipe crx cont.
 one 24" DIP for conveying potable water
 1,600' SW MP L-21 & 2428.6' S c/l 6th St.

PRINTED: 10/21/2014 @ 1:58PM

FILE NAME: L:\HDR Contracts\70000 Series\CONTR074960-HC\WD Transmission and PS\13.00 CADD\Drawings\G-3\HC\WD Plan Index 1.dwg



AGENCY REVIEW
 10/21/2014

GRAPHIC SCALE = 1" ON ORIGINAL

SCALE:	1" = 500'
DATE:	MAY 2014
JOB NO.:	74960
DESIGNED:	KJB
DRAWN:	WMC
CHECKED:	
Q/C:	

OWNER APPROVAL:
 BY:
 TITLE:

REVISIONS:	
NO.:	DATE:

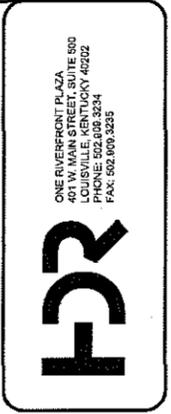


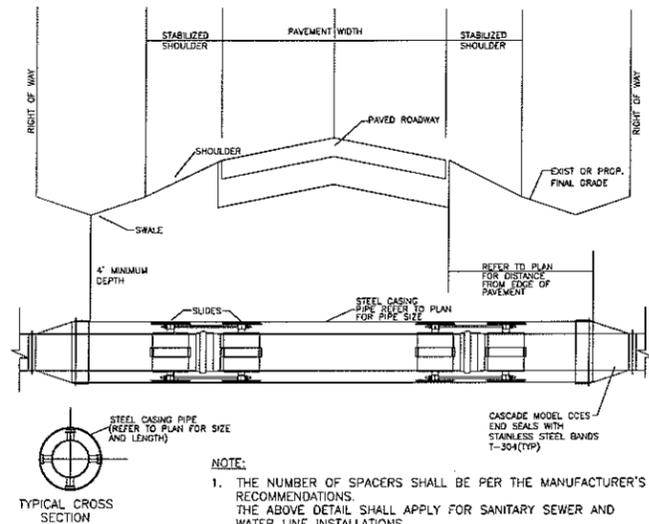
DRAWING:

G-3

3 of 30

LWC INTERCONNECT - TRANSMISSION MAIN
 AND PUMP STATION IMPROVEMENTS
 HARDIN COUNTY WATER DISTRICT No. 1
 FORT KNOX, KENTUCKY
 PLAN INDEX SHEET
 1 OF 2

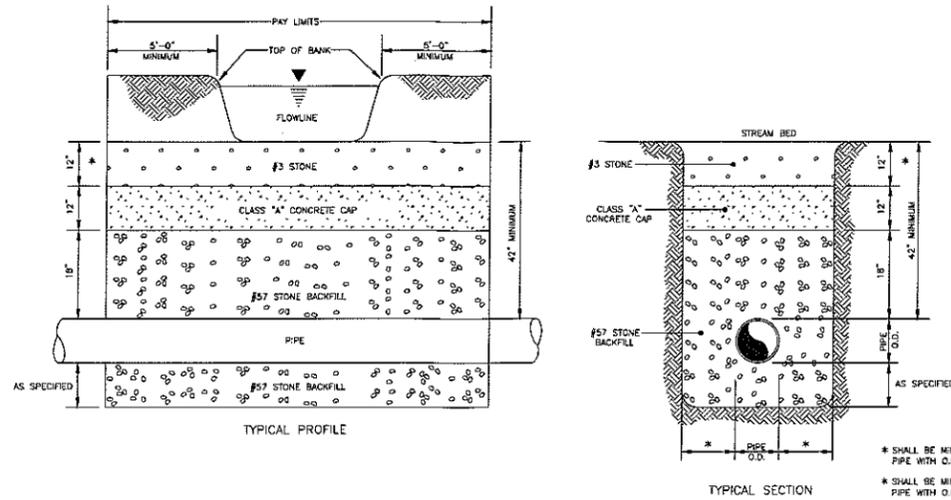




BORE & JACK CASING DETAIL

N.T.S.

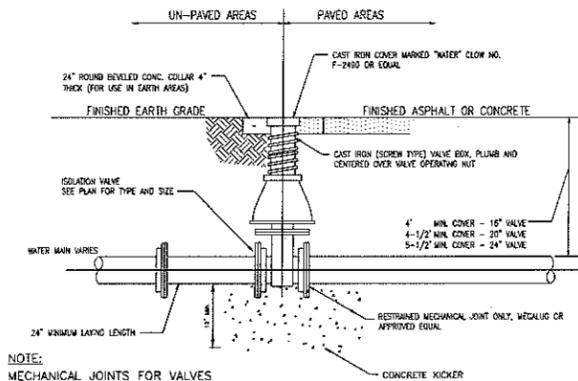
- NOTE:
1. THE NUMBER OF SPACERS SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS. THE ABOVE DETAIL SHALL APPLY FOR SANITARY SEWER AND WATER LINE INSTALLATIONS.
 2. SAME DETAIL APPLIES FOR OPEN CUT INSTALLATION.



CREEK CROSSING DETAIL

NTS

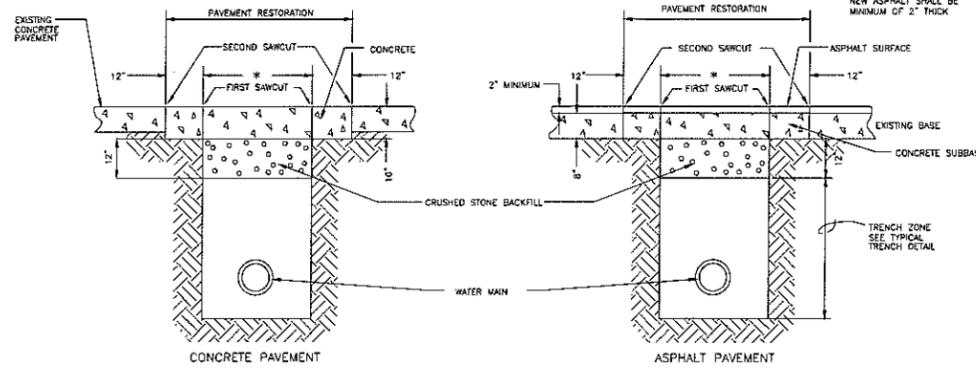
- STREAM CROSSING CONDITIONS
1. COMPLY WITH SECTION 1.7.4 OF THE LWC STANDARD SPECIFICATIONS.
 2. THIS DETAIL APPLIES ONLY TO BLUE-LINE STREAMS, AS SHOWN ON THE PERTINENT USGS QUADRANGLE MAP.
 3. MANAGEMENT CONSTRUCTION PRACTICES MUST BE USED AT ALL TIMES DURING CONSTRUCTION. ADEQUATE SILT CONTROL MUST BE PLACED PRIOR TO THE START OF CONSTRUCTION AND MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
 4. REVEGETATE ALL DISTURBED GRASSY AREAS ON THE STREAM SLOPES. SOD STAKED MAY BE REQUIRED TO SECURE SOD ON THE STREAM BANKS.
 5. MAINTAIN AT LEAST 3.5' OF BACKFILL AT THE STREAM CROSSING FROM THE TOP OF PIPE TO THE ORIGINAL STREAM BED ELEVATION.
 6. OBTAIN APPROVAL FROM THE METROPOLITAN SEWER DISTRICT PRIOR TO THE START OF THE STREAM CROSSING.
 7. THRUST BLOCKING SHALL BE CONSTRUCTED AT ALL BENDS.
 8. VARIATION FROM THIS STANDARD REQUIRES LWC & KY. DIVISION OF WATER APPROVAL.



VALVE INSTALLATION

N.T.S.

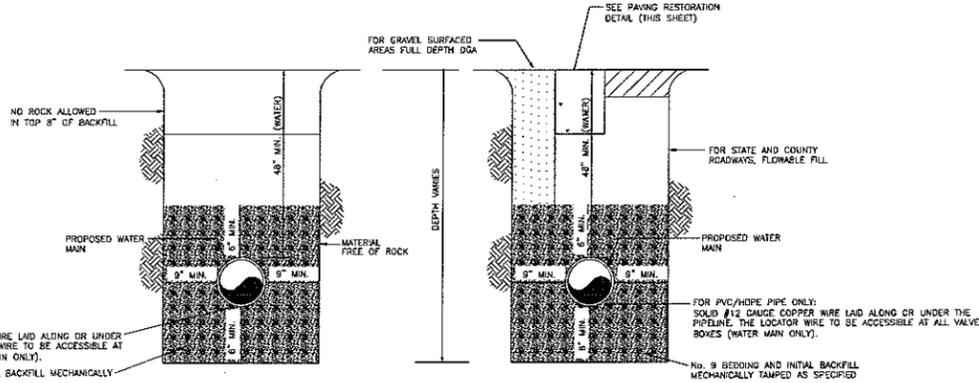
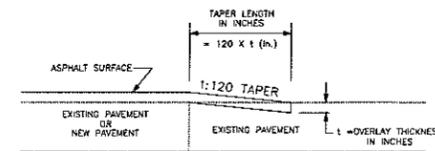
- NOTE:
- MECHANICAL JOINTS FOR VALVES AND FITTINGS SHALL BE RESTRAINED WITH GRIPPINGS AS MFR. BY ROMAC, FORD OR APPROVED EQUAL.



PAVING RESTORATION

NTS

- NOTES:
1. ASPHALT PAVEMENT REPLACEMENT SHALL APPLY ONLY TO THE CITY OF WEST POINT ROADWAY CROSSINGS, THE DETAILS BELOW THE 12" CRUSHED STONE BACKFILL IS PROVIDED IN TYPICAL TRENCH DETAIL.
 2. CONCRETE PAVEMENT REPLACEMENT SHALL APPLY FOR WATER MAIN INSTALLATION ALONG EX. CONCRETE ROADWAY ON SHEETS C-1 AND C-2
 3. CONTRACTOR WILL BE HELD RESPONSIBLE DURING THE ENSUING 18 MONTHS FOR PROPER BACKFILLING AND REPLACEMENT OF SURFACE. DURING THE 5 YEAR PERIOD AFTER THE CUT IS MADE, ANY PAVEMENT SETTLEMENT SHALL BE IMMEDIATELY REPAIRED IN AN APPROVED MANNER AT THE EXPENSE OF THE CONTRACTOR.
 4. BACKFILLING UP TO BOTTOM OF SUBBASE ELEVATION SHALL BE COMPLETED PRIOR TO SECOND PAIR OF SAWCUTS AND EXCAVATION FOR THE ADDITIONAL 12" OF CONCRETE ON EACH SIDE OF THE TRENCH.
 5. DILUTE SS1H (OR OTHER APPROVED TACK COAT MATERIAL) SHALL BE APPLIED AT THE RATE OF 0.1 GAL. PER SQUARE YARD OVER THE CONCRETE BASE. ALLOW SUFFICIENT TIME FOR IT TO "BREAK" BEFORE THE FINISHED BITUMINOUS CONCRETE IS PLACED, AND SEAL ALL JOINTS SECURELY AFTER PAVING.
 6. PAVEMENT RESTORATION SHALL BE TRENCH WIDTH AS SHOWN IN DETAIL, UNLESS OTHERWISE SHOWN ON PLANS.

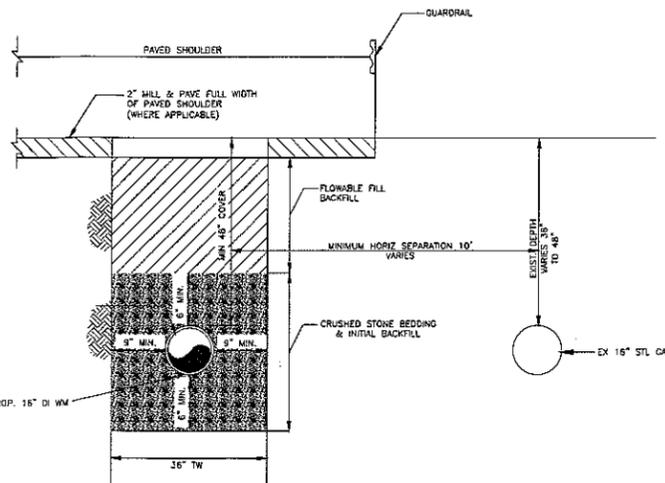


CASE I BACKFILL

CASE II BACKFILL

WATER TRENCH AND BACKFILL DETAIL

N.T.S.



WATER MAIN TRENCH DETAIL IN PAVED SHOULDER (KYTC)

N.T.S.



AGENCY REVIEW

11/13/2014

GRAPHIC SCALE = 1" ON ORIGINAL

SCALE: NO SCALE

DATE: MAY 2014

JOB NO.: 74960

DESIGNED: KJB

DRAWN: JGD

CHECKED:

D/C:

OWNER APPROVAL:

BY:

TITLE:

REVISIONS:

NO.: DATE:



DRAWING:

SD-1

25 OF 30

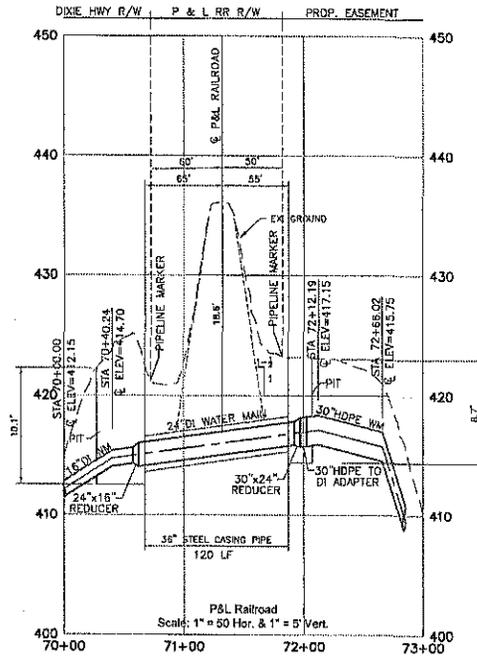
LWC INTERCONNECT - TRANSMISSION MAIN
 AND PUMP STATION IMPROVEMENTS
 HARDIN COUNTY WATER DISTRICT No. 1
 FORT KNOX, KENTUCKY

WATER LINE
 STANDARD DETAILS



ONE RIVERFRONT PLAZA
 401 W. MAIN STREET, SUITE 900
 LOUISVILLE, KENTUCKY 40202
 PHONE: 502.603.9254
 FAX: 502.606.9255

RELEASE UNDER DISCRETION BY THE ARCHITECT/ENGINEER. THE INFORMATION ON THIS DRAWING IS THE PROPERTY OF THE ARCHITECT/ENGINEER AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

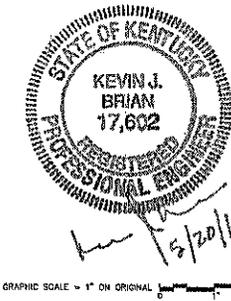


PIPELINE PROFILE VIEW

NOTES:

THE FRONT OF THE CASING PIPE SHALL BE PROVIDED WITH MECHANICAL ARRANGEMENTS OR DEVICES THAT WILL POSITIVELY PREVENT THE AUGER FROM LEADING THE PIPE SO THAT NO UNSUPPORTED EXCAVATION IS AHEAD OF THE PIPE.

EXHIBIT A
LICENSE #PL-HC-012
 One buried 36" steel pipe crx cont.
 one 24" DIP for conveying potable water
 1,600' SW MP L-21 & 2428.6' S c/l 6th St.



GRAPHIC SCALE = 1" ON ORIGINAL

ONE PROFESSIONAL P.E.
 301 W. MAIN STREET, SUITE 200
 FORT KNOX, KENTUCKY 40501
 PHONE: 773.243.3334
 FAX: 773.243.3335



**LWC INTERCONNECT - TRANSMISSION MAIN
 AND PUMP STATION IMPROVEMENTS**
 HARDIN COUNTY WATER DISTRICT No. 1
 FORT KNOX, KENTUCKY
P&L CROSSING
PROFILE AND CROSS SECTION VIEW

SCALE:	1"=5' VERT 1"=50' HOR
DATE:	MAY 2015
JOB NO.:	74966
DESIGNED:	KJB
DRAWN:	WAG
CHECKED:	
D/S:	
OWNER APPROVAL:	
BY:	
TITLE:	
REVISIONS:	
NO.:	DATE:

DRAWING: **2**
2 OF 2



Project: 14-2387 Hardin County Main

West Point, KY

Method: H.S.A.

Boring Date: 20-Nov-14

Location:

Inside Diameter: 2 1/4 inches

Drill Rig Type: CME-45

Hammer Type: Automatic

Groundwater: Dry upon completion

Weather: Sunny, 30's°F

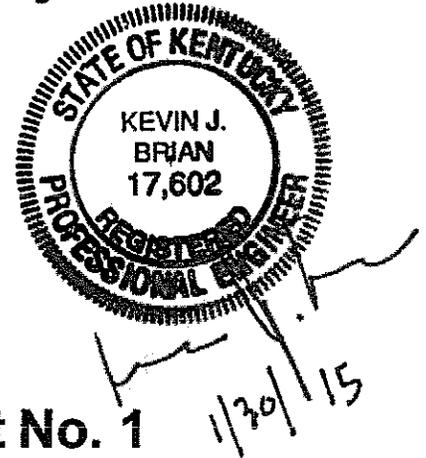
Driller: Glenn Powers

From (ft)	To (ft)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6-inch increment	Recovery (in)	SPT-N value	Rock Quality (RQD, %)	Atterberg Limits	Moisture Content (%)	% Fines (clay & silt)	RIMAC	Unconfined Compressive Strength, (psf)
0.0	0.5	Crushed stone with some clay		1	SS	3, 4, 6	4	10						
0.5	3.5	VERY STIFF, mottled brown and yellow brown, silty LEAN CLAY (CL)		2 1/2	SS	7, 8, 11	18	19					5900	
3.5		STIFF, brown, silty LEAN CLAY (CL), with some sand, moist		5	SS	4, 7, 8	18	15					2130	
				7 1/2	SS	5, 7, 9	18	16					1212	
				10	SS	5, 6, 6	18	12					1406	
				15	SS	3, 3, 3	18	6					242	
	20.5			20	SS	2, 3, 4	18	7						
20.5		Boring terminated at 20.5 feet, no refusal												

EXHIBIT A
 LICENSE #PL-HC-012
 One buried 36" steel pipe crx cont.
 one 24" DIP for conveying potable water
 1,600' SW MP L-21 & 2428.6' S c/1 6th St.

Specifications
for
LWC Interconnect
Transmission Main and Pump Station
Improvements
Hardin County, Kentucky

May 2014



Hardin County Water District No. 1

Prepared by:

HDR Engineering, Inc.
401 West Main Street, Suite 500
Louisville, Kentucky 40202
(502) 584-4118



EXHIBIT A
LICENSE #PL-HC-012
One buried 36" steel pipe crx cont.
one 24" DIP for conveying potable water
1,600' SW MP U-21 & 2428.6' S c/A 6th St.

SECTION 02610
WATER PIPE AND FITTINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor, material, and equipment necessary to install water main piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02630 - Encasement Pipe.
- C. Section 02640 - Water Valves and Gates.
- D. Section 02675 - Disinfection of Potable Water Pipe.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE (DIP) AND FITTINGS

- A. Ductile iron pipe (DIP) shall conform to ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51 Standard. The pipe shall conform to pressure class 350 minimum unless noted otherwise. All fittings and joints should be capable of accommodating pressure of not less than 250 psi. DIP is required for all new water mains 14-inch diameter and larger and for all fire hydrant lateral and fire service lines.
- B. Fittings shall be ductile iron 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 and shall conform to the details and dimensions shown therein. Fittings shall have rubber gasket joints meeting the requirements of AWWA C111. Fittings shall be cement-mortar lined and bituminous coated to conform to the latest revision of ANSI/AWWA standards.
- C. DIP shall be installed within 200 feet of fuel station or contaminated soils. Joints shall be installed with petroleum resistant nitrile gaskets.
- D. Ductile iron mechanical joint fittings shall be in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 (or A21.53 for compact fittings) and have joints in accordance with ANSI/AWWA C111/A21.11. Fittings and joints shall be supplied with all accessories.
- E. All fittings and valves shall be restrained with a friction type retainer gland, as manufactured by Ford, Romac or approved equal.
- F. All ductile fittings shall be rated at 250 psi water working pressure plus water hammer. Ductile iron fittings shall be ductile cast-iron grade 70-50-05 per ASTM Specification A339-55.
- G. Cement mortar lining and seal coating for pipe and fittings, where applicable shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.
- H. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor, during the bidding phase, shall determine the number of fittings required on the job and include the cost of the fittings and installation in the unit price for pipe.
- I. Ductile iron pipe and fittings shall be as manufactured by U.S. Pipe & Foundry Company, American Cast Iron Pipe Company, or approved equivalent.

2.02 POLYVINYL CHLORIDE (PVC) WATER PIPE - C.I. PIPE SIZE

- F. Each length of pipe shall be legibly marked, stating: manufacturer, diameter, wall thickness and primer.
- G. Precaution shall be taken to avoid deforming the pipe and damaging the primer during shipping.

2.02 CARRIER PIPE SPACERS

- A. Carrier pipes installed inside encasement pipes shall be centered throughout the length of encasement pipe. Centering shall be accomplished by the installation of polyethylene pipeline spacers attached to the carrier pipe in such manner as to prevent the dislodgement of the spacers as the carrier pipe is pulled or pushed through the encasement pipe. Spacers shall be of such dimensions to provide: full supportive load capacity of the pipe and contents; of such thickness to allow installation and/or removal of the pipe; and to allow no greater than 2 inch movement of the carrier pipe within the cover pipe after carrier pipe is installed.
- B. Spacers shall be located immediately behind each bell and at a maximum spacing distance as follows:

Carrier Pipe Diameter (inches)	Maximum Spacing (feet)
2 - 2-1/2	4
3 - 8	7
10 - 26	10
28	9
30	8
32	7
34	6
36 - 38	5.5

The materials and spacing to be used shall be accepted by the Engineer prior to installation. The polyethylene pipeline spacers shall be manufactured by Pipeline Seal and Insulator, Inc. (PSI), Raci Spacers, Inc., or equivalent. Installation shall be in accordance with manufacturer=s recommendations.

2.03 ENCASEMENT PIPE END SEALS

- A. After installation of the carrier pipe within the encasement pipe, the ends of the casing shall be sealed with either a wraparound or a pull-on casing end seals fabricated of minimum 1/8-inch thick neoprene rubber. The seals shall be attached to the encasement pipe and the carrier pipe by 304 stainless steel band clamps not less than 1/2-inch wide. The casing end seals shall be as manufactured by Advance Products & Systems, Inc., or approved equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where shown on the Drawings, the Contractor shall install encasement pipe. Install encasement pipe to maintain alignment, grade and the circular shape of the encasement pipe. The encasement pipe shall be straight and true in alignment; and any significant deviation from line or grade, in the opinion of the Engineer or permitting authority, shall be sufficient cause for disapproving or rejecting the installation.
- B. Two methods of installation are designated, the open-cut method and the boring method.
 1. The open-cut method shall consist of placing the encasement pipe in the excavated trench, then installing the carrier pipe inside the encasement pipe. Excavation, bedding and backfilling shall be in accordance with Section 02225.
 2. The boring and jacking method consists of pushing or jacking the encasement pipe into the subsurface material as an auger cuts out the material or after the auger has completed the bore. Where designated on the drawings, crossings beneath state maintained roads, railroads, or other surfaces not to be disturbed, shall be installed by boring and jacking of steel casing pipe followed by installation of the carrier pipe within the casing pipe. The Contractor shall provide a jacking pit, bore

1. All pipes shall be laid with ends abutting and true to the lines and grades indicated on the plans. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
2. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure it is clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
3. Joint deflection for slip joint or mechanical joint pipe shall be no more than 75% of the maximum deflection recommended by the manufacturer. No pipe bending on 4-inch or larger. Joint deflection must be shown on shop drawing submittals.
4. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.
5. Anchorage of Bends:
 - a. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by providing both a friction type restrainer gland and poured concrete thrust blocking. Thrust blocks shall be as shown on the Drawings, with sufficient volumes of poured concrete being provided; however, care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair. Polyethylene wrap shall be provided around all fittings, including retainer glands before pouring concrete thrust blocks. Sack concrete is not acceptable.
 - b.
 - c. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other appurtenances. Such items shall be included in the price bid for the supported item.
6. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has the opportunity to make an inspection of the joints, alignment and grade in the section laid, but such inspection shall not relieve the Contractor of further liability in case of defective joints, misalignment caused by backfilling and other such deficiencies that are noted later.
7. All joint surfaces shall be cleaned immediately before jointing the pipe. The joint shall be lubricated in accordance with the pipe manufacturer's recommendations. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. All pipe shall be provided with home marks to insure proper gasket seating. Details of gasket installation and joint assembly shall follow the manufacturer's direction for the joint type and material of the pipe. The resulting joints shall be watertight and flexible.

3.04 TESTING OF WATER PIPE

- A. The completed work shall comply with the provisions listed herein, or similar requirements which will insure equal or better results. Suitable test plugs, water pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to HCWD1.
- B. Only HCWD1 personnel are permitted to operate active hydrants and valves. There will be no charge to the Contractor for water or labor for contracts with HCWD1.
- C. Water main piping shall be pressure tested to 250 percent of the normal system operating pressure or to 100 percent of the rated working pressure of the pipe, whichever is less. At no time shall the test pressure exceed 100 percent of the pipe's rated working pressure. A chart recorder provided by HCWD1 shall be installed on the pump discharge connection to the new water main to record pressure and time. A pipe section shall be accepted if the test pressure does not fall more than 5 psi during the minimum 2-hour test period. The pipe shall be tested for allowable leakage according to AWWA C-600 or C-605, as applicable, concurrently with the pressure test.
- D. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than

6,000 feet. Testing shall proceed from the source of water toward the termination of the line. The line shall be tested upon the completion of the first 6,000 feet. After the completion of two (2) consecutive tests without failure, the Contractor, at his option and with the Engineer's approval, may discontinue testing until the system is complete.

- E. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.
- F. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and hydrants. If permanent air vents are not located at high points within the test section, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water.
- G. All piping shall be tested for leakage at a pressure no less than that specified for the pressure test. The leakage shall be defined as the quantity of water that must be supplied to the tested section to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The leakage shall be less than an allowable amount determined by the following equation:

$$L = \frac{SD (P)^{1/2}}{133,200}$$

Where: L = allowable leakage (gallons/hour)
S = length of pipe tested, in feet
D = nominal diameter of pipe (inches)
P = test pressure (psig)

- H. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing the leaks and retesting as the Engineer may require without additional compensation. All visible leaks are to be repaired regardless of the amount of leakage.
- I. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

3.05 PLACEMENT OF IDENTIFICATION TAPE

- A. Detectable underground marking tape shall be placed over all water mains as specified in Section 02225.

3.06 PLACEMENT OF LOCATION WIRE

- A. Detectable underground location wire shall be placed above all non-metallic water main as specified in Section 02225.

3.07

- A. Granular HTH shall be placed in appropriately measured quantities of each pipe segment to facilitate disinfection, see Section 02675.

END OF SECTION 02610

**SECTION 02630
ENCASEMENT PIPE**

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor, material, and equipment necessary to install encasement pipe together with all appurtenances as shown and detailed on the Drawings and specified herein.

1.02 RELATED WORK

- A. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 - Water Pipe and Fittings.

PART 2 - PRODUCTS

2.01 STEEL PIPE

- A. Steel seamless pipe shall be new Grade B steel material, with a minimum yield of 35,000 psi and a wall thickness as shown below unless otherwise required by a permitting authority. The material shall conform to the chemical and mechanical requirements of the latest revision of ASTM A139 "Electric-Fusion (ERW) - Welded Steel Pipe (NPS 4 and Over)," unless otherwise stated herein.
- B. The minimum wall thickness shall be in accordance with the following table:

Steel Casing Pipe Wall Thickness

Casing Diameter (inches)	(Minimum Wall Thickness Under Railroads (inches)	Minimum Wall Thickness All Other Uses (inches)
16 and under	0.250	0.250
18	0.281	0.250
20 and 22	0.312	0.281
24	0.344	0.312
26	0.375	0.344
28	0.406	0.375
30	0.438	0.406
32	0.469	0.438
34 and 36	0.532	0.469

- C. Welds of the steel casing pipe shall be solid butt-welds with a smooth non-obstructing joint inside and conform to all specifications as required by American Welding Society (AWS). The casing pipe shall be installed without bends. All welders and welding operators shall be qualified as prescribed by AWS requirements.
- D. Hydrostatic testing shall not be necessary.
- E. A protective coating shall be applied to each length of pipe. Following an SSPC SP-7 "Brush-Off Blast Cleaning" surface preparation, 3 (dry) mils of Tnemec-Primer 10-99 (red), or Porter International Primer 260FD (red), or an equivalent thickness of an approved equivalent paint shall be applied in the manner recommended by the respective paint manufacturer.

G. Precaution shall be taken to avoid deforming the pipe and damaging the primer during shipping.

2.02 CARRIER PIPE SPACERS

- A. Carrier pipes installed inside encasement pipes shall be centered throughout the length of encasement pipe. Centering shall be accomplished by the installation of polyethylene pipeline spacers attached to the carrier pipe in such manner as to prevent the dislodgement of the spacers as the carrier pipe is pulled or pushed through the encasement pipe. Spacers shall be of such dimensions to provide: full supportive load capacity of the pipe and contents; of such thickness to allow installation and/or removal of the pipe; and to allow no greater than 2 inch movement of the carrier pipe within the cover pipe after carrier pipe is installed.
- B. Spacers shall be located immediately behind each bell and at a maximum spacing distance as follows:

Carrier Pipe Diameter (inches)	Maximum Spacing (feet)
2 - 2-1/2	4
3 - 8	7
10 - 26	10
28	9
30	8
32	7
34	6
36 - 38	5.5

The materials and spacing to be used shall be accepted by the Engineer prior to installation. The polyethylene pipeline spacers shall be manufactured by Pipeline Seal and Insulator, Inc. (PSI), Raci Spacers, Inc., or equivalent. Installation shall be in accordance with manufacturer=s recommendations.

2.03 ENCASEMENT PIPE END SEALS

- A. After installation of the carrier pipe within the encasement pipe, the ends of the casing shall be sealed with either a wraparound or a pull-on casing end seals fabricated of minimum 1/8-inch thick neoprene rubber. The seals shall be attached to the encasement pipe and the carrier pipe by 304 stainless steel band clamps not less than 1/2-inch wide. The casing end seals shall be as manufactured by Advance Products & Systems, Inc., or approved equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Where shown on the Drawings, the Contractor shall install encasement pipe. Install encasement pipe to maintain alignment, grade and the circular shape of the encasement pipe. The encasement pipe shall be straight and true in alignment; and any significant deviation from line or grade, in the opinion of the Engineer or permitting authority, shall be sufficient cause for disapproving or rejecting the installation.
- B. Two methods of installation are designated, the open-cut method and the boring method.
1. The open-cut method shall consist of placing the encasement pipe in the excavated trench, then installing the carrier pipe inside the encasement pipe. Excavation, bedding and backfilling shall be in accordance with Section 02225.
 2. The boring and jacking method consists of pushing or jacking the encasement pipe into the subsurface material as an auger cuts out the material or after the auger has completed the bore. Where designated on the drawings, crossings beneath state maintained roads, railroads, or other surfaces not to be disturbed, shall be installed by boring and jacking of steel casing pipe followed by installation of the carrier pipe within the casing pipe. The Contractor shall provide a jacking pit, bore through the earth, and/or rock, jack the casing pipe into proper line and grade and then install the carrier pipe within the casing pipe. The approach trench shall be large enough to accommodate one

through the earth, and/or rock, jack the casing pipe into proper line and grade and then install the carrier pipe within the casing pipe. The approach trench shall be large enough to accommodate one section of casing pipe, the jacks and blocking. The Contractor shall furnish and use adequate equipment to maintain the line and grade.

- C. The carrier pipe shall be ductile iron, polyvinyl chloride, or polyethylene pipe as designated on the Drawings. The carrier pipe shall be installed using pipe spacers as described in this Section. Carrier pipe shall be restrained through the encasement with harness type restraints for PVC pipe and field locking style gasket for DI pipe. Carrier pipe will not be permitted to rest on bells or couplings.
- D. Following installation of the carrier pipe, the ends of the encasement pipe shall be sealed with products of the type described in this Section.

3.02 DAMAGE

- A. The cost of repairing damage to the highway or railroad which is caused by a boring and jacking installation shall be borne by the Contractor.

END OF SECTION 02630

**PADUCAH & LOUISVILLE RAILWAY, INC.
INSURANCE REQUIREMENTS
EXHIBIT C**

A. RAILROAD PROTECTIVE INSURANCE - DURING INSTALLATION PERIOD

If the LICENSEE shall use its own forces or shall employ a contractor for the installation of the Pipeline, then, before commencing work, the LICENSEE or LICENSEE'S CONTRACTOR, as the case may be, shall provide and maintain the following insurance, in form and amount and with the companies satisfactory to, and as approved by, the RAILROAD.

(a) Statutory Workers' Compensation and Employer's Liability insurance.

(b) An Occurrence Form Railroad Protective Policy with limits of not less than Two Million (\$2,000,000.00) Dollars per occurrence for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property, with Six Million (\$6,000,000.00) Dollars aggregate for the term of the policy with respect to Bodily Injury, Liability, Property Damage Liability and Physical Damage to Property. The Policy must name

**PADUCAH & LOUISVILLE RAILWAY, INC.
200 CLARK STREET
PADUCAH, KY 42003**

as the Insured, and shall provide for not less than Ten (10) days' prior written notice to Railroad of cancellation of, or any material change, in the policy.

In lieu of purchasing the above noted Railroad Protective Policy, Licensee may choose to pay a fee of Two Thousand Two Hundred Fifty and No/100 Dollars (\$2,250.00) to Railroad in order to procure coverage for Licensee's Pipeline project under Railroad's blanket Railroad Protective Policy.

B. POST INSTALLATION

Before commencing work, and until this Agreement shall be terminated or the Pipeline removed (whichever date is later), the LICENSEE shall provide and maintain the following insurance, in form and amount with companies satisfactory to, and as approved by, the RAILROAD:

(a) Statutory Workers' Compensation and Employer's Liability Insurance.

(b) Automobile Liability in an amount not less than One Million (\$1,000,000.00) Dollars combined single limit.

(c) Commercial General Liability in an amount not less than Two Million (\$2,000,000.00) Dollars combined single limit. In the event the policy is a Claims Made Policy, coverage shall include an aggregate of Six Million (\$6,000,000.00) Dollars.

The policy must name

**PADUCAH & LOUISVILLE RAILWAY, INC.
200 CLARK STREET
PADUCAH, KY 42003**

as an Additional Insured and must not contain any exclusions related to doing business on, near, or adjacent to Railroad facilities.

LICENSEE shall provide RAILROAD with a CERTIFICATE of INSURANCE, evidencing such coverage and, upon request, the LICENSEE shall deliver a certified, true and complete copy of the policy or policies. The policies shall provide for not less than Ten (10) days' prior written notice to the RAILROAD of cancellation of, or any material change in, the policies.

It is understood and agreed that the foregoing insurance coverage is not intended to, and shall not, relieve the LICENSEE from or serve to limit LICENSEE'S liability under the provisions of the License Agreement.

It is further understood and agreed that, so long as this Agreement shall remain in force and the Pipeline shall not have been removed (whichever shall be later), the RAILROAD shall have the right, from time to time, to revise the amount or form of insurance coverages provided in this paragraph as circumstances or changing economic conditions may require. The RAILROAD shall give the LICENSEE written notice of any such requested change at least Thirty (30) days' prior to the date of expiration of the then existing policy or policies, which notice constitutes an amendment to this Agreement and shall become a part hereof; and the LICENSEE agrees to, and shall, thereupon provide the RAILROAD with such revised policy or policies therefor.

All Insurance provided must be primary and shall not be reduced or limited by any insurance procured by RAILROAD.

END OF EXHIBIT.



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
6/24/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Curneal & Hignite Insurance, Inc. 2905 Ring Road P.O. Box 807 Elizabethtown KY 42702-0807	CONTACT NAME: Jeffrey Stiles, CIC PHONE (A/C, No, Ext): (270) 737-2828 E-MAIL ADDRESS: jstiles@chiins.com		FAX (A/C, No): (270) 737-4950
	INSURER(S) AFFORDING COVERAGE INSURER A: Arch Insurance Co		NAIC # 11150
INSURED Hardin County Water District No. 1 1400 Rogersville Road Radcliff KY 40160	INSURER B:		
	INSURER C:		
	INSURER D:		
	INSURER E:		
	INSURER F:		

COVERAGES **CERTIFICATE NUMBER:** CL1562410291 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:	X		GWPXG0143604	1/1/2015	1/1/2016	EACH OCCURRENCE \$ 1,000,000 DAMAGED TO RENTED PREMISES (Ea occurrence) \$ 50,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 3,000,000 PRODUCTS - COMP/OP AGG \$ 3,000,000 Failure to Supply \$ 1,000,000
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS			GWPXG0143604	1/1/2015	1/1/2016	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ Underinsured motorist \$ 100,000
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$ 0			GWFXS0143604	1/1/2015	1/1/2016	EACH OCCURRENCE \$ 3,000,000 AGGREGATE \$ 3,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below		N/A				<input type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Umbrella Liability policy follows the form of the Commercial General Liability policy.

CERTIFICATE HOLDER PADUCAH & LOUISVILLE RAILWAY, INC. 200 CLARK STREET PADUCAH, KY 42003	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE J Stiles, CIC/JBS 



CERTIFICATE OF LIABILITY INSURANCE

DATE(MMDD/YYYY)
7/6/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER NORTH HARDIN INSURANCE AGENCY INC 353 W Lincoln Trail Blvd Radcliff, KY 40160	CONTACT NAME: MICK SIMMONS
	PHONE (A/C, No, Ext): (270) 351-4431
	FAX (A/C, No): (270) 351-4493
	E-MAIL ADDRESS: nhia1959@aol.com
	INSURER(S) AFFORDING COVERAGE
	INSURER A: KEMI
	INSURER B:
	INSURER C:
	INSURER D:
	INSURER E:
	INSURER F:

INSURED **HARDIN COUNTY WATER DISTRICT #1**
1400 ROGERSVILLE ROAD
RADCLIFF, KY 40160
270-351-3222

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADOL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MMDD/YYYY)	POLICY EXP (MMDD/YYYY)	LIMITS
	COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:						EACH OCCURRENCE \$ DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COMP/OPAGG \$ \$
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> DED <input type="checkbox"/> RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	<input checked="" type="checkbox"/> Y/N <input type="checkbox"/> N/A		317899	7/1/15	7/1/16	<input type="checkbox"/> PER STATUTE <input checked="" type="checkbox"/> OTHER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
WATERWORKS OPERATION

CERTIFICATE HOLDER PADUCAH & LOUISVILLE RAILWAY INC 200 CLARK ST PADUCAH KY 42003 SSCHMUCK@HCWD.COM	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE 
--	--

Application for New Pipeline or Supplement to Existing Permit No. _____

Applicant Information

Legal Name of Company:	Hardin County Water District No. 1		
Municipal Ownership, if any:		State of incorporation:	Kentucky
If not a corporation, name(s) of owners or partners:	Water district organized under KRS Chapter 74, Political Subdivision of Hardin County Fiscal Court		
Contact Name:	Daniel Clifford	Phone:	270-351-3222
Fax:	270-352-3055	Email Address:	DClifford@hcwd.com
Business Address:	1400 Rogersville Rd		

Corporate Information

Same as above

Legal Name of Company:			
Municipal Ownership, if any:		State of incorporation:	
If not a corporation, name(s) of owners or partners:			
Contact Name:		Phone:	
Fax:		Email Address:	
Business Address:			

Application For

Pipeline Crossing Pipeline parallel to track Both

Purpose

Product to be handled in pipeline: Water

Location

Name of Railroad:	Paducah and Louisville Railway		
City:	West Point	State:	KY
		County:	Hardin
Distance and direction from nearest Railroad milepost:	697 feet NE of L21 1,600 feet SW of L21		
Distance and direction from centerline of nearest road crossing:	2,428.6 feet S of 6th Street		
Distance in feet measured along the track from the point pipe(s) cross the track (main track or more than one track) to known point on Railroad (centerline of road crossing, center of railroad culvert, east or west end of a railroad bridge, points of a railroad switch):	Distance from intersection of CSX and P&L RR: 492 feet, N		
Angle pipe will make with track at the point of crossing (any crossing not at 90 degrees MUST be approved by Railroad):	90 degrees		
Distance from centerline of nearest track if a parallel pipeline encroachment:	N/A		
Total length of pipeline on railroad right of way:	110'		

Application for New Pipeline or Supplement to Existing Permit No. _____

Construction Data

Indicate Boring Method:	<input checked="" type="radio"/> Dry Boring <input type="radio"/> Jacking <input type="radio"/> Open Trenching
Distance from header of dry boring or jacking pit to center of closest track measured perpendicular to track:	66 feet
Vertical distance from base of rail of lowest track to top of casing:	18.6 feet
Distance from bottom of track ditch to top of casing:	4 feet
Distance below ground surface outside of track and track ditch area to top of casing:	4.8 feet

Pipe Data

	Carrier	Casing		Carrier	Casing
Contents to be handled:	Water	NA	Normal Operating Pressure:	125 psi	NA
Nominal Size of Pipe:	24"	36"	Outside Diameter:	25.8"	36"
Inside Diameter:	24.94"	34.936"	Wall Thickness:	0.43"	0.532"
Weight per Foot:	109.7 lbs	212.9 lbs	Material:	DI	Carbon Steel
Process of Manufacture:	Cast	Seamless or ERW	Specification:	02610	02630
Grade or Class:	350	Grade B	Test Pressure:	250 psi	NA
Type of Joint:	Restrained	Butt Weld	Type of Coating:	Bituminous	Epoxy
Details of Cathodic Protection:	Poly wrap	Epoxy	Details of Seal or Protection at Ends of Casing:	NA	See Detail
Method of Installation:	NA	Auger Bore	Character of Subsurface Material at the Crossing Location:	Very Stiff	Lean Clay
Approximate Ground Water Level:	None	Observed	Source of Information on Subsurface Conditions (Borings, Test Pits or Other):	See Boring B-5	

Note: Any soil investigation made on Railroad property or adjacent to tracks shall be carried on under the supervision of Railroad's Chief Engineer.

Attachments: Drawings

- G-1 Cover and Location Map
 - G-2 General Notes and Legend
 - G-3 Plan Index Sheet
 - 1of2 P&L RR Crossing - Plan View
 - 2of2 P&L RR Crossing - Profile and Cross Section View
 - SD-1 Waterline Standard Detail
 - SD-2 Waterline Standard Detail
 - Fig-8 Boring Locations
 - 1of1 Boring Log for B-5
- Specifications**
- 02610 - Water Pipe and Fittings
 - 02630 - Encasement Pipe

Application for New Pipeline or Supplement
Existing Permit No. _____

Project Information

Date you expect to be on Railroad premises:	July 2015	Date you expect to complete project:	December 2015
Is facility: <input type="radio"/> Temporary <input checked="" type="radio"/> Permanent	If temporary, estimated term: _____ (weeks, months, etc.)		
Will you employ a contractor for installation or maintenance?: <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Yes, but contractor has not been identified			
Company Name:		Contact Name:	
Phone:		Fax:	
Mobile:		Email Address:	
Business Address:			

Please include eight (8) copies of plan and profile drawings (no larger than 11" x 17"), eight (8) copies of an area map (indicating the worksite) (no larger than 11" x 17"), a copy of the existing agreement (if applicable), and a non-refundable application fee of \$1250.00 (subject to change without notice) and submit to:

Omega Rail Management, Inc.
PO Box 120338
Nashville, TN 37212-0338
(800) 990-1961
(800) 660-6326 (Facsimile)

If, in the opinion of the Railroad, sufficient hazard is involved, Railroad will supply flagmen, with proper advance notice, or if the pipeline installation requires removal, replacement, modification, or locating of track, bridges, signals, railroad wires or pipelines, roads, or the supply of railroad engineering or supervision, the applicant agrees the full cost of such railroad services will be borne by the applicant.

	General Manager, HCWD1	Feb 3, 2015
_____ Signature of Applicant	_____ Title	_____ Date

If this application has been prepared by a consultant or other third party, please complete the following:

Name of individual who prepared application:	Jennifer Dieterlen
Name of firm:	HDR Engineering
Business address of preparer:	401 West Main Street, Louisville KY 40202
Phone:	502-909-3234
Fax:	502-909-3235
Email:	jennifer.dieterlen@hdrinc.com

OFFICE USE ONLY	
Application received:	2.23.15
By:	AC
Permit No. Assigned:	PL-HC-012

APPENDIX D
LWC PREQUALIFIED
CONTRACTORS

LWC PreQualified Contractors by Selected Category(ies)

Bid Number

Amount Required:

\$1.00

Contractors Listed are prequalified in the Categories you requested:

ALL of these designated Categories:

ANY of these designated Categories:

20" - 48" Ductile Iron Water Mains

3D Enterprises Contracting Corporation

Mr. Donny Breeding President
3257 Lochness Drive
Lexington KY 40517

MBE No **WBE** No **HBE** No
Phone Number 8592726618
Fax Number 8592737206
Email Address drb@3dky.com

Basham Construction & Rental Co.

Mr. Randall Basham
1102 South Park Road
Fairdale KY 40118

MBE No **WBE** No **HBE** No
Phone Number (502) 961-9001
Fax Number (502) 961-0998
Email Address bashamconst@yahoo.com

Bowen Engineering Corporation

Mr. Brian Stater
8802 North Meridian Street
Indianapolis IN 46240

MBE No **WBE** No **HBE** No
Phone Number 3175964629
Fax Number (317) 841-4257
Email Address bstater@bowenengineering.com

Cleary Construction Inc.

Mr. Ryan Cornwell
2006 Edmonton Road
Tompkinsville KY 42167

MBE No **WBE** No **HBE** No
Phone Number 270-487-1784
Fax Number 270-487-8029
Email Address ryancornwell@clearyconst.com

Flynn Brothers Contracting, Inc.

Mr. Jason Rice
P O BOX 32065 P O Box 32065
Louisville KY 40232

MBE No **WBE** No **HBE** No
Phone Number (502) 364-9100
Fax Number (502) 363-1646
Email Address jcrice@flynnbrothers.com

Garney Companies, Inc.

Mr. Stephen Ford
200 Crutchfield Avenue
Nashville TN 37210

MBE No **WBE** No **HBE** No
Phone Number 6153507975
Fax Number 6153506067
Email Address sford@garney.com

Hall Contracting of Kentucky, Inc.

Mr. Richard Shutt
3800 Crittenden Drive
Louisville KY 40209

MBE No **WBE** No **HBE** No
Phone Number (502) 367-6151
Fax Number (502) 361-5771
Email Address rshutt@hallky.com

Howell Contractors, Inc.

Mr. Paul Bricking
980 Helen Ruth Drive
Ft. Wright KY 41017

MBE No **WBE** No **HBE** No
Phone Number 8593315457
Fax Number 8593316768
Email Address pbricking@howellcontractors.com

Infrastructure Systems, Inc.

Mr. Devin C. Schmidt
260 W. Vincennes St.
Orleans IN 47452

MBE No **WBE** No **HBE** No
Phone Number (812) 865-3309
Fax Number (812) 865-3009
Email Address dschmidt@netsurfusa.net

J. Fletcher Creamer & Son, Inc.

Mr. Robert A. Flock
1701 East Linden Ave
Linden NJ 07036

MBE No **WBE** No **HBE** No
Phone Number 9089865688
Fax Number 9089253350
Email Address rflock@jfcson.com

Kelsey Construction, LLC

Mr. Gobel Newsome
212 Cedar Grove Road
Shepherdsville KY 40165

MBE No **WBE** No **HBE** No
Phone Number (502) 955-1410
Fax Number (502) 921-9092
Email Address gobel@kelseyconstruct.com

Lawrence Construction & Leasing, Inc.

Mr. Timothy Mahoney,
460 Shorland Drive
Walton KY 41094

MBE No **WBE** No **HBE** No
Phone Number (859) 586-5758
Fax Number (859) 586-5594
Email Address lawrence.construction@outlook.com

Layne Heavy Civil, Inc. (FKA - Reynolds, Inc.)

Mr. Les Archer, President
4520 North State Rd. 37
Orleans IN 47452

MBE No **WBE** No **HBE** No
Phone Number (812) 865-3232
Fax Number (812) 865-3075
Email Address Mike.green@layne.com and lisa.sowder@layne.com

MAC Construction & Excavating Inc.

Mr. Bryan Winslow
1908 Unruh Court PO Box 6787
New Albany IN 47151-6787

MBE No **WBE** No **HBE** No
Phone Number (812) 941-7895
Fax Number 8129410699
Email Address bryanw@macconstruction.com

Miller Pipeline Corporation

Mr. Kevin Miller, President
8850 Crawfordsville Rd.
Indianapolis IN 46234

MBE No **WBE** No **HBE** No
Phone Number (317) 293-0278
Fax Number (317) 293-8502
Email Address Kevin.Miller@millerpipeline.com

Phillips Construction, LLC

Mr. Robert Phillips, President
3649 Highway 41A
Henderson KY 42420

MBE No **WBE** No **HBE** No
Phone Number 2708306773
Fax Number 2708309866
Email Address rphillips@phillipsllc.net

S. J. Louis Construction, Inc.

Mr. Jaime Woods
1351 Broadway Street W P. O. Box 459
Rockville MN 56369-0459

MBE No **WBE** No **HBE** No
Phone Number 3202539291
Fax Number 3202533533
Email Address jaimew@sjlouis.com

SAK Construction, LLC

Mr. Jerome Shaw, Jr.,
864 Hoff Road
O'Fallon MO 63366

MBE No **WBE** No **HBE** No
Phone Number 6363851000
Fax Number 6363851100
Email Address ccope@sakcon.com

Scott & Ritter, Inc.

Mr. Darron Wheat, President
2385 Barren River Rd. P.O. Box 749
Bowling Green KY 42102-0749

MBE No **WBE** No **HBE** No
Phone Number 2707819988
Fax Number 2707823267
Email Address dwheat@scottandritter.com

Smith Contractors, Inc.

Ms. Vondra Guffey,
1241 Bypass North P O Box 480
Lawrenceburg KY 40342

MBE No **WBE** No **HBE** No
Phone Number (502) 839-4196
Fax Number (502) 839-8348
Email Address vg@sci82.com

Southern Pipeline Construction Co.

Ms. Beverly Goebel
1272 Old Fern Valley Road
Louisville KY 40219

MBE No **WBE** Yes **HBE** No
Phone Number 5029665195
Fax Number 5029665122
Email Address BeverlyG@soupipe.com

T & C Contracting, Inc.

Mr. Dave Amlung
PO Box 72398 PO Box 72398
Louisville KY 40272

MBE No **WBE** No **HBE** No
Phone Number 5029373433
Fax Number (502) 937-8636
Email Address dave@tcky.biz

Tom Brown Construction Co., Inc.

Mr. Tom Brown
7965 National Turnpike
Louisville KY 40214

MBE No **WBE** No **HBE** No
Phone Number 5023610666
Fax Number (502) 367-7049
Email Address BrownTomConstruc@bellsouth.net

Walsh Construction Company

Ms. Lisa Christy
1260 East Summit Street
Crown Point IN 46307

MBE No **WBE** No **HBE** No
Phone Number 2196612450
Fax Number 2196612470
Email Address lkchristy@walshgroup.com

LWC PreQualified Contractors by Selected Category(ies)

Bid Number

Amount Required:

\$1.00

Contractors Listed are prequalified in the Categories you requested:

ALL of these designated Categories:

ANY of these designated Categories:

12" - 36" Boring

Advanced Paving & Construction Co.

Mr. Daniel Lee
P O Box 125 PO Box 125
Eastwood KY 40018

MBE No **WBE** Yes **HBE** No
Phone Number (502) 245-8935
Fax Number (502) 244-3620
Email Address advancedpaving@aol.com

Basham Construction & Rental Co.

Mr. Randall Basham
1102 South Park Road
Fairdale KY 40118

MBE No **WBE** No **HBE** No
Phone Number (502) 961-9001
Fax Number (502) 961-0998
Email Address bashamconst@yahoo.com

C Squared, Inc.

Mr. Chris Eichberger
7321 St. Andrews Church Road
Louisville KY 40214

MBE No **WBE** No **HBE** No
Phone Number (502) 363-0069
Fax Number (502) 363-2333
Email Address Chris@csquaredinc.com

Capitol Tunneling Inc.

Ms. Christine Harris
2216 Refugee Road
Columbus OH 43207

MBE No **WBE** No **HBE** No
Phone Number (614) 444-0255
Fax Number (614) 444-4094
Email Address charris@capitoltunneling.com

Cleary Construction Inc.

Mr. Ryan Cornwell
2006 Edmonton Road
Tompkinsville KY 42167

MBE No **WBE** No **HBE** No
Phone Number 270-487-1784
Fax Number 270-487-8029
Email Address ryancornwell@clearyconst.com

Debbie Sutherland Excavating

Ms. Debbie Sutherland
585 Browningtown Road
Shepherdsville KY 40165

MBE No **WBE** Yes **HBE** No
Phone Number (502) 955-7161
Fax Number (502) 543-3583
Email Address internet1921@windstream.net

Flynn Brothers Contracting, Inc.

Mr. Jason Rice
P O BOX 32065 P O Box 32065
Louisville KY 40232

MBE No **WBE** No **HBE** No
Phone Number (502) 364-9100
Fax Number (502) 363-1646
Email Address jcrice@flynnbrothers.com

Hall Contracting of Kentucky, Inc.

Mr. Richard Shutt
3800 Crittenden Drive
Louisville KY 40209

MBE No **WBE** No **HBE** No
Phone Number (502) 367-6151
Fax Number (502) 361-5771
Email Address rshutt@hallky.com

Howell Contractors, Inc.

Mr. Paul Bricking
980 Helen Ruth Drive
Ft. Wright KY 41017

MBE No **WBE** No **HBE** No
Phone Number 8593315457
Fax Number 8593316768
Email Address pbricking@howellcontractors.com

Infrastructure Systems, Inc.

Mr. Devin C. Schmidt
260 W. Vincennes St.
Orleans IN 47452

MBE No **WBE** No **HBE** No
Phone Number (812) 865-3309
Fax Number (812) 865-3009
Email Address dschmidt@netsurfusa.net

Lawrence Construction & Leasing, Inc.

Mr. Timothy Mahoney,
460 Shorland Drive
Walton KY 41094

MBE No **WBE** No **HBE** No
Phone Number (859) 586-5758
Fax Number (859) 586-5594
Email Address lawrence.construction@outlook.com

Layne Heavy Civil, Inc. (FKA - Reynolds, Inc.)

Mr. Les Archer, President
4520 North State Rd. 37
Orleans IN 47452

MBE No **WBE** No **HBE** No
Phone Number (812) 865-3232
Fax Number (812) 865-3075
Email Address Mike.green@layne.com and lisa.sowder@layne.com

MAC Construction & Excavating Inc.

Mr. Bryan Winslow
1908 Unruh Court PO Box 6787
New Albany IN 47151-6787

MBE No **WBE** No **HBE** No
Phone Number (812) 941-7895
Fax Number 8129410699
Email Address bryanw@macconstruction.com

Midwest Mole, Inc.

Ms. Joanne Edwards
6814 W 350 N
Greenfield IN 46140

MBE No **WBE** No **HBE** No
Phone Number 3175451335
Fax Number 3175451558
Email Address joanne@midwestmole.com

Miller Pipeline Corporation

Mr. Kevin Miller President
8850 Crawfordsville Rd.
Indianapolis IN 46234

MBE No **WBE** No **HBE** No
Phone Number (317) 293-0278
Fax Number (317) 293-8502
Email Address Kevin.Miller@millerpipeline.com

Phillips Brothers Construction, LLC

Mr. Clifton Smith
120 Insanity Lane
Vine Grove KY 40175

MBE No **WBE** No **HBE** No
Phone Number 2708776303
Fax Number 2708776305
Email Address pbcest@yahoo.com

R and J Horizontal Boring, LLC

Mr. Rankin Frazer President
175 Jesselin Drive
Lexington KY 40503

MBE No **WBE** No **HBE** No
Phone Number 859-576-09
Fax Number
Email Address randjboring@gmail.com

Riley Contracting Inc.

Mr. Tavis Riley,
2835 US HWY 250 South
Norwalk OH 44857

MBE No **WBE** No **HBE** No
Phone Number 4196688482
Fax Number 4196685083
Email Address tavis@rileytrenchless.com

S. J. Earth Boring, Inc.

Ms. Sheila Jo Burke, President
239 Broce Burke Drive P. O. Box 28
Salvisa KY 40372

MBE No **WBE** Yes **HBE** No
Phone Number 859-865-2063
Fax Number 859-865-2063
Email Address sjgburke@wildblue.net

Sedam Contracting Co., LLC

Mr. Rod Kiefer, President
302 W. Lagrange Rd.
Hanover IN 47243

MBE No **WBE** No **HBE** No
Phone Number 8128665607
Fax Number 8128665625
Email Address linda@sedamllc.com

Smith Contractors, Inc.

Ms. Vondra Guffey,
1241 Bypass North P O Box 480
Lawrenceburg KY 40342

MBE No **WBE** No **HBE** No
Phone Number (502) 839-4196
Fax Number (502) 839-8348
Email Address vg@sci82.com

Southern Pipeline Construction Co.

Ms. Beverly Goebel
1272 Old Fern Valley Road
Louisville KY 40219

MBE No **WBE** Yes **HBE** No
Phone Number 5029665195
Fax Number 5029665122
Email Address BeverlyG@soupipe.com

T & C Contracting, Inc.

Mr. Dave Amlung
PO Box 72398 PO Box 72398
Louisville KY 40272

MBE No **WBE** No **HBE** No
Phone Number 5029373433
Fax Number (502) 937-8636
Email Address dave@tcky.biz

Tom Brown Construction Co., Inc.

Mr. Tom Brown
7965 National Turnpike
Louisville KY 40214

MBE No **WBE** No **HBE** No
Phone Number 5023610666
Fax Number (502) 367-7049
Email Address BrownTomConstruc@bellsouth.net

Turn-Key Tunneling, Inc.

Ms. Jackie Obednikovski VP
1247 Stimmel Road
Columbus OH 43223

MBE No **WBE** Yes **HBE** No
Phone Number 6142754832
Fax Number 6142754834
Email Address jackie@tunnelit.net

LWC PreQualified Contractors by Selected Category(ies)

Bid Number

Amount Required:

Contractors Listed are prequalified in the Categories you requested:

\$1.00

ALL of these designated Categories:

ANY of these designated Categories:

Electrical

Advanced Electrical Systems, Inc.

Ms. Evelyn Strange President
P.O. Box 36503 P.O. Box 36503
Louisville KY 40233

MBE No **WBE** Yes **HBE** No
Phone Number 5029621102
Fax Number 5029628836
Email Address evelyn@aeslou.com

Alelco, Inc.

Mr. Charles Baysinger President/Treasurer
2376 State Road MM
New Bloomfield MO 65063

MBE No **WBE** No **HBE** No
Phone Number 5734913335
Fax Number 5734913336
Email Address cbaysinger@alelco.com

Arrow Electric Co., Inc.

Ms. Gail Green
317 Wabasso Ave
Louisville KY 40209

MBE No **WBE** No **HBE** No
Phone Number 5023572451
Fax Number (502) 366-8497
Email Address gail@arrowelectric.com

Arthur Gordon Electric

Mr. Arthur G. Gordon
100 Weist Place
Louisville KY 40206

MBE No **WBE** No **HBE** No
Phone Number 5026642728
Fax Number 5028999583
Email Address arthurgordon@bellsouth.net

BMV Electric Company, LLC

Mr. Neal Mueller
4122 Bishop Lane, Suite 101
Louisville KY 40218

MBE No **WBE** No **HBE** No
Phone Number 5023159595
Fax Number 5023159596
Email Address neal@bmvelectric.com

Cos-Bec, Inc. dba J. George Electric Company

Ms. Pamela A. Kidd
1515 Payne Street
Louisville KY 40206

MBE No **WBE** No **HBE** No
Phone Number 502-568-2030
Fax Number 502-568-6072
Email Address pamela@jgeorge.org

Cottongim Enterprises, Inc.

Ms. Sara Day
5010 E. State Road 56
Salem IN 47167

MBE No **WBE** No **HBE** No
Phone Number 8128836602
Fax Number 8128836668
Email Address sd@8836602.com

Delta Services, LLC

Mr. Dennis Fowler
4676 Jennings Lane
Louisville KY 40218

MBE No **WBE** No **HBE** No
Phone Number 5027197813
Fax Number (502) 491-2995
Email Address dennis@deltaservicesllc.com

Earthwell Energy Management

Ms. Patti Gravelle
1831 Plantside Drive
Louisville KY 40299

MBE No **WBE** No **HBE** No
Phone Number 5025878447
Fax Number 5025878272
Email Address patti.gravelle@earthwell.com

Eaton Electrical Inc.

Mr. Eric Croner
4620A Proximity Drive
Louisville KY 40213

MBE No **WBE** No **HBE** No
Phone Number 5029615514
Fax Number 5029615520
Email Address ericcroner@eaton.com

Glenwood Electric, Inc.

Mr. Phil Thaman
12250 Chandler Drive
Walton KY 41094

MBE No **WBE** No **HBE** No
Phone Number 8594853700
Fax Number 8594853701
Email Address pat@glenwoodelectric.com

Hall Contracting of Kentucky, Inc.

Mr. Richard Shutt
3800 Crittenden Drive
Louisville KY 40209

MBE No **WBE** No **HBE** No
Phone Number (502) 367-6151
Fax Number (502) 361-5771
Email Address rshutt@hallky.com

Henderson Services, LLC

Mr. Richard Masterson
4502 Poplar Level Rd.
Louisville KY 40213-2124

MBE No **WBE** No **HBE** No
Phone Number (502) 719-6615
Fax Number (502) 452-1308
Email Address rmasterson@henderson-services.com

Horner Electric, Inc.

Ms. Kelly Russell
1521 East Washington Street
Indianapolis IN 46201

MBE No **WBE** No **HBE** No
Phone Number 3176394261
Fax Number 3176394344
Email Address kelly.russell@hornerelectric.com

J & G Electric

Mr. Jim Richardson
84 East Bailey Road
Buffalo KY 42716

MBE No **WBE** No **HBE** No
Phone Number 2703254324
Fax Number 2703254825
Email Address jim@jandgelectric.us

JD Electric, LLC

Mr. Jason Dailey President
6032 Action Avenue
Louisville KY 40218

MBE No **WBE** No **HBE** No
Phone Number 5023769764
Fax Number 5026712442
Email Address jdelectricllc@bellsouth.net

Johnson Group, Inc.

Mr. Todd Johnson
3600 Chamberlain Lane, Ste. 402
Louisville KY 40241

MBE No **WBE** No **HBE** No
Phone Number (502) 412-6343
Fax Number (502) 412-3523
Email Address tjohnson@jgiky.com

Kentuckiana Electrical Service

Mr. Roger Brewer
1505 Portland Avenue
Louisville KY 40203

MBE No **WBE** No **HBE** No
Phone Number 5025838003
Fax Number 5024530400
Email Address roger@keslou.com

Knight Electric, Inc., DBA KT Tanks

Ms. Kelly Thurston
286 Farmers Drive
Russellville KY 42276

MBE No **WBE** No **HBE** No
Phone Number 2707267910
Fax Number 2707266203
Email Address kelly@knight-elec.com

Lesshafft Electric Company, Inc. dba Meiners Electric

Mr. David Fischer,
4630 Astor Road
Louisville KY 40218

MBE No **WBE** No **HBE** No
Phone Number 5026574000
Fax Number 5029680942
Email Address dfischer@meiners-electric.com

Link Electric Company, Inc.

Mr. Ricky George Jr.
3817 Fitzgerald Road
Louisville KY 40216

MBE No **WBE** Yes **HBE** No
Phone Number (502) 778-1155
Fax Number (502) 778-2868
Email Address rglane@link-electric.com

Marrs Electric, Inc.

Mr. Myron Marrs, Jr.
140 Outer Loop
Louisville KY 40214

MBE No **WBE** No **HBE** No
Phone Number 5023614466
Fax Number 5023663121
Email Address mmarrs@marrselect.com

Payne Electric Co., Inc.

Ms. Terry Hansen
5802 Fern Valley Rd.
Louisville KY 40228

MBE No **WBE** Yes **HBE** No
Phone Number 5029693115
Fax Number 5029696369
Email Address thansen@payneelectricco.com

Powers Electric & Plumbing Co. Inc.

Mr. Ellsworth J. Powers President
7016 W. Highway 22
Crestwood KY 40014

MBE Yes **WBE** No **HBE** No
Phone Number (502) 241-8541
Fax Number (502) 241-8469
Email Address ej40014@aol.com

Ready Electric Company, Inc.

Ms. Jeff Godby
3300 Gilmore Industrial Blvd.
Louisville KY 40213

MBE No **WBE** No **HBE** No
Phone Number (502) 893-2511
Fax Number (502) 893-2519
Email Address jeffg@readyelec.com

T.E.M. Group, Inc.

Mr. Ron Boughey
3560 Bashford Avenue
Louisville KY 40218

MBE Yes **WBE** No **HBE** No
Phone Number 5024540101
Fax Number 5024540110
Email Address rboughey@temelectric.com

Timmons Electric Co., Inc.

Mr. Samuel L. Timmons, Jr. President
130 North Court Street
Morganfield KY 42437

MBE No WBE No HBE No
Phone Number 2703892420
Fax Number 2703892443
Email Address teci.phil@owens.twcbc.com

United Electric Co., Inc.

Mr. Dan Walsh
4333 Robards Lane
Louisville KY 40218

MBE No WBE No HBE No
Phone Number 5024595242
Fax Number 5024528748
Email Address danwalsh@unitedelec.com

Walter B. Diecks Electric Co., Inc.

Ms. Judy Young
1523 East Washington St.
Louisville KY 40205

MBE No WBE No HBE No
Phone Number (502) 589-1268
Fax Number (502) 589-1269
Email Address jyoung@dieckselectric.com