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CONTRACT DOCUMENTS AND SPECIFICATIONS

CONTRACT 2: 500,000 GALLON McCAMMON RIDGE ROAD W.S.T.

&

CONTRACT 3: 100,000 GALLON MORRILL W.S.T.

**JACKSON COUNTY WATER ASSOCIATION
JACKSON COUNTY, KENTUCKY**

PREPARED BY:

**KENVIRONS, INC.
452 VERSAILLES ROAD
FRANKFORT, KY 40601**

PROJECT No. 2013077



JANUARY 2017

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SECTION 00100
ADVERTISEMENT FOR BIDS

Jackson County Water Association
Contract 1: Transmission Main from McKee to Sandgap
Contract 2: 500,000 Gallon McCammon Ridge Road W.S.T.
Contract 3: 100,000 Gallon Morrill W.S.T.

Separate Sealed BIDS for the construction of Contract 1: Transmission Main from McKee to Sandgap, Contract 2: 500,000 Gallon McCammon Ridge Road W.S.T, and Contract 3: 100,000 Gallon Morrill W.S.T. will be received by the Jackson County Water Association, US 421 South, P.O. Box 232, Tyner, KY 40486 until February 28, 2017 at 2:00 P.M. local time and then publicly opened and read aloud at the Association's Office.

Contract 1 consists of installing approximately 35,000 L.F. of 6" and 8" PVC waterline, constructing two pump stations, one PRV station, one master meter station, and all necessary appurtenances. Contract 2 consists of installing one 500,000 gallon elevated tank along McCammon Ridge Road southeast of McKee and all necessary appurtenances. Contract 3 consists of installing one 100,000 gallon elevated tank southwest of Morrill and all necessary appurtenances.

The CONTRACT DOCUMENTS may be examined at the following locations:
JACKSON COUNTY WATER ASSOC., US 421 SOUTH, P.O. BOX 232, TYNER, KY 40486
KENVIRONS, INC., 452 VERSAILLES ROAD, FRANKFORT, KY 40601

Copies of the CONTRACT DOCUMENTS may be obtained from Lynn Imaging, 328 Old Vine Street, Lexington, KY 40507 (859-226-5850) and www.lynnimaging.com upon payment of a nonrefundable price of \$300.00 for Contract 1 and \$200.00 for Contracts 2 & 3 for each set plus any shipping charges.

Each Bidder must accompany his bid with a Bid Bond in amount of not less than five (5) percent of the base bid. No Bidder may withdraw his bid for a period of ninety (90) days. The Bidder awarded the contract shall execute a 100% Performance Bond and a 100% Payment Bond and shall furnish insurance as required, in the General Conditions. This contract shall be completed within 270 calendar days after date of authorization to start work. Liquidated damages will be \$800 per calendar day.

Bidders must comply with the President's Executive Order Nos. 11246 and 11375, which prohibit discrimination in employment regarding race, creed, color, sex, or national origin. Bidders must comply with Section 3, Section 109, Title VI of the Civil Rights Act of 1964, the Anti-Kickback Act and the contract Work Hours Standard Act. Bidders must certify that they do not, and will not, maintain or provide for their employees any facilities that are segregated on a basis of race, color, creed, or national origin.

Any bid that is obviously unbalanced may be rejected. The Jackson County Water Association reserves the right to reject any and all bids and waive informalities.

Small, minority and women's businesses and labor surplus area firms are encouraged to bid this project.

By: Dallas Cox, President
Jackson County Water Association

SECTION 00200

INSTRUCTIONS TO BIDDERS

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ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will 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 and where the bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents in the number and for the non-refundable deposit sum, if any, stated in the Advertisement for Bids may be obtained from the Issuing Office.
- 2.02 Complete sets of Bidding Documents must 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, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

- A. The Owner may make such investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all

such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein in a timely manner. Conditional bids will not be accepted.

- B. Bidder and any subcontractors the bidder uses must be acceptable to the Owner and have current eligibility for federal programs.
- C. Approval of any proposed subcontract award can not be given by the Owner unless and until the proposed subcontractor has submitted the Certifications and/or other evidence showing that it has fully complied with any reporting requirements to which it is or was subject.

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.

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.

- 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 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, or 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 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 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 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 pre-Bid conference will not be held.

ARTICLE 6 - SITE AND OTHER AREAS

- 6.01 The Site is identified in the Bidding Documents. Easement 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. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by 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. 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 Engineer as having received the Bidding Documents. Questions received less than five 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 5 % of Bidder's maximum Bid price and in the form of a certified check or a Bid bond (EJCDC No.

C-430, 2002 Edition) 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 10 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 within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

- 9.01 The number of days within which, or the date by which, the Work is to be substantially completed. Upon substantial completion, if necessary, a date for final completion and payment should be determined between the Owner, Contractor and Engineer based on remaining work, market and weather conditions.

ARTICLE 10 -LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages 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, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or "or-equal" item. No item of material or equipment will be considered by Engineer as a substitute or equal until after the bids have been opened and the contract has been awarded. The burden of proof of the merit of the proposed item, and cost for review of a proposed substitute item, is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. Bidders shall not rely upon approvals made in any other manner. Any reduction made in contract price due to approval of a substitute item or equal, will be subtracted from the bidder's contract and placed into contingency funds for the project.

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 responsible 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 and 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 Bid 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. If required by State where work is to be performed, the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporation business address and state of incorporation shall be provided on the Bid Form.
- 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 business address of the partnership shall be provided on the Bid Form.
- 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 business address of the firm must be provided on the Bid Form.
- 13.06 A Bid by an individual shall show the Bidder's name and business 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 business address of the joint venture must be provided on the Bid Form.
- 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 and dates of which shall be filled in on the Bid form.
- 13.10 The address and telephone number for communication 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 for the state of the Project, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 Unit Price

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
- B. The total of all bid prices will be the sum of the products of the 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.

ARTICLE 15 - SUBMITTAL OF BID

- 15.01 Bid Form is to be completed and submitted with all the attachments required.
- 15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids 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." When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid. A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form.

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 or negotiated, that Bidder will be disqualified from further bidding on the Work. This provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder's errors in judgment in preparing the Bid.

ARTICLE 17 - OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

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 be non-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.
- 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 in price and in the best interest of the Owner by considering other factors such as work history, recommendations, etc.

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 must 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 10 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.
- 21.02 This Contract is expected to be funded with funds provided by the United States Department of Agriculture, Rural Development (RD). Refer to Article 18 of General Conditions for information on the Federal Requirements.

SECTION 00410

BID FORM

Project Identification: 500,000 Gallon McCammon Ridge Road Water Storage Tank

Contract Identification and Number: 2

ARTICLE 1 - BID RECIPIENT

1.01 This Bid Is Submitted To: Jackson County Water Association, US 421 South, P.O. Box 232, Tyner, KY 40486.

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 the Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitations those dealing with the dispositions of Bid security. The 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.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____

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 carefully studied 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 SC-4.02, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in SC-4.06.

- E. 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 the 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.
- F. 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.
- G. Bidder is 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. 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.
- I. 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.
- J. 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.
- K. 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 the 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

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

Note: Bids shall include sales tax and all other applicable taxes.

00410-2

BASE BID

No.	Item Description	Unit	Quantity	Unit Price	Item Price
1	500,000 Gallon Elevated Water Storage Tank	LS	1	_____	_____
2	Earthwork	LS	1	_____	_____
3	Foundation	LS	1	_____	_____
4	Painting	LS	1	_____	_____
5	Yard Work including lined channels & site restoration	LS	1	_____	_____
6	Yard Piping	LS	1	_____	_____
7	Check Valve Station	LS	1	_____	_____
8	Fencing	LF	360	_____	_____
9	Access Road	LS	1	_____	_____
Total Base Bid					\$ _____

- A. Unit Prices have been computed in accordance with paragraph 11.03.A of the General Conditions.
- B. 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.

ARTICLE 6 - TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete in accordance with paragraph 14.04 of the General Conditions on or before the date, 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 - ATTACHEMENTS TO THIS BID

- 7.01 The following documents are attached to and made a condition of the Bid:
 - A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);
 - B. If Bid amount exceeds \$10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in paragraph 18.10 of the General Conditions;

C. If Bid amount exceeds \$25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions (AD-1048);

D. If Bid amount exceeds \$100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants and Loans. Refer to paragraph 18.11 of the General Conditions.

ARTICLE 8 - DEFINED TERMS

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

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

Name (typed or printed): _____

By: _____

(Individual's signature)

SEAL, if required by State

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:

9.02 Bid submitted on _____, 2017.

SECTION 00410

BID FORM

Project Identification: 100,000 Gallon Morrill Water Storage Tank

Contract Identification and Number: 3

ARTICLE 1 - BID RECIPIENT

- 1.01 This Bid Is Submitted To: Jackson County Water Association, US 421 South, P.O. Box 232, Tyner, KY 40486.
- 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 the Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

- 2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitations those dealing with the dispositions of Bid security. The 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.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
 - 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 carefully studied 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 SC-4.02, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in SC-4.06.

- E. 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 the 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.
- F. 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.
- G. Bidder is 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. 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.
- I. 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.
- J. 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.
- K. 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 the 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

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

Note: Bids shall include sales tax and all other applicable taxes.

00410-2

BASE BID

No.	Item Description	Unit	Quantity	Unit Price	Item Price
1	100,000 Gallon Elevated Water Storage Tank	LS	1	_____	_____
2	Earthwork	LS	1	_____	_____
3	Foundation	LS	1	_____	_____
4	Painting	LS	1	_____	_____
5	Yard Work including lined channels & site restoration	LS	1	_____	_____
6	Yard Piping	LS	1	_____	_____
7	Check Valve Station	LS	1	_____	_____
8	Fencing	LF	280	_____	_____
9	Access Road	LS	1	_____	_____
10	Tank Demolition	LS	1	_____	_____
Total Base Bid					\$ _____

- A. Unit Prices have been computed in accordance with paragraph 11.03.A of the General Conditions.
- B. 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.

ARTICLE 6 - TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete in accordance with paragraph 14.04 of the General Conditions on or before the date, 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 - ATTACHEMENTS TO THIS BID

- 7.01 The following documents are attached to and made a condition of the Bid:
 - A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);
 - B. If Bid amount exceeds \$10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in paragraph 18.10 of the General Conditions;

- C. If Bid amount exceeds \$25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions (AD-1048);
- D. If Bid amount exceeds \$100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants and Loans. Refer to paragraph 18.11 of the General Conditions.

ARTICLE 8 - DEFINED TERMS

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

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

Name (typed or printed): _____

SEAL,
if required
by State

By: _____
(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:

9.02 Bid submitted on _____, 2017.

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): Jackson County Water Association
US 421 South
P.O. Box 232
Tyner, Kentucky 40486

BID

Bid Due Date:

Project (Brief Description Including Location): Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank
Jackson 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: _____
Signature and Title

Attest: _____
Signature and Title

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

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.

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): Jackson County Water Association
US 421 South
P.O. Box 232
Tyner, Kentucky 40486

BID

Bid Due Date:

Project (Brief Description Including Location): Contract 3: 100,000 Gallon Morrill Water Storage Tank
Rockcastle 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

(Seal)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: Signature and Title

By: Signature and Title
(Attach Power of Attorney)

Attest: Signature and Title

Attest: Signature and Title

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

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.

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(name)

(date)

(title)

oOo

U.S. DEPARTMENT OF AGRICULTURE

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transactions," "debarred," "suspended," "ineligible," "lower tier covered transactions," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I have have not, participated in a previous contract or subcontract subject to Executive 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract, I have, have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3. I have, have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract, I have, have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATIONS OF NON-SEGREGATED FACILITIES**

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date _____

(Signature of Bidder or Prospective Contractor)

Address (including Zip Code)

SECTION 00510
NOTICE OF AWARD

To: _____

PROJECT

Description: Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____, 2017 and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this ____ day of _____, 2017.

Jackson County Water Association
Owner

By: _____

Title: President

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by _____
_____ this the ____ day of _____, 2017.

By: _____

Title: _____

SECTION 00510
NOTICE OF AWARD

To: _____

PROJECT

Description: Contract 3: 100,000 Gallon Morrill Water Storage Tank

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____, 2017 and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this ____ day of _____, 2017.

Jackson County Water Association
Owner

By: _____

Title: President

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by _____
_____ this the ____ day of _____, 2017.

By: _____

Title: _____

**AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)
FUNDING AGENCY EDITION**

THIS AGREEMENT is by and between _____ Jackson County Water Association _____ (“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:

Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank

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:

Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Kenvirons, 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*

A. The Work will be substantially completed within **270** 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 on this Project and that Owner will suffer financial loss if the Work is not completed within the time specified in Paragraph 4.02 above, plus any extensions allowed in accordance with Article 12 of the General Conditions. Accordingly, Contractor shall pay Owner

~~\$800~~ for each day that expires after the time specified in Paragraph 4.02 until the Work is substantially complete. After substantial completion, retainage may be reduced to an amount agreed upon by Owner, Contractor, and Engineer. It should be no less than 150% of the amount required for completion and ready for final payment. Liquidated damages may not be assessed after substantial completion has been achieved.

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 below:
- A. For all Work, at the prices stated in Contractor's Bid, attached in Section 00410.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. 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 25th 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. 95 percent of Work completed (with the balance being retainage); and
 - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
 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.

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 maximum legal rate.

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 Bidding 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:
 1. This Agreement (pages 1 to 6, inclusive).
 2. Performance bond (pages 1 to 2, inclusive).
 3. Payment bond (pages 1 to 2, inclusive).

4. Other bonds (pages ____ to ____, inclusive).
 - a. ____ (pages ____ to ____, inclusive).
 - b. ____ (pages ____ to ____, inclusive).
 - c. ____ (pages ____ to ____, inclusive).
 5. General Conditions (pages 1 to 59, inclusive).
 6. Supplementary Conditions (pages 1 to 3, inclusive).
 7. Specifications as listed in the table of contents of the Project Manual.
 8. Drawings consisting of 9 sheets with each sheet bearing the following general title: Contract 2: 500,000 Gallon McCammon Ridge Road W.S.T. & Contract 3: 100,000 Gallon Morrill W.S.T.
 9. Addenda (numbers __, inclusive).
 10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages 1 to ____, inclusive and included in Section 00410).
 - b. Documentation submitted by Contractor prior to Notice of Award (pages ____ to ____, inclusive).
 - c. _____.
 11. 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 1 to 1, inclusive).
 - b. Work Change Directives.
 - c. Change Order(s).
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. 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.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, 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 _____, 2017. This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER:

CONTRACTOR:

_____ Jackson County Water Association _____

By: _____

By: _____

Title: President _____

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

U.S. 421 South _____

P.O. Box 232 _____

Tyner, KY 40486 _____

Agent for service of process:

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

Agency Concurrence:

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency: USDA Rural Development _____

By: _____

Date: _____

Title: State Engineer _____

**AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)
FUNDING AGENCY EDITION**

THIS AGREEMENT is by and between _____ Jackson County Water Association _____ (“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:

Contract 3: 100,000 Gallon Morrill Water Storage Tank

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:

Contract 3: 100,000 Gallon Morrill Water Storage Tank

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Kenvirons, 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.

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A. The Work will be substantially completed within **270** 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 on this Project and that Owner will suffer financial loss if the Work is not completed within the time specified in Paragraph 4.02 above, plus any extensions allowed in accordance with Article 12 of the General Conditions. Accordingly, Contractor shall pay Owner

\$800 for each day that expires after the time specified in Paragraph 4.02 until the Work is substantially complete. After substantial completion, retainage may be reduced to an amount agreed upon by Owner, Contractor, and Engineer. It should be no less than 150% of the amount required for completion and ready for final payment. Liquidated damages may not be assessed after substantial completion has been achieved.

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ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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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.

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7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

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- 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 Bidding 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:
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 2. Performance bond (pages 1 to 2, inclusive).
 3. Payment bond (pages 1 to 2, inclusive).

4. Other bonds (pages ____ to ____, inclusive).
 - a. ____ (pages ____ to ____, inclusive).
 - b. ____ (pages ____ to ____, inclusive).
 - c. ____ (pages ____ to ____, inclusive).
 5. General Conditions (pages 1 to 59, inclusive).
 6. Supplementary Conditions (pages 1 to 3, inclusive).
 7. Specifications as listed in the table of contents of the Project Manual.
 8. Drawings consisting of 9 sheets with each sheet bearing the following general title: Contract 2: 500,000 Gallon McCammon Ridge Road W.S.T. & Contract 3: 100,000 Gallon Morrill W.S.T.
 9. Addenda (numbers __, inclusive).
 10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages 1 to ____, inclusive and included in Section 00410).
 - b. Documentation submitted by Contractor prior to Notice of Award (pages ____ to ____, inclusive).
 - c. ____.
 11. 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 1 to 1, inclusive).
 - b. Work Change Directives.
 - c. Change Order(s).
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. 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.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, 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 _____, 2017. This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER:

_____ Jackson County Water Association _____

By: _____

Title: President _____

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

U.S. 421 South _____

P.O. Box 232 _____

Tyner, KY 40486 _____

CONTRACTOR:

By: _____

Title: _____

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

Agent for service of process:

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

Agency Concurrence:

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency: USDA Rural Development _____

By: _____

Date: _____

Title: State Engineer _____

SECTION 00550

NOTICE TO PROCEED

TO: _____ DATE: _____
 _____ Project: Contract 2: 500,000 Gallon
 _____ McCammon Ridge Road Water Storage Tank

You are hereby notified to commence WORK in accordance with the Agreement dated _____, on or before _____, and you are to complete the WORK within 270 consecutive calendar days thereafter. The date of completion of all WORK is therefore _____.

Jackson County Water Association
 Owner

By _____
 Title President

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED
 is hereby acknowledged by _____
 this the _____ of _____, _____.

By: _____

Title: _____

Employer Identification
 Number: _____

SECTION 00550

NOTICE TO PROCEED

TO: _____ DATE: _____

Project: Contract 3: 100,000 Gallon

Morrill Water Storage Tank

You are hereby notified to commence WORK in accordance with the Agreement dated _____, on or before _____, and you are to complete the WORK within 270 consecutive calendar days thereafter. The date of completion of all WORK is therefore _____.

Jackson County Water Association
Owner

By _____
Title President

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED

is hereby acknowledged by _____

this the _____ of _____, _____.

By: _____

Title: _____

Employer Identification
Number: _____

**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): Jackson County Water Association
U.S. 421 South, P.O. Box 232
Tyner, KY 40486

CONTRACT

Date: _____
Amount: _____
Description (Name and Location): Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank
Jackson County, Kentucky

BOND

Bond Number: _____
Date (Not earlier than Contract Date): _____
Amount: _____
Modifications to this Bond Form: _____

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

Surety's Name and Corporate Seal (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

Surety's Name and Corporate Seal (Seal)

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

Attest: _____
Signature and Title:

EJCDC No. C-610 (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, 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)

**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): Jackson County Water Association
U.S. 421 South, P.O. Box 232
Tyner, KY 40486

CONTRACT
Date: _____
Amount: _____
Description (Name and Location): Contract 3: 100,000 Gallon Morrill Water Storage Tank
Rockcastle County, Kentucky

BOND
Bond Number: _____
Date (Not earlier than Contract Date): _____
Amount: _____
Modifications to this Bond Form: _____

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

SURETY

Company: _____

Signature: _____ (Seal)
Name and Title: _____

Surety's Name and Corporate Seal (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

SURETY

Company: _____

Signature: _____ (Seal)
Name and Title: _____

Surety's Name and Corporate Seal (Seal)

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

Attest: _____
Signature and Title:

EJCDC No. C-610 (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, 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)

**SECTION 00615
PAYMENT 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): Jackson County Water Association
U.S. 421 South, P.O. Box 232
Tyner, KY 40486

CONTRACT

Date: _____
Amount: _____
Description (Name and Location): Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank
Jackson County, Kentucky

BOND

Bond Number: _____
Date (Not earlier than Contract Date): _____
Amount: _____
Modifications to this Bond Form: _____

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: _____

SURETY

Signature: _____ (Seal)
Name and Title: _____

Surety's Name and Corporate Seal (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: _____

SURETY

Signature: _____ (Seal)
Name and Title: _____

Surety's Name and Corporate Seal (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.

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

**SECTION 00615
PAYMENT 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):

Jackson County Water Association
U.S. 421 South, P.O. Box 232
Tyner, KY 40486

CONTRACT

Date:
Amount:
Description (Name and Location): Contract 3: 100,000 Gallon Morrill Water Storage Tank
Rockcastle County, Kentucky

BOND

Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

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

SURETY

Company:

Signature: _____ (Seal)
Name and Title:

Surety's Name and Corporate Seal (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

SURETY

Company:

Signature: _____ (Seal)
Name and Title:

Surety's Name and Corporate Seal (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.

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

SECTION 00625 CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank	Owner: Jackson County Water Association	Owner's Contract No.: 2
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 2013077

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- All Work under the Contract Documents:
 The following specified portions:

_____ Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- Amended Responsibilities
 Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

SECTION 00625 CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: Contract 3: 100,000 Gallon Morrill Water Storage Tank	Owner: Jackson County Water Association	Owner's Contract No.: 3
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 2013077

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- All Work under the Contract Documents:
 The following specified portions:

_____ Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- Amended Responsibilities
 Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	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

Issued and Published Jointly By



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NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN COUNCIL OF ENGINEERING COMPANIES

AMERICAN SOCIETY OF CIVIL ENGINEERS

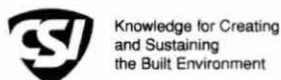
This document has been approved and endorsed by

The Associated General Contractors of America



and the

Construction Specification Institute



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 an 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. C-710, 2002 Edition) and other provisions 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. Add the following language to the end of Paragraph 1.01.A.2:

The Project is financed in whole or in part by USDA Rural Development.

SC-1.01.A.4. Add the following language to the end of Paragraph 1.01.A.4:

The Application for Payment form to be used on this Project is Form RD 1924-18. The Agency must approve all Applications for Payment before payment is made.

SC-1.01.A.10. Add the following language to the end of Paragraph 1.01.A.10:

The Change Order form to be used on this Project is Form RD 1927-7. Agency approval is required before Change Orders are effective.

SC-1.01.A.15. Delete in it's entirety and replace with the following:

Contract Times: The number of days or date stated in the Agreement to achieve substantial completion. Final completion date will be determined by Contractor, Owner and Engineer, after substantial completion, based on remaining work, weather and market conditions.

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-4.02. Delete Paragraphs 4.02.A and 4.02.B in their entirety and insert the following:

- A. No reports or explorations or tests of subsurface conditions at or contiguous to the Site are known to the Owner or Engineer.

SC-4.06. Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

- A. No reports or explorations or tests of subsurface conditions at or contiguous to the Site are known to the Owner or Engineer.
- B. Not used.

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
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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

SC-6.06 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-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-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 prior to substantial completion, nor place in escrow any funds that are required for retainage, or invest the retainage for benefit.

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 and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due ten days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-18.08 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).

NVIRONS, INC.
ANKFORT, KENTUCKY

Project No.
2013077

CONTRACT CHANGE ORDER

Change Order No.
1

Contract For:
Contract 2: 500,000 Gallon McCammon Ridge Road
Water Storage Tank

County
Jackson

Owner:
Jackson County Water Association

(Contractor)

You are hereby requested to comply with the following changes from the contract plans and specifications:

Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE Contract Price	INCREASE Contract Price
TOTALS	\$ _____	\$ _____
NET CHANGE IN CONTRACT PRICE	\$ _____	\$ _____

JUSTIFICATION:

The amount of the Contract will be (Decreased) (Increased) by the sum of: _____
Dollars (\$ _____)

The Contract Total including this and previous Change Orders will be: _____
Dollars (\$ _____)

The Contract Period provided for completion will be (Increased) (Decreased) (Unchanged): _____

This document will become a supplement to the contract and all provisions will apply hereto.

Requested by _____ (Owner) _____ (Date)

Recommended by _____ (Owner's Architect/Engineer) _____ (Date)

Accepted by _____ (Contractor) _____ (Date)

Provided by _____ (Name and Title) _____ (Date)

RD 1924-18
(Rev. 6-97)

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL DEVELOPMENT
FARM SERVICE AGENCY

PARTIAL PAYMENT ESTIMATE

CONTRACT NO. _____

PARTIAL PAYMENT ESTIMATE NO. _____

PAGE _____

OWNER: _____

CONTRACTOR: _____

PERIOD OF ESTIMATE
FROM _____ TO _____

CONTRACT CHANGE ORDER SUMMARY

ESTIMATE

No.	Agency Approval Date	Amount	
		Additions	Deductions
TOTALS		\$0.00	\$0.00
NET CHANGE		\$0.00	\$0.00

1. Original Contract	_____	\$0.00
2. Change Orders	_____	\$0.00
3. Revised Contract (1 + 2)	_____	\$0.00
4. Work Completed*	_____	
5. Stored Materials*	_____	
6. Subtotal (4 + 5)	_____	\$0.00
7. Retainage*	_____	
8. Previous Payments	_____	
9. Amount Due (6-7-8)	_____	\$0.00

* Detailed breakdown attached

CONTRACT TIME

Contractual (days) _____
 Estimated _____
 Remaining _____

On Schedule

Yes
 No

Starting Date _____
 Projected Completion _____

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that to the best of their knowledge, information and belief the work covered by this payment estimate has been completed in accordance with the contract documents, that all amounts have been paid by the contractor for work for which previous payment estimates was issued and payments received from the owner, and that current payment shown herein is now due.

ARCHITECT OR ENGINEER'S CERTIFICATION:

The undersigned certifies that the work has been carefully inspected and to the best of their knowledge and belief, the quantities shown in this estimate are correct and the work has been performed in accordance with the contract documents.

Architect or Engineer _____

By _____

Date _____

ACCEPTED BY AGENCY:

The review and acceptance of this estimate does not attest to the correctness of the quantities shown or that the work has been performed in accordance with the contract documents.

By _____

Title _____

Date _____

APPROVED BY OWNER:

Owner _____

By _____

Date _____

In accordance with the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0575-0042. The time required to complete this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information.

TYPICAL UNIT PRICE BREAKDOWN *

ITEM	DESCRIPTION	CONTRACT (revised)			THIS PERIOD		TOTAL TO DATE	
		QUANTITY	UNIT PRICE	AMOUNT	QUANTITY	AMOUNT	QUANTITY	AMOUNT
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
				\$0.00		\$0.00		\$0.00
TOTALS				\$0.00		\$0.00		\$0.00

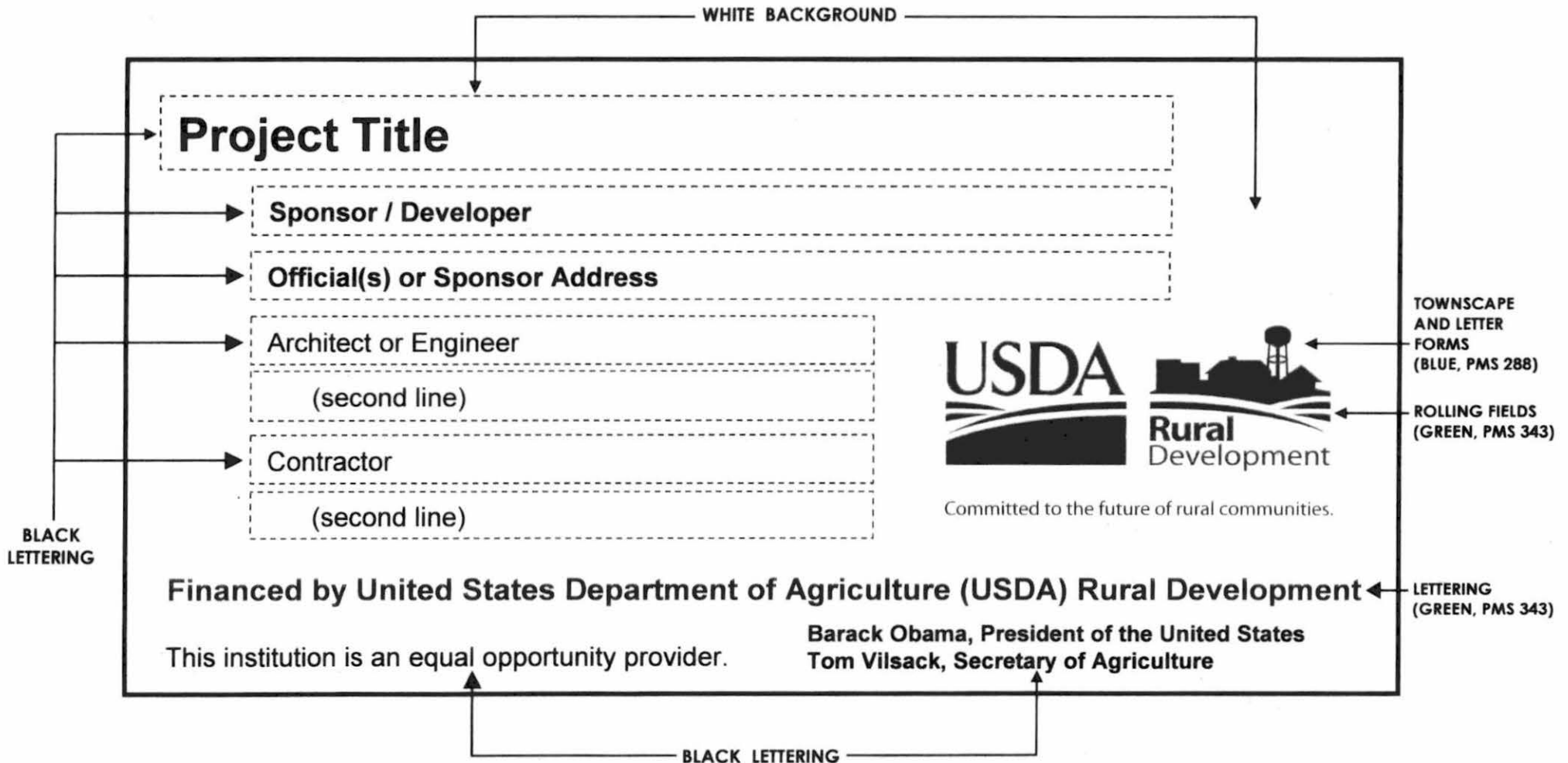
TYPICAL LUMP SUM PRICE BREAKDOWN *

TYPICAL STORED MATERIALS AND RETAINAGE BREAKDOWN *

ITEM	DESCRIPTION	SCHEDULED VALUE	WORK COMPLETED		% COMPLETE	MATERIALS STORED AT END OF THIS PAYMENT PERIOD			
			THIS PERIOD	TO DATE		DESCRIPTION	QUANTITY	UNIT VALUE	AMOUNT
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
TOTALS		\$0.00	\$0.00	\$0.00	0	TOTAL			

* As a minimum, detailed breakdowns should contain this information.

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS



SIGN DIMENSIONS: 1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x 3/4")
PLYWOOD PANEL (APA RATED A-B GRADE-EXTERIOR)

TECHNICAL SPECIFICATIONS

CONTRACT 2: 500,000 GALLON McCAMMON RIDGE ROAD W.S.T

&

CONTRACT 3: 100,000 GALLON MORRILL W.S.T.

**JACKSON COUNTY WATER ASSOCIATION
JACKSON COUNTY, KENTUCKY**

PREPARED BY:

**KENVIRONS, INC.
452 VERSAILLES ROAD
FRANKFORT, KENTUCKY 40601**

PROJECT No. 2013077

JANUARY 2017

DIVISION 1: GENERAL REQUIREMENTS

SECTION 01001

SPECIAL CONDITIONS

1.0 DESCRIPTION OF THE WORK AND DESIGNATION OF OWNER

These Specifications and accompanying Drawings describe the work to be done and the materials to be furnished for the construction of the projects entitled 500,000 Gallon McCammon Ridge Road Water Storage Tank and 100,000 Gallon Morrill Water Storage Tank. This project consists of three contracts.

Contract 1: Transmission Main from McKee to Sandgap

Contract 2: 500,000 Gallon McCammon Ridge Road Water Storage Tank

Contract 3: 100,000 Gallon Morrill Water Storage Tank

All references to the Owner in these Specifications, Contract Documents and plans shall mean the Jackson County Water Association.

2.0 AVAILABLE FUNDS

The attention of all Bidders is directed to the fact that funds will be made available for the award of the contract through Rural Development.

3.0 TIME OF COMPLETION

The time allowed for the completion of each contract is 270 calendar days. The time allowed for completion shall begin at midnight, local time, on the date which the Owner, or his authorized representative, the Engineer, shall instruct the Contractor in writing to start work, but no later than 10 days after Notice to Proceed.

Additional time will be allowed the Contractor to cover approved over-runs or additions to the contract in the same proportion that the said over-run or addition in net monetary value bears to the original amount; the total of said additional time to be computed to the nearest whole calendar day.

4.0 LIQUIDATED DAMAGES

It is understood that time is the essence of this contract and that the Owner will sustain damages, monetary and otherwise, in the event of delay in completion of the work hereby contracted.

Therefore, if the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part of the consideration for the awarding of these contracts, to pay to the Owner the amount specified in the

contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.

The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

Liquidated damages are fixed at \$800 per calendar day of over-run beyond the date set for completion or authorized extension thereof.

5.0 INSURANCE

See Section 00800, Supplementary Conditions SC-5.04 for the minimum amounts of insurance coverage to be furnished under these contracts.

6.0 PERFORMANCE AND PAYMENT BOND

The Contractor shall furnish separate performance and payment bonds issued by an approved bonding company in an amount at least equal to one hundred percent (100%) of the contract price, as security for the faithful performance of this contract and for the payment of persons performing labor and furnishing materials in connection with this contract. These bonds shall be executed by a company authorized to do business in the State of Kentucky and shall be signed or countersigned by a Kentucky resident agent. Bonds shall remain in effect for one year after date of final acceptance of the work.

7.0 SITE DIMENSIONS

All Contractors furnishing materials and equipment for this contract shall obtain exact dimensions at the site. Scale or figure dimensions on the drawings and details show the correct size under ideal conditions and shall not, under any circumstances, be so construed as to relieve the Contractor from responsibility for taking measurements at the site and furnishing materials or equipment of the correct size.

8.0 DAMAGE TO EQUIPMENT STORED AND/OR IN PLACE PRIOR TO INITIAL OPERATION

Any equipment damaged or which has been subjected to possible damage by reason of inundation, improper storage and/or protection during the construction period of project, shall be handled only as follows:

- a) Be replaced with new equipment.

- b) With approval of the Engineer, be returned to the manufacturer of the equipment, or his authorized repair agency, for inspection and repair provided, however, that such repair after inspection will place the equipment in new condition, and restore the manufacturer's guarantee the same as for new equipment.

9.0 SALVAGED MATERIALS AND EQUIPMENT

All materials and/or equipment to be removed from existing structures and not specifically specified to be re-used shall remain the property of the Owner. Such materials and/or equipment shall be stored on sites by the Contractor as directed by the Owner.

The use of second hand and/or salvaged materials will not be permitted, unless specifically provided for in the detailed specifications. Materials and equipment shall be new when turned over to the Owner.

10.0 TEMPORARY FACILITIES

- a) Build and maintain temporary offices and storage sheds as necessary for the work. Location of temporary buildings shall be subject to the approval of the Engineer.
- b) Provide temporary heat, light and power required by the work. Temporary telephone service shall be provided in the job office paid for by the General Contractor, except that the party placing a long distance call shall pay the toll charge.
- c) Each Contractor shall construct and maintain, in a sanitary condition, sanitary facilities for his employees and also employees of his subcontractors. At completion of the contract work, these sanitary facilities shall be properly disposed of as directed by the Engineer.
- d) Temporary construction for safety measures, hoists and scaffolds shall be erected in accordance with the General Conditions.
- e) Construction yard shall be located on job site. Provide security and safety protection.
- f) The obtaining of all utilities for construction, including power and water, shall be the responsibility of the Contractor, and he shall bear the cost of all utilities used for construction. Cost of all connections and facilities for use of utilities shall be borne by the Contractor.

11.0 PROPERTY PROTECTION

Care is to be exercised by the Contractor in all phases of construction to prevent damage and injury to the Owner's or other property.

In connection with work performed on "private property" (property other than that belonging to the Owner), the Contractor shall confine his equipment, the storage of materials, and the operation of his workmen to the limits indicated on the plans, or to lands and right-of-way provided for the project by the Owner, and shall take every precaution to avoid damage to the private property Owner's buildings, grounds and facilities.

Fences, hedges, shrubs, etc. within the construction limits shall be carefully removed, preserved, and replaced when the construction is completed. Where ditches or excavations cross lawns, the sod shall be removed carefully and replaced when the backfilling has been completed. If sod is damaged or not handled properly, it shall be replaced with new sod equal to existing sod at the Contractor's expense. Grassed areas, other than lawns, shall be graded, fertilized and seeded when construction is completed. When construction is completed the private property Owner's facilities and grounds shall be restored to as good or better condition than found as quickly as possible at the Contractor's expense. All disturbed areas shall be re-vegetated (permanently or temporarily) within 14 days.

12.0 CONFLICT WITH OR DAMAGE TO EXISTING UTILITIES AND FACILITIES

Insofar as location data is available to the Engineers, existing underground utilities (such as waterlines, sewer lines, gas lines, telephone conduits, etc.) are accurately located on the drawings. Due, however, to the approximate nature of much of this data, the location of any particular facility cannot be certified to be correct. In general, locations and elevations shown are approximate only.

Before proceeding with the work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the construction work. The purpose of the conference is to verify the location of, and possible interference with, the existing utilities that are shown on the Plans, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities that are not shown on the Plans.

13.0 CONTROL OF EROSION

The Contractor shall be responsible for control of siltation and erosion from the project work. Control shall include all necessary ditching, check dams, mulching, etc. to prevent deposition of materials in roadside ditches. The Owner shall incur no extra costs from such work.

01001-4

The contractor shall obtain and pay for all grading, storm water, etc. permits, if any required to complete the work. The contractor shall maintain compliance with all conditions, limitations and stipulations of all permits. The contractor shall not commence work, except mobilization, until he has obtained all required permits for said work. The contractor shall supply the owner with copies of all permits within 24 hours of receipt. A KPDES Storm Water Discharge Permit will be required for this project. The contractor shall fill out, sign and submit the Notice of Intent (NOI) and the Notice of Termination (NOT). The notice to proceed will not be issued until the permit has been provided. The Kentucky Pollution Discharge Elimination System (KPDES) Form NOI-SWCA is included in these Specifications. The preferred electronic Notice of Intent (eNOI) for Stormwater Discharges Associated with Construction Activity (KPDES Form NOI-SWCA) under the KPDES General Permit is available on the Web.

For the eNOI, visit: <https://dep.gateway.ky.gov/eForms/default.aspx?FormID=7>.

14.0 MEASUREMENT AND PAYMENT

14.1 MEASUREMENT OF QUANTITIES

All Work completed under the Agreement will be measured by the Engineer according to United States standard measure.

14.1.1: Unless otherwise specified, measurement of concrete quantities will include only that volume within the neat lines as shown on the Plans or as altered by the Engineer to fit field conditions. The prismatic formula will be used in computing the volumes of structures, or portions of structures, having end sections of unequal areas.

14.1.2: All items which are measured by the linear foot, such as pipe, will be measured along the centerline distance of the installed item with no allowance for connections, fittings or laps at connections.

14.1.3: In computing volumes of excavation, borrow and embankments, the average end-area method will be used. For the purpose of ascertaining quantities, it is agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of areas.

14.2 LUMP SUM

When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

14.3 PLAN QUANTITIES

When the plan quantities for a specific portion of the Work are designated as the pay quantities in the Contract Documents, they shall be the final quantities for which payment for such specific portion of the Work will be made, unless the dimensions of said portions of the Work shown on the plans are revised by the Engineer. When revised dimensions result in an increase or decrease in the quantities of such Work, the final quantities for payment will be revised in the amount represented by the authorized changes in dimensions.

14.4 ACTUAL QUANTITIES

When actual quantities for a specific portion of the Work are designated as the pay quantities in the Contract Documents, they shall be the final quantities for which payment for such specific portion of the Work will be made. The actual quantities will be determined by the difference in field measurements and cross sections before and after construction.

14.5 SCOPE OF PAYMENT

The contract unit prices whether based on lump sum, plan quantities or actual quantities for the various bid items of the Contract Documents shall be considered full compensation for all labor, materials, supplies, equipment, tools, and all things of whatever nature required for the complete incorporation of the item into the Work the same as though the items were to read "in Plan" unless the Contract Documents provide otherwise.

14.6 PAYMENTS

Estimates for payment, partial payments and final payments shall be in accordance with and follow procedures set forth in the General Conditions and Supplementary Conditions.

15.0 **ACCESS ROADS**

The Contractor, Contractor's employees and all trucks delivering equipment, supplies or materials to the project shall use the access roads shown in the Plans for entering and leaving the project sites.

16.0 **TESTING LABORATORY SERVICES**

16.1 GENERAL

16.1.1 Work Included. From time to time during progress of the Work, the Owner may require that testing be performed to determine that materials provided for

the Work meet the specified requirements; such testing includes, but is not necessarily limited to:

- 1) Material Compaction
- 2) Cast-In-Place Concrete

16.1.2 Related Work Described Elsewhere. Requirements for testing may be described in various Sections of these Specifications; where no testing requirements are described, but the Owner decides that testing is required, the Owner may require testing to be performed under current pertinent standards for testing.

16.1.3 Selection of Testing Laboratory. The Owner will select a testing laboratory.

16.1.4 Codes and Standards. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

16.1.5 Product Handling. The Contractor shall promptly process and distribute all required copies of test reports for which he is responsible and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the Work.

16.2 PAYMENT FOR TESTING SERVICES

16.2.1 Initial Services. The Contractor will pay for all initial testing services required by the Owner.

16.2.2 Retesting. When initial tests indicate non-compliance with the Contract Documents, all subsequent retesting made necessary by the non-compliance shall be performed by a testing laboratory selected by the Contractor and approved by the Engineer and the costs thereof will be paid directly by the Contractor.

16.2.3 CONTRACTOR'S Convenience Testing. Inspection or testing performed exclusively for the CONTRACTOR'S convenience shall be the sole responsibility of the Contractor.

16.3 EXECUTION

16.3.1 Cooperation with Testing Laboratory. Representatives of the testing laboratory shall have access to the Work at all times. The Contractor shall provide facilities for such access in order that the laboratory may properly perform its functions.

16.3.2 SCHEDULES FOR TESTING

16.3.2.1 Establishing Schedule. By advance discussion with the testing laboratory selected by the Owner, the Contractor shall allow for the time required for the laboratory to perform its tests and to issue each of its findings. The Contractor shall allow for this time within the construction schedule.

16.3.2.2 Revising Schedule. When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the testing laboratory as required.

16.3.2.3 Adherence to Schedule. When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributed to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

16.3.3 Taking Specimens. All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the testing laboratory; all sampling equipment and personnel will be provided by the testing laboratory; and all deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

17.0 **SUBMITTALS AND SUBSTITUTIONS**

17.1 GENERAL

17.1.1 Work Included. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards. To insure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its review and approval or rejection by the Engineer.

17.1.2 RELATED WORK DESCRIBED ELSEWHERE.

17.1.2.1 Contractual requirements for submittals are described in the General Conditions and Supplementary Conditions.

17.1.2.2 Individual submittals required are described in the pertinent sections of these Specifications.

17.2 SUBSTITUTIONS

17.2.1 ENGINEER'S Approval Required. The Agreement is based on the materials, equipment, and methods described in the Contract Documents. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Engineer to evaluate the proposed substitution. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this Work by the Engineer.

17.2.2 "Or Equal". Where the phrase "or equal" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Engineer unless the item has been specifically approved for this Work. The decision of the Engineer shall be final.

17.2.3 Availability of Specified Items. The Contractor shall verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work. In the event the specified item or items will not be so available, the Contractor shall notify the Engineer prior to receipt of Bids.

17.3 IDENTIFICATION OF SUBMITTALS

The Contractor shall completely identify each submittal and resubmittal by showing at least the following information:

- 1) Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
- 2) Name of project as it appears in these Specifications.
- 3) Drawing number and Specifications Section number to which the submittal applies.
- 4) Whether this is an original submittal or resubmittal.

17.4 COORDINATION OF SUBMITTALS

17.4.1 General. Prior to submittal for Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:

- 1) Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.

- 2) Coordinate as required with all trades and with all public agencies involved.
- 3) Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.
- 4) Clearly indicate all deviations from the Contract Documents.

17.4.2 Grouping of Submittals. Unless otherwise specifically permitted by the Engineer, the Contractor shall make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.

17.5 TIMING OF SUBMITTALS

The Contractor shall make all submittals far enough in advance of schedule dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery. In scheduling, allow at least five full working days for the Engineer's review following his receipt of the submittal. All submittals shall be submitted in digital PDF format to Engineer.

18.0 **INSTALLATION REQUIREMENTS**

Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the respective manufacturers, unless otherwise specified.

19.0 **PROOF OF COMPLIANCE**

Whenever the Contract Documents require that a product be in accordance with Federal specification, ASTM designation, ANSI specification, or other association standard, the Contractor shall present an affidavit from the manufacturer certifying that the product complies therewith. Where requested or specified, the Contractor shall submit supporting test data to substantiate compliance.

20.0 **PROJECT RECORD DOCUMENTS**

20.1 As the Work progress, the Contractor shall keep a complete and accurate record of changes or deviations from the Contract Documents and the Shop Drawings, indicating the Work as actually installed. Changes shall be neatly and correctly shown on the respective portion of the affected document, using black line prints of the Drawings affected, or the Specifications, with appropriate

supplementary notes. This record set of Drawings, Shop Drawings, and Specifications shall be kept at the job site for inspection by the Engineer.

20.2 The records above shall be arranged in order, in accordance with the various sections of the Specifications, and properly indexed. Prior to application for final payment, and as a condition to its approval by the Engineer, deliver the record Drawings and Specifications, arranged in proper order, indexed, and endorsed as hereinbefore specified.

20.3 No review or receipt of such records by the Engineer or Owner shall be a waiver of any deviation from the Contract Documents or the Shop Drawings or in any way relieve the Contractor from his responsibility to perform the Work in accordance with the Contract Documents and the Shop Drawings to the extent they are in accordance with the Contract Documents.

21.0 PROJECT MEETINGS

The Contractor's Superintendent for the Work shall attend project meetings as required by either the Owner or Engineer.

22.0 VIDEO TAPE

The line Contractor, before proceeding with any work, shall make or have made a video of all areas where work is to be performed and a copy of this video cassette shall be furnished to the Engineer to review for completeness. This video shall be utilized as backup and reference for claims and cleanup.

23.0 DAILY REPORTS

The project inspector, as designated by the Owner and/or Engineer, will keep a daily record of materials installed. This daily report will be used by the Owner and the Engineer to determine the payments due to the Contractor. The Contractor shall sign the inspector's daily report each day. Should the contractor disagree with the inspector's report, the differences shall be resolved before the end of the next day, with the Contractor signing the daily report.

24.0 FINAL ADJUSTMENT OF QUANTITIES

Upon completion of the project, a final adjusting change order will be written to reconcile the differences between the bid quantities and the actual quantities installed. This final adjusting change order will be determined based on the inspector's daily reports.

25.0 DAVIS BACON AND RELATED ACTS

The Contractor must comply with the minimum rates for wages for laborers and mechanics as determined by the Secretary of Labor in accordance with the provisions of the Davis Bacon and Related Acts.

DIVISION 2: SITE WORK

SECTION 02001

EARTHWORK

1.0 SCOPE

This section covers the required topsoil removal, excavation, the removal and proper utilization or disposal of all excavated materials, necessary borrow, fill requirements, and the shaping and finishing of all excavation work to the required lines and grades.

2.0 TOPSOIL REMOVAL

All topsoil on areas to receive fill shall be stripped and stockpiled at an approved location.

3.0 CLEARING AND GRUBBING

Work shall consist of cutting and removing designated trees, stumps, brush, logs, removal of fences, or other loose and projecting material. Unless otherwise specified, it shall also include the grubbing of stumps, roots and other natural obstructions which, in the opinion of the Engineer, must be removed to prosecute properly the construction work and operate properly the facility upon the completion of construction.

No cleared or grubbed materials shall be used in backfills or embankment fills.

All stumps, roots and other objectionable material shall be grubbed up so that no roots larger than 3 inches in diameter remain less than 18 inches below the ground surface.

All holes and depressions left by grubbing operations shall be filled with suitable material and compacted to grade.

Disposal shall be by burning or other methods satisfactory to the Engineer; however, burning will be permitted only when the Contractor has obtained written permission from the local regulatory agency.

The Contractor shall also remove from the site and satisfactorily dispose of all miscellaneous rubbish including, but not limited to, masonry, scrap metal, rock, pavement, etc., that is under the fill or to be removed as shown on the Drawings, specified herein, or directed by the Engineer.

Existing improvements, adjacent property, utility and other facilities, and trees, plants and brush that are not to be removed shall be protected from injury or damage resulting from the Contractor's operations.

Trees and shrubs, designated to remain or that are beyond the clearing and grubbing limits, which are injured or damaged during construction operations shall be treated at the Contractor's expense by experienced tree surgery personnel.

3.1 EROSION CONTROL

Temporary measures shall be applied throughout the construction permit to control and to minimize siltation to adjacent properties and waterways. Such measures shall include, but not be limited to, the use of berms, baled straw silt barriers, gravel or crushed stone, mulch, slope drains and other methods. These temporary measures shall be applied to erodible material exposed by any activity associated with the construction of this project.

4.0 **STRUCTURAL EXCAVATION**

Structural excavation shall consist of and include the removal of all materials encountered or involved in the excavation and subgrade preparation for the placing of structures. The final depths and extent of structural excavation will be determined by the nature of the material encountered; however, after excavation to the limits as shown on the drawings, the ENGINEER shall inspect the work and determine if additional excavation is required.

5.0 **EXCAVATION CONSTRUCTION METHODS**

5.1 OPEN-CUT EXCAVATION - GENERAL

All open cut excavation shall be performed in accordance with this section to the lines, grades, and dimensions shown on the drawings or established by the ENGINEER.

All necessary precautions shall be taken to preserve the material below and beyond the lines of all excavation in the soundest possible condition. Any damage to the work due to the CONTRACTOR'S operations, including shattering of the material beyond the required excavation lines, shall be repaired at the expense of and by the CONTRACTOR. Any and all excess excavation for the convenience of the CONTRACTOR for any purpose or reason, except as may be ordered in writing by the ENGINEER and whether or not due to the fault of the CONTRACTOR, shall be at the expense of the CONTRACTOR. Where required to complete the work, all such excess excavation and over-excavation shall be refilled with materials furnished and placed at the expense of and by the CONTRACTOR. Slopes shattered or loosened by blasting shall be taken down at the expense of and by the CONTRACTOR.

All excavation for embankment and structure foundations shall be performed in the dry. No excavation shall be made in frozen materials without written approval.

The bottom and side slope of rock or shale upon or against which concrete or pervious blanket material is to be placed shall be excavated to the required dimensions as shown on the drawings or established by the ENGINEER. No material will be permitted to extend within the neat lines of the structure. If, at any point in rock or shale upon written orders from the ENGINEER, material is excavated beyond the limits required to receive the structure, the additional excavation shall be filled solidly with concrete. If material is excavated beyond the limits required to receive the structure without written orders from the ENGINEER, the additional excavation shall be brought back to grade with "Class A" concrete at the CONTRACTOR'S expense.

5.2 UTILIZATION OF EXCAVATED MATERIAL

All suitable material removed from the excavations shall be used insofar as practicable, in constructing the permanent works and at such other places as directed. The CONTRACTOR shall not waste materials removed from excavations and suitable for use in the construction of the permanent works, without a written application to do so and a written approval from the ENGINEER.

5.3 DISPOSAL OF SURPLUS AND/OR WASTE MATERIAL

All surplus excavated material and/or all waste materials shall be disposed of outside of the floodplain in an area provided by the CONTRACTOR and approved by the ENGINEER.

The surfaces thereof shall be left in a neat and sightly condition and sloped to provide positive drainage. Compaction of the waste materials shall be required.

5.4 BLASTING FOR EXCAVATION

A. General

Blasting may be done only to the depth, amount, and extent, and in such locations approved by the ENGINEER. Approval of the methods of blasting by the ENGINEER will not relieve the CONTRACTOR of his responsibility in blasting operation, and no payment will be made for any necessary extra excavation below or outside of the limit lines indicated on the drawings, or modifications thereof, due solely to injury caused by over-shooting, improper blasting, or carelessness on the part of the CONTRACTOR. All material thus removed shall be replaced by concrete when a concrete structure is to be placed upon or against such surface, or by compacted fill material when fill is to be placed thereon, at the expense of the CONTRACTOR and in a manner satisfactory to the ENGINEER. Extra fill is to be of the same type as that to be placed directly above it.

B. Blasting Trench and/or Structure Excavation

The use of explosives or blasting material of any kind in trench excavation and/or the structure excavation shall be carried out by using not over one-half (1/2) pound of explosives (equivalent in strength to 40 percent dynamite) per cubic yard of material to be blasted and by shooting only a few holes simultaneously.

C. Use of Explosives

The transportation, handling, storage, and use of dynamite and other explosives shall be directed and supervised by a person of proven experience and ability in blasting operation. All blasting operations shall be in accordance with applicable local, state, and federal laws. Before any explosives are brought on the job, permission to do so shall be obtained from the ENGINEER. All blasts shall be fired electrically with an electric blasting machine. Where detonating cord is used as a detonating agent, the detonation cord shall be fired with an electric blasting cap. Delay electric detonators shall be used for all delayed blasts. Blasting machines used for firing shall be known to be in good condition and of sufficient capacity to fire all charges. Rubber-covered or other adequately insulated copper wires in good condition shall be used for firing lines and shall have solid cores of appropriate gage. Sufficient firing lines shall be provided to permit the blaster to be located at a safe distance from the blast. Single conductor lead lines shall be used. All operations involving the handling or use of explosives shall be discontinued during approach of a thunderstorm or while it is in progress. Blasting operations in the proximity of overhead power lines, communication lines, or other structures shall not be carried on until the operator and/or OWNER of such lines has been notified and precautionary measures deemed necessary have been taken. All holes loaded on a shift shall be fired on the same shift. The use of black powder is prohibited. Before any drilling operations in preparation for blasting are started, the CONTRACTOR shall furnish the ENGINEER a detailed plan of operations showing the method proposed for the prevention of damage. In order to assure adequate protection, such plan may be modified to meet the conditions that may develop.

5.5 SHEETING AND BRACING

Sheeting and bracing as may be required to safely support the sides of excavations while maintaining the required side slopes shall comply with the safety precautions as outlined in current and accepted safety manuals, such as "Associated General Contractors Manual of Accident Prevention in Construction". Where sheeting and bracing are necessary to prevent caving of the walls of excavations and to safeguard the workmen, the excavations shall be dug to such widths that proper allowance is made for the space occupied by the

sheeting and bracing. The CONTRACTOR shall perform the additional excavation required and furnish and put in place the necessary sheeting and bracing and shall remove the same as the excavation is filled, at his own expense.

5.6 REMOVAL OF WATER

The CONTRACTOR shall construct and maintain all necessary channels, flumes, and/or other temporary diversion and protective works; shall furnish all materials required therefore; and shall furnish, install, maintain and operate all well points, casings, pumps and other equipment for dewatering the various parts of the work and for maintaining the foundations, trenches and other parts of the work free from water as required for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed, or leveled, to give a slightly appearance and so as not to interfere in any way with the operation, usefulness or stability of the permanent structures.

5.7 PROTECTION OF FINISHED STRUCTURE EXCAVATIONS

It shall be the CONTRACTOR'S responsibility to maintain finished excavated foundation surfaces for the works in good condition until such time as the structures are placed on or against the surfaces.

5.8 BORROW

Borrow excavation shall consist of and include the required excavation and proper utilization of approved materials obtained from designated areas when sufficient quantities of suitable materials are not available from other required excavation.

The control of excavation in any borrow area and the selection of materials therefrom shall at all times be as directed by the ENGINEER. On completion of excavation, all borrow pits shall be left in a neat and slightly condition. Unless otherwise approved by the ENGINEER, all borrow pits shall be so graded and dressed that water will readily drain therefrom, and away from all embankments, berms and structures. When shown on the drawings, terraces, or diversions shall be constructed to protect the slopes of the borrow areas from erosion and shall be considered a subsidiary of this specification.

6.0 **STRUCTURE FOUNDATION FILL**

After clearing and stripping operations have been completed, all structure locations shall be proofrolled with a loaded pan or heavy pneumatic tired vehicle to densify upper soils and to locate possible areas which will require undercutting, removal and/or re-compaction. This operation shall be conducted under the surveillance of the ENGINEER.

6.1 FILL MATERIAL APPROVAL

Before initiating filling operations, the CONTRACTOR shall receive approval of fill material by the ENGINEER. Several laboratory Proctor density tests shall be run on representative samples obtained from the proposed borrow material.

6.2 PLACEMENT OF FILLS

Where structures or other appurtenances are constructed on fill, the fill shall be placed in layers not over six (6") inches deep, as measured before compaction and be thoroughly compacted.

6.3 COMPACTION

Compaction may be obtained by use of a sheepfoot roller or pneumatic-tired roller. Water shall be applied as directed to obtain close adhesion between layers and all parts of the material. Fill shall be compacted to a minimum of 95% of the Standard Proctor maximum dry density (ASTM Specifications D- 698). A minimum of two (2) compaction tests per each two (2') feet of fill on a structure location shall be run by an experienced soils engineering technician.

In order to prevent damage to existing structures, heavy construction equipment shall not be allowed to operate within approximately 8 feet horizontally of the existing structure exterior wall.

7.0 **BACKFILLING AROUND STRUCTURES**

Only suitable material approved by the ENGINEER shall be used for backfilling around structures.

Backfilling around structures shall have material placed in layers of six (6") inch depth and compacted by pneumatic tools or other small equipment operated by hand. In no case shall the backfilling be allowed to obtain an elevation of one (1') foot above any other area. It shall be uniformly compacted throughout the structure depth. Any deviation shall be cause for the ENGINEER to require the material deposited to be removed and re-compacted at the CONTRACTOR'S expense.

All backfilling shall be done in such a manner that the pipe or structure over or against which it is being placed will not be disturbed or injured. Any pipe or structure injured, damaged or moved from its proper line or grade during backfilling operations shall be removed or repaired to the satisfaction of the ENGINEER and then re-backfilled.

8.0 DAM EMBANKMENT (NOT APPLICABLE TO THIS PROJECT)

One foot of material shall be stripped from the top of the existing embankment. This material shall be stockpiled for use as final cover. The surface of the embankment shall then be moistened and/or worked with a harrow, scarifier, or other suitable equipment to provide a satisfactory bonding surface for the additional fill. The surface condition must be approved by the ENGINEER prior to any fill being placed.

No fill material used in raising the embankment shall be dumped in place, but shall be distributed by blading or dozing in a manner that will insure placement so that voids, pockets, and bridging are held to a minimum. The hauling and placement equipment shall be routed over the area such that all areas receive approximately the same compactive effort. The fill shall be compacted such that in-place density checks indicate a soil dry density of at least 90 percent of the maximum value as determined by the standard Proctor density test. The embankment shall be raised in approximately horizontal lifts extending the entire length and width of the embankment. The thickness of the lifts before compaction shall not be more than eight (8) inches.

The stockpiled topsoil shall be uniformly spread over the raised embankment to insure that the final surface is capable of being vegetated.

It is anticipated that sufficient material to reach the designated elevations and grades will be generated from the excavation necessary to construct the principal spillway and the cleaning of the emergency spillway. Should an insufficient supply of material be available from these two sources, the needed additional material will be obtained from the borrow area below the toe of the embankment designated on the Drawings. Borrow operations shall be conducted in accordance with 4.08 BORROW.

9.0 PRELOADING OF STRUCTURES

All tanks shall be preloaded with water prior to making final pipe connections. Elevations of structures shall be monitored until settlement has virtually ceased.

10.0 BACKFILLING TRENCHES

The backfill shall be in accordance with other applicable sections of these specifications.

11.0 FINISH GRADING

Finish grading shall be to the finished elevations and grades shown, and shall be made to blend into conformation with remaining natural ground surfaces. All finish graded surfaces shall be left smooth and free to drain. Areas to be sown in grasses shall be prepared according to Section 02003. Excess materials shall

be spread and compacted as directed. Grading within the construction area and around the outside of building and structure lines shall be performed in a manner which will prevent accumulation of water within the area. Where necessary, or where shown, finish grading shall be extended to insure that water will be directed to drainage ditches, and the site area left smooth and free from depressions holding water.

12.0 MAINTENANCE

All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments and channels shall be maintained by the CONTRACTOR in good condition at all times until final acceptance by the OWNER. The CONTRACTOR shall maintain trench backfill at the original ground surface by periodically adding specified backfill material as necessary or when directed by the ENGINEER. Such maintenance shall be continued until final acceptance of the project.

13.0 PAYMENT

Payment for all excavation and fill work shown on the Drawings and herein specified, that is required to complete the clearing, grubbing, site grading, roads, structural excavation, trench excavation, borrow excavation, backfill, sheeting, shoring, topsoil, crushed stone or gravel, drainage, pumping, embankment fills and any other excavation and fills required to complete the work as shown on the Drawings shall be included in the work to which it is subsidiary in the Bid Schedule and no measurement of the quantities will be made. The contours and elevations of the present ground are believed to be reasonably correct but are not guaranteed. The CONTRACTOR shall satisfy himself by actual examination of the site of work as to the existing elevations and contours and the amount of work required under this Section.

The cost of all initial soils inspections and testing shall be paid by the OWNER. If compaction tests do not meet required values, the cost of additional testing as required by the ENGINEER shall be paid by the CONTRACTOR.

SECTION 02002

ACCESS ROAD

1.0 GENERAL

This specification covers the earthwork and surfacing necessary to construct the access road in accordance with the Drawings and the direction of the Engineer. The access road will serve as the construction access road and as the water utility's service access road once the project is completed.

2.0 LOCATION

The layout of the access road will generally be as shown on the Drawings. The exact location and cross-section of the road will be as directed by the Engineer at the time of construction and will be such as to insure its stability and to keep the grade of the road to a minimum.

3.0 FILL

All roadway fill will be compacted as directed by the Engineer with the hauling/placement equipment to insure its stability.

4.0 DRAINAGE

Culvert pipes shall be installed in sizes shown on the drawings. Pipe shall be bituminous coated corrugated metal concrete pipe unless otherwise specified.

5.0 SURFACING

The access road to the tanks will be surfaced with four inches of #2 coarse aggregate overlain with two inches of #57 coarse aggregate. It will not be necessary to surface uniform, competent rock surfaces. The coarse aggregates shall be in compliance with Section 805 of the Kentucky Department of Highways, "Standard Specification for Road and Bridge Construction."

6.0 PAYMENT

Payment for all work on access roads shown on the Drawings and herein specified shall be included in the payment for one of the following Bid Items "500,000 Gallon Elevated Water Storage Tank" or "100,000 Gallon Elevated Water Storage Tank" as contained in the Bid Schedule and no measurement of the quantities will be made. The information given on the Drawings is believed to be reasonably correct but is not guaranteed.

SECTION 02003

SEEDING, MULCHING AND CLEANING UP

1.0 GENERAL

The Work covered by this Specification consists of furnishing all materials, equipment, and labor for preparing the seedbed, fertilizing, seeding and mulching the disturbed areas as directed by the ENGINEER. This Specification also covers cleaning up and repairing damage.

The ENGINEER shall direct all areas to receive seeding and mulching. All areas receiving seeding and mulching shall have lime and fertilizer applied.

2.0 MATERIALS

2.1 LIME

Two tons of agricultural limestone per acre shall be required.

2.2 FERTILIZER

A. Amounts. The following amounts of fertilizer are required per acre:

(1) Nitrogen (N)	60 lbs.
(2) Phosphorous (P205)	120 lbs.
(3) Potash	120 lbs.

B. Analysis. This requirement can be met by applying fertilizer having an analysis of 10-20-20 at the rate of 600 pounds per acre.

2.3 SEED

The following amounts of pure live seed are required per acre:

(1) KY-31 Fescue	60 lbs.
(2) Perennial Ryegrass	25 lbs.
(3) Red Clover	10 lbs.

2.4 MULCH

Mulch shall consist of wood fiber applied at a rate of 1600 pounds per acre, bituminous treated straw applied at a rate of 2000 pounds per acre or other mulch subject to the advance approval of the ENGINEER.

3.0 EXECUTION

3.1 TIME

The seeding shall be completed within two weeks after completion of the work or as soon thereafter as conditions are favorable.

3.2 PREPARATION OF SEEDBED

- A. Application of Lime and Fertilizer. Immediately prior to seedbed preparation, the CONTRACTOR shall apply the agricultural lime and fertilizer uniformly over the area to be seeded.
- B. Mechanical Tillage. The seedbed shall be prepared by pulverizing and breaking up the soil to a minimum depth of two inches with a disk harrow, drag harrow, spike tooth harrow or similar tool. All rocks, clods, and undesirable material that would interfere with seeding operations shall be removed.

3.3 SEEDING

- A. Time. The seeding operations shall be performed immediately after, or as soon as practicable, after the seedbed has been prepared.
- B. Equipment. The seed shall be drilled or broadcast uniformly over the seedbed with regular approved type of equipment or method acceptable to the ENGINEER.
- C. Tillage. The seeded area shall be passed over with a harrow or cultipacker to help cover more seed and improve seedling establishment. Excessive tillage shall be avoided.

3.4 MULCHING

The approved mulch shall be applied uniformly over the seeded area at the rate required.

4.0 CLEANING UP

4.1 After all construction work is complete, prior to final payment, all exposed areas shall be cleaned and left in a sightly manner.

4.2 All unused material shall be removed from the site. No burning will be allowed on the site.

5.0 HYDROSEEDING AND HYDROMULCHING

The CONTRACTOR may hydroseed and hydromulch if the following requirements are met.

1. The individual seed quantities shall be increased by 20%.
2. The mulch shall be a processed hay or straw applied at a rate of 3/4 ton per acre with 80 lbs. per acre of an organic tackifier.
3. The hydroseeder slurry shall not be allowed to drop below a pH of 5.0.

6.0 MAINTENANCE AND WARRANTIES

6.1 MAINTENANCE

The CONTRACTOR shall be responsible for the maintenance of all work under this Section until final acceptance. Adequate protection of exposed slopes shall be provided at all times to prevent excessive erosion. No work will be accepted unless there is evidence of healthy growth and sufficient cover to prevent erosion.

6.2 WARRANTIES

Work executed under this Section shall be guaranteed for one year with the guarantee beginning on the date of final acceptance of all work under this Contract. Any seeded areas of the site which are found to not have an adequate growth of cover during the guarantee period, shall be re-seeded as soon as weather conditions permit, at no cost to the OWNER.

7.0 PAYMENT

Payment for all re-vegetation work and cleanup shall be included in the work to which it is subsidiary in the Bid Schedule and no measurement of the quantities will be made.

SECTION 02100

FENCE CONSTRUCTION

1.0 SCOPE

Fencing is normally bid as an alternate construction item and if included is to be constructed at locations and in the manner shown on the plans.

1.1 CHAIN LINK FENCING

Fencing shall be of non-climbable type as manufactured by the Cyclone Fence Company, or approved equal. It shall be standard overall height as shown in Drawings and constructed of chain link fabric with three rows of barb wire on top of steel brackets. Chain link fabric shall be one foot less than complete overall height of fence.

1.1.1 Option. These Specifications are based upon the use of steel, chain link, galvanized fencing. At Contractor's option, and at no additional expense to Owner, fencing may be constructed of aluminum products and accessories. Basic specification requirements for aluminum shall be equivalent to specifications for steel fencing. Aluminum fencing products and accessories shall also conform to applicable portion of the "Recommended Commercial Standard for Aluminum Alloy Chain Link Fencing" as published by the Chain Link Fence Manufacturers Institute.

1.1.2 Material. All fencing materials shall conform to applicable portions of the Standards of the Chain Link Fence Manufacturers Institute (CLFMI). Material for framework shall be open hearth, copper-bearing steel conforming to the applicable requirements of the latest ASTM for Standard Specifications, Serial Designation A7 for Steel for Bridges and Buildings.

End, corner, angle and pull posts shall be 3-inch outside diameter, standard tubular steel weighing not less than 5.79 pounds per linear foot. Line posts shall be 2 1/4-inch structural "H" sections weighing 4.1 pounds per linear foot or 2 3/8-inch outside diameter steel pipe weighing 3.65 pounds per linear foot. Top rail shall be 1 5/8-inch outside diameter steel pipe weighing 2.27 pounds per linear foot or "H" section weighing 2.27 pounds linear foot. Top rails shall be provided with expansion rail couplings spaced at not less than 20 foot intervals. Gate posts for pedestrian gates shall be 3-inch outside diameter pipe weighing 5.79 pounds per linear foot. Gate posts for vehicular gates shall be 4-inch outside diameter pipe weighing 9.1 pounds per linear foot.

Braces shall be provided at all corners and wherever fabric is not continuous, such as at gates or at other openings. Braces shall be of the same material as top rail. Extension arms on intermediate posts shall be of pressed steel.

Extension arms on end and corner posts shall be heavy malleable iron. Extension arms shall carry 3 barbed wires. Fittings used in connection with the fence and gates shall be malleable iron or pressed steel. Barbed wire shall be four-point pattern, two strand, No. 12-1/2 gauge, copper-bearing steel wire, heavily hot galvanized after weaving, with large barbs placed 3 inches apart. Chain link fabric shall be copper-bearing base metal No. 9 gauge wire heavily zinc coated by hot dip process after weaving. The fabric shall have a knuckled selvage along the top rail and a twisted and barbed selvage at the bottom. The barbing shall be done by cutting the wire on a bias, creating sharp points. A 2-inch padlock and chain shall be furnished with each gate. Three keys shall be furnished with each padlock. Chain shall be welded to the gate. Gate frames shall be of 1.9 inch outside diameter pipe weighing 2.72 pounds per linear foot. Corner fittings shall be heavy, malleable iron castings or pressed steel. Fabric shall be same as in fence. Each gate frame shall be equipped with 3/8-inch diameter adjustable ball-and-socket hinges, catch and stops. Double gates shall have center rests. Hinges shall provide for swinging the gate open through an arc of not less than 180 degrees. Gates shall be suitably braced and reinforced to prevent sagging. Double gates shall be provided with center plumber rod, catch and semi-automatic outer catches to secure gate in opened position. All materials entering into the construction of required fencing shall be heavily galvanized by the hot dip process.

1.1.3 Construction. End, corner and gate posts shall be set in a concrete base not less than 18 inches in diameter which shall extend at least three inches below the bottom of the post. The post shall extend to a depth of at least three feet below the surface of the ground. A brace shall be spaced midway in height of each end, corner and gate post and shall extend to the first line post. Braces shall be securely fastened to posts by means of malleable iron connections and trussed from line post back to end, corner or gate post with a 3/8-inch diameter rod.

Line posts shall be set in a concrete base not less than 12 inches in diameter which shall extend at least three inches below the bottom of the post. The post shall extend to a depth of at least thirty inches below the surface of the ground. Line posts shall be equally spaced along the line of fence at intervals not to exceed ten (10') feet.

Galvanized steel pipe sleeves, 4-inch O.D. for corner, pull and gate posts and 3 1/2-inch O.D. for line posts shall be embedded in concrete as shown on the plans for all fence posts to be installed on concrete structures.

Top rail shall be installed between line posts. Fabric shall not be erected until concrete has had sufficient time to cure. Chain-link fabric shall be stretched to uniform tightness on the outside of the posts with suitable tools and shall be attached with No. 6 gauge galvanized wire clips securely clinched and attached by means of adjustable clamps. Fabric shall be fastened to line posts at 14-inch

intervals. Fabric shall be attached to rail at 24-inch intervals by galvanized tie wires.

A No. 7 coil spring galvanized wire shall be stretched along the bottom of the fence and securely fastened to the posts. The chain-link fabric shall be attached to the tension wire at intervals not to exceed two feet.

1.2 MEASUREMENT AND PAYMENT

Payment for all work on fencing shown on the Drawings and herein specified shall be included in the payment for one of the following Bid Items "500,000 Gallon Elevated Water Storage Tank or 100,000 Gallon Elevated Water Storage Tank" as contained in the Bid Schedule and no measurement of the quantities will be made. This shall include posts, gates, concrete, and any other work, incidentals or equipment required for a satisfactory installation as shown on the Drawings.

SECTION 02326

SPLIT STEEL CASING PIPE

1.0 GENERAL

1.1 SCOPE OF WORK

A. Split steel casing pipe shall be furnished and installed as shown on the Drawings and specified herein.

2.0 PRODUCTS

2.1 SPLIT STEEL CASING PIPE

A. Flanged Maintenance Pipe (FMP) or shall consist of black two-piece split steel casing with an ID of 18" and a wall thickness of 0.25". The flange shall be continuous with hole pattern "C". The section lengths of 5' and 10' shall be utilized for staggering and the bolts shall be 3/8" stainless steel. Lifting eyes shall be welded on each half of the casing pipe.

B. Flange Maintenance Pipe shall meet Cooper E- 80 loading.

C. The inside diameter of steel casing pipe shall be at least 2 inches greater than the largest outside diameter of the carrier pipe, joints or couplings.

3.0 EXECUTION

3.1 SPLIT STEEL CASING PIPE INSTALLATION

A. Flanged Maintenance Pipe (FMP) is a split steel casing system manufactured by Ironhed, LLC utilized to avoid service interruptions. The FMP shall be side flange assembled with staggered joints and no sharp edges or burs. FMP shall be bolted together with stainless hardware. The split steel casing shall be of the size and wall thickness as shown on the Drawings.

3.3 CARRIER PIPE PROTECTION

A. Protective Coating

1. Prior to installing the split steel casing pipe, the existing pipe shall be wrapped in a two layer corrosion and mechanical protective system. The inner wrap shall be Viscowrap-ST and the outer wrap shall be Viscotaq PE Outer Wrap. The existing wrapping on the

pipe shall not be removed prior to installing the new protective casing.

B. Pipeline Spacers

1. High density polyethylene (HDPE) casing spacer shall be non-metallic and molded in segments for easy field assembly with a supplied ball tip Allen wrench. Individual segments shall have a solid core with runners extending to within 1.5" from the casing pipe. The runners shall essentially center the carrier pipe within the casing. Plastic casing spacers shall be located within two feet of both ends of the casing. Casing Spacers shall be installed along the carrier pipe length at the spacing indicated in the table below. All casing spacers shall be supplied with a molded TPR (Thermo Plastic Rubber) non-slip button comprised of pliable material having a high coefficient of friction that is designed to grip all types of pipe materials. All mounting hardware shall be constructed from 304 or 316 stainless steel. The casing spacers shall be Cascade Phoenix Gold Series, as manufactured by Cascade Waterworks Mfg. Co., Yorkville, Illinois, or approved equal.
2. Spacers shall be of such dimensions to provide 1) full supportive load capacity of the pipe and contents; 2) of such thickness to allow installation and/or removal of the pipe; and 3) to allow no greater than 1/2 inch movement of the carrier pipe within the casing pipe after the carrier pipe is installed.
3. Spacers shall be located immediately behind each bell and at a maximum spacing distance as shown below unless a lesser maximum spacing distance is recommended by the pipe manufacturer:

Diameter (inches)	Max. Spacing (feet)
2 – 2 – ½	4
3 – 8	7
10 – 26	10
28	9
30	8
32	7
34	6
36 – 38	5.5
40 – 44	5
46 – 48	4

The materials and spacing to be used shall be accepted by the Engineer prior to installation. The pipeline spacers shall be manufactured by Cascade Waterworks Manufacturing Co., of Yorkville, Illinois, Pipeline

Seal and Insulator, Inc., of Houston, Texas, or equal. Installation shall be in accordance with manufacturer's recommendations.

B. Casing Pipe End Seals

1. Upon completion of installation of the carrier pipe, the annular space at the ends of the casing pipe shall be sealed to prevent the entrance of groundwater, silt, etc., into the casing pipe. The seal shall be a manufactured product specially made for this purpose. The seal shall be Link Seal - PL as manufactured by the Thunderline Corporation, Wayne, Michigan, or equal.

C. Casing Pipe Vents

1. Vent pipes shall be installed on the ends of casing pipes in the following numbers and at the following locations:
 - a. U.S. routes and interstate routes—each end of casing pipe.
 - b. Kentucky state routes and other major streets—one end of casing pipe.
 - c. At locations as directed by the Owner.
2. Vent pipes shall be installed at a distance from the end of the casing pipe sufficient not to interfere with the installation or removal of the casing pipe end seals. Vent pipes shall be extended to the street, road, highway, or railroad right-of-way line(s) or as directed by the Owner.
3. Vent pipes shall be constructed of 2-inch coated steel pipe, same as for main line steel pipe, with return bend and bug screen. Vent pipes return bend to be 6 feet above ground elevation or as directed by the Owner.
4. Steel coating of vent pipe shall extend 6 inches above ground surface with the remaining above ground portion to be painted with 2 coats of white.

4.0 MEASUREMENT AND PAYMENT

Payment for all work on split steel casing pipe shown on the Drawings and herein specified shall be included in the payment for the following Bid Item "500,000 Gallon Elevated Water Storage Tank " as contained in the Bid Schedule and no measurement of the quantities will be made. This shall include casing pipe, labor, incidentals or equipment required for a satisfactory installation as shown on the Drawings.

DIVISION 3: CONCRETE

SECTION 03001

CONCRETE

1.0 CAST IN PLACE CONCRETE

1.1 SCOPE

This specification covers the furnishing of all materials, except as may be otherwise provided in the contract, equipment, labor and plant, and performing all operations specified herein, including the manufacturing, transporting, placing, finishing and curing of the concrete. The furnishing and placing of reinforcing steel when specified is covered in a separate technical specification.

1.2 COMPOSITION

Concrete shall be composed of Portland cement, water, fine aggregate, coarse aggregate, and when specified or approved in writing by the Engineer, admixtures for entraining air or retarding agents. The design of the concrete mixture will be based on the water-cement ratio necessary to secure (a) a plastic workable mixture suitable for the specific conditions of placement, and (b) when properly cured, a product having durability, impermeability and strength, in accordance with all the requirements of the structures covered by these specifications. The concrete mixture shall be designed so that the concrete placed according to plans shall produce a minimum laboratory cylinder compressive strength equal to the strength designated in item 1.3 of this section for the class of concrete specified.

1.3 CLASSIFICATION

Concrete shall be classified as Class A. The basis of classification of concrete shall be the minimum compressive strength at twenty-eight (28) days as listed below. Other minimum design requirements are also shown.

Minimum Strength			Cement Factor	
Class	(7-day)	(28-day)	(Bags/C.Y.)	Air Entrainment
A	2850	4000 psi	6.0	4-½ ± 1-½ %

1.4 CEMENT

1.4.1 Portland Cement. Portland cement shall meet the requirements of ASTM Designation: C-150 for the type of cement specified.

1.4.2 Air-Entraining Portland Cement. Air entraining Portland cement shall meet the requirements of ASTM Designation: C-175 for the type of cement specified.

1.4.3 Storage of Cement on the Site. Cement shall be properly stored and protected from weather, dampness or other destructive agents and any cement which is damaged will be rejected and not permitted to be used in the work.

1.4.4 Sampling and Testing. Portland cement shall be subject to sampling and testing in accordance with ASTM Designation: C-150.

Air-entraining Portland cement shall be subject to sampling and testing in accordance with ASTM Designation: C-175.

1.5 AGGREGATES

1.5.1 Fine and Coarse Aggregates. Shall conform to the provisions of ASTM Designation: C-136 and ASTM Designation: C-33. Sand shall consist of clean, well graded particles of hard, durable stone and shall contain limited amount of deleterious substances. It shall be equivalent to washed Ohio, Scioto, or Cumberland River sand.

Coarse aggregate shall be washed river gravel or crushed limestone of hard durable particles and shall contain limited amounts of deleterious substances. The maximum size of coarse aggregate will be limited to one and one-half (1 1/2) inches.

1.5.2 Handling and Measurement of Materials. Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size will be avoided and that various sizes will not become intermixed before proportioning. Methods of handling and transporting aggregates shall be such as to avoid contamination, excessive breakage, segregation or degradation, or intermingling or various sizes.

Scales for weighing aggregates and cement shall be beam type or springless dial type. They shall be accurate within 1 percent under operating conditions. All exposed fulcrums, clevises and similar working parts of scales shall be kept clean.

The quantities of cement and aggregates in each batch of concrete as indicated by the scales, shall be within the following percentages of the required batch weights:

Cement - plus or minus 1.0 percent
Aggregates - plus or minus 2.0 percent

Measuring tanks for mixing water shall be of adequate capacity to furnish the maximum amount of mixing water required per batch and shall be equipped with outside taps and valves to provide for checking their calibration unless other means are provided for readily and accurately determining the amount of water in the tank.

Cement shall be measured by weight or in bags of 94 lbs. each. When cement is measured by weight, it shall be weighted on scale separate from that used for other materials, and in a hopper entirely free and independent of the hopper used for weighing the aggregates. When cement is measured in bags, no fraction of a bag shall be used unless weighed.

Aggregates shall be measured by weight. Mix proportions shall be based on saturated, surface-dry weights. The batch weight of each aggregate shall be the required saturated, surface-dry weight plus the weight of surface moisture it contains.

Mixing water shall consist of water added to the batch, ice added to the batch, water occurring as surface moisture on the aggregates and water introduced in the form of admixtures. The added water shall be measured by weight or volume to an accuracy of 1 percent of the required total mixing water. Added ice shall be measured by weight. Wash water shall not be used as a portion of the mixing water for succeeding batches.

Dry admixtures shall be measured by weight, and paste or liquid admixtures by weight or volume, within a limit of accuracy of 3 percent.

1.5.3 Sampling and Testing. When testing is required, the sampling shall be done in accordance with, and the testing results shall conform to, the ASTM Standards referenced herein. The source from which the aggregates are to be obtained shall be selected well in advance of the time when the material will be required in the work. Samples of the aggregates, when requested, shall be furnished at least fifteen (15) days in advance of the time when the placing of concrete is expected to begin.

Usually 150 pounds of sand for initial tests and 150 pounds for periodic tests will be sufficient. Usually 200 pounds of coarse aggregate for initial tests and 200 pounds for periodic tests will be sufficient.

Unless otherwise specified, all test samples shall be taken under the supervision of the Engineer and delivered to the designated point by the Contractor at his expense. Tests will be made by and under the supervision of the Engineer. Routine control tests and analysis of the aggregates at various stages in the processing operations will be made by the Engineer. The Contractor shall provide such facilities as the Engineer may consider necessary for the ready procurement of representative test samples.

It shall be the responsibility of the Owner to pay for the necessary tests. Once a material has been tested and approved for use, it shall be the Contractor's responsibility to use material throughout the job which is equal in all respects and from the same source as that approved material he delivered to the testing laboratory.

The Engineer shall order additional material tests, if in his opinion the material stored or being used is not equal to the approved tested material. The Contractor shall pay for additional tests if the material is not suitable in accordance with these specifications or if the characteristics of the material are such that a redesign of concrete mix is necessary.

If the Contractor desires to change supplier and/or source of materials after materials have been tested and approved, the Engineer may order additional material tests, the cost of which shall be charged to the Contractor.

In rare instances, a material may meet the requirements of these specifications, but have unusual characteristics which render it unsuitable for the use intended. Therefore, the Owner reserves the right to reject materials if adequate reason is furnished. The Owner also reserves the right to reject material suppliers and sources if quality, uniformity, and other important considerations are not and/or cannot be acceptably maintained. If suppliers or sources of material are rejected after work begins, it may be necessary to test materials from different suppliers and/or sources. If the Engineer deems that tests are necessary, the Contractor shall pay the cost of the necessary tests and all concreting shall be stopped until material is approved for use by the Engineer.

Each material must come from a single source, unless otherwise approved in writing by the Engineer.

All materials must be tested in accordance with these specifications and approved by the Engineer in writing before used in the work, unless the Engineer establishes that some or all of the tests will not be required because of the size of the project or for other reasons. Reports of test results shall be submitted to the Engineer in four (4) copies. It is the intent that the Owner shall pay for material tests necessary to insure suitability for the work, but the Owner shall not pay for material tests caused by negligence, indecision, or carelessness on the part of the Contractor, his subcontractors, or his suppliers.

In the case of ready-mixed concrete the requirements for design mix and testing shall be the same unless waived by the Engineer.

After award of the contract, the Contractor shall submit in writing to the Engineer the name, address and qualifications of the ready mix supplier who will furnish concrete for the project. The Contractor shall also submit the supplier and

source of the sand, coarse aggregate, cement and admixture. The Engineer shall then select a testing laboratory and request proposed mixes from the Contractor or ready-mix plant. The Engineer will then indicate tests and design mixes required, to the testing laboratory. The testing laboratory shall also receive a copy of the materials specifications. After receiving the requisition for tests, the Contractor shall send materials per these specifications to the testing laboratory.

1.6 WATER

Water used in mixing concrete shall be fresh, clean and free from injurious amounts of sewage, oil, acid, alkali, salts, or organic matter, and its source shall be subject to the approval of the Engineer. The water used in mixing must be a minimum required for a plastic mix. No water will be permitted for purposes of hastening mixing and reducing tamping or vibration.

1.7 ADMIXTURES

1.7.1 Air-Entrainment. The air-entraining admixtures shall fully meet the requirements of ASTM Designation: C-260 and shall be subject to tests in accordance with ASTM Designation: C-233.

1.7.2 Retarding Agents. Approved types of retarding agents shall be included in the concrete mix when specified on drawings or authorized in writing by the Engineer.

1.7.3 Other Compounds. The use of calcium chloride or other accelerators or anti-freeze compounds will not be allowed.

1.8. CONSISTENCY

The consistency of any concrete shall be such that it can be worked readily into the corners and angles of the forms and around reinforcement with the method of placing employed on the work, but without permitting the materials to segregate or excess free water to collect on the surface. The following ranges represent the extreme limits of allowable slump when tested, in accordance with ASTM Designation: C-143. Where vibrators are used, the Engineer may allow a slightly less slump than the specified minimum.

Class of Concrete	Slump Range (Inches)
Class A	1½ to 3 ½

The quantity of mixing water shall not be changed without the consent of the Engineer.

1.9 AIR-ENTRAINED CONCRETE

1.9.1 General. When air-entrained concrete is specified, air-entrainment shall be accomplished by using an air-entrained Portland cement or by using an air-entraining admixture with normal Portland cement. If the entrained air content falls below the specified limit when using air-entrained cement, an air-entraining admixture shall be added in sufficient quantity to bring the entrained air content within the specified limits. If the entrained air content is found to be greater than the maximum specified, when using an air-entrained cement, the use of an air-entraining cement shall be prohibited and air-entrainment shall be accomplished by using an air-entraining admixture with normal Portland cement. Air-entraining admixtures shall be added in solutions to a portion of the mixing water by means of a mechanical batcher in a manner that will insure uniform distribution of the agent throughout the batch. The air content of freshly mixed air-entrained concrete shall be determined as a percentage of the volume of the concrete by following the methods specified in ASTM Designation: C-138, C-173, or C-231. Air content determination shall be made on samples of concrete during placement of the concrete in the forms.

Unless otherwise specified the air content (by volume) of the concrete at the time of placement shall be:

Maximum Size Aggregate	Air Content (%)
3/8 inch to 1/2 inch	6 to 9
over 1/2 inch to 1 inch	5 to 8
over 1 inch to 2 1/2 inches	3 to 6

1.9.2 Adjustment of Mix Proportions. When air-entrained concrete is specified, the amount of water and fine aggregate prescribed for normal concrete shall be reduced to compensate for the increased volume of air contained in the air-entrained concrete. This is to maintain the concrete's strength.

1.10 QUALITY OF CONCRETE

1.10.1 Control. The Contractor shall be responsible for the design of the concrete mixtures and the quality of the concrete including ready-mix. Prior to any concrete construction or any change in the mix during construction, the Contractor shall furnish a statement to the Engineer giving the proportions by dry weight of cement and of fine and coarse aggregate that will be used in the manufacture of each class of concrete contained in the contract. The Contractor will also furnish material samples to the laboratory for testing a design mix. Based on laboratory evidence, the Engineer will either approve the proposed mix or indicate the necessary proportions to meet the specified requirements.

1.10.2 Measurements. All materials entering into the concrete shall be mechanically measured by weight except the air-entraining admixture and water which may be measured by volume.

1.10.3 Delivery Ticket. Where truck mixers or ready-mix are used, the Contractor shall submit, for each load, a certified delivery ticket given the quantities of cement, fine and coarse aggregate, water, admixture, and the time that water was added to the batch.

1.11 DESIGN MIX AND CYLINDER TESTS

Standard tests of the strength of the concrete may be made by the Engineer at any time he elects to do so. The following tests will be performed by the methods indicated:

Test	Method (ASTM Designation)
Sampling	C-172
Slump Test	C-143
Air Content	C-231 or C-173
Compression Test Specimens	C-31 or C-42
Compressive Strength	C-39 or C-42
Unit Weight	C-138

Test of a portion of a batch may be made on samples representative of that portion for any of the following purposes:

- (1) Determining uniformity of the batch.
- (2) Checking compliance with requirements for slump and air content when the batch is discharged over an extended period of time.
- (3) Checking compliance of the concrete with the specifications when the whole amount being placed in a small structure, or a distinct portion of a larger structure, is less than a full batch.

1.11.1 Slump Test. At least one slump test shall be made before first concrete pour, at the start of pouring any concrete and at each seven cubic yards deposited during one operation. These shall be made from same samples as those taken for cylinder tests, and records of same kept therewith. Tests shall be made according to ASTM Designation C-143 and as required under ASTM Designation C-94 for ready-mixed concrete. The Contractor shall furnish the necessary equipment and labor for making slump tests. Water in excess of the

maximum required for a practical concrete mix will have adverse effects on shrinkage, durability, and strength of concrete. Concrete which has a greater slump than specified or directed by the Engineer can be rejected by the Engineer without cost to the Owner.

1.11.2 Entrained Air Tests. The Contractor shall furnish and have on the job at all times, one (2) LA-345 Chase Air Indicator Kit, one (1) LA-340 Spare Chase Air Indicator, and two (2) quarts of isopropyl alcohol (rubbing alcohol) for the Engineer's use in making entrained air measurements. The alcohol can be obtained locally at any drug store and the one (1) LA-345 and one (1) LA-340 can be procured from Forney's Inc., Route 18, R.D. No. 2, Wampum, Pennsylvania 16157, for approximately \$40.00.

The amount of measured entrained air shall be recorded by the Engineer. Mortar shall be sampled only from concrete taken directly from the mixer. At least one (1) air measurement shall be made for each test cylinder taken. Concrete which has more or less entrained air than specified or directed by the Engineer can be rejected by the Engineer without cost to the Owner.

1.11.3 Initial Design Mix Cylinder Tests. Where more than 50 cubic yards of concrete are placed: The testing laboratory selected by the Owner shall make a set of six (6) test cylinders from the design mix. Three (3) shall be tested at 7 days and three (3) shall be tested at 28 days per ASTM Designation C-39. Test cylinders shall have a compressive strength per Article 3 of this section. The CONTRACTOR shall pay the cost of the design mix and design mix cylinder tests, and the Owner shall not pay for additional design mixes and design cylinder tests, caused by negligence, indecision, or carelessness on the part of the Contractor or his suppliers.

It is important for the Contractor to pursue all concrete testing requirements with dispatch so that approval of concrete can be granted by the Engineer in writing after all tests are completed.

1.11.4 Periodic Cylinder Tests. All cylinders shall be made per ASTM C-31 and tested per ASTM C-39. The Contractor shall furnish all labor and equipment for sampling and curing cylinders on the job site and transportation to the laboratory for testing. The Owner shall select the laboratory and the Contractor shall bear the cost for testing the concrete cylinders.

At the start of concreting, three cylinders shall be made. One shall be tested at 7 days and two shall be tested at 28 days.

Throughout the remainder of the job, the Engineer shall direct when cylinders shall be taken and in what number they shall be taken. At each time when twenty (20) or more cubic yards of concrete are placed during one operation, and when the sum of smaller deposits of concrete equal thirty (30) cubic yards since

previous test, and at any change in mix, three (3) cylinders shall be made. One (1) shall be tested at 7 days and two (2) shall be tested at 28 days.

For a strength test, three (3) test specimens will be made from a composite sample. The test result will be the average of the strength of the three specimens, except that, if one specimen in a test shows manifest evidence of improper sampling, molding, or testing, it shall be discarded and the remaining two strengths averaged. Should more than one specimen, representing a given test, show definite defects due to improper sampling, molding or testing, the entire test shall be discarded.

The Engineer will ascertain and record the batch number for the concrete and the exact location in the work at which each batch represented by a strength test is deposited.

The Engineer shall have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the Engineer to inspect materials, equipment and process and to obtain samples of the concrete. All tests and inspections will be conducted so as not to interfere unnecessarily with the manufacture and delivery of the concrete.

1.12 FAILURE TO MEET STRENGTH REQUIREMENTS

If cylinders do not meet strength requirements, the Engineer can order shutdown on all concreting and redesign of concrete mix by the laboratory selected by the Owner. The cost of mix redesign shall be paid for by the Contractor. The Engineer can also order additional tests, such as load tests, Swiss Hammer tests, and/or core tests in the areas of the work represented by unacceptable cylinders. If areas of work are found to be under strength requirements, the Engineer can order the Contractor to strengthen or replace those areas as the expense of the Contractor.

When it is determined that such concrete shall be removed and replaced the Contractor shall be notified in writing, stating the extent of the replacement to be made.

1.13 BATCHING AND MIXING

1.13.1 Equipment. The Contractor shall provide at the site of the work a modern and dependable batch-type mixing plant with a capacity consistent with the size of the job. The equipment shall be capable of combining the aggregate, cement and water into a uniform mixture and of discharging this mixture without segregation. Adequate facilities shall be provided for the accurate measurement and control of each of the materials entering the concrete. The complete plant assembly shall include provisions to facilitate the inspection of all operations at all times. Ready-mix concrete may be used, if approved by the Engineer, in which case the mixing plant at the site will not be required. All mixing

requirements specified herein for concrete mixed at the site shall be applicable to ready-mixed concrete. Measurements of materials for ready-mixed concrete shall conform to ASTM Designation: C-94. The Engineer shall have free access to the mixing plant at all times. Truck mixers will be allowed, provided the use of this method will cause no violation of any applicable provisions of specifications for concrete contained herein. Truck mixers, unless otherwise authorized by the Engineer, shall be of the revolving drum-type, watertight, and so constructed that the concrete can be mixed to insure the uniform distribution of materials throughout the mass. Each truck mixer shall be equipped with a tank of known capacity which shall be equipped with an accurate device for measuring the amount of water added. Truck mixers and agitator shall be operated within the limits of capacity and speed of rotation designated by the manufacturer of the equipment.

1.13.2 Mixing Time. Neither the speed nor the volume capacity of the mixer shall exceed those recommended by the manufacturer. Excessive over-mixing, requiring additions of water to preserve the required consistency, will not be permitted. The mixing time for each batch after all solid materials are in the mixer drum, provided that all the mixing water shall be introduced before one-fourth (1/4) of the mixing time has elapsed, shall be not less than two (2) minutes for mixers having capacities up to two (2) cubic yards. For mixers of larger capacities, this minimum shall be increased fifteen (15) seconds for each cubic yard or fraction thereof of additional capacity.

When a truck mixer is used, each batch of concrete shall be mixed not less than fifty (50) nor more than three hundred (300) revolutions, at a mixing speed of not less than four (4) r.p.m. after all materials are in the mixer drum. In all such cases, however, the concrete shall be delivered to the job site and discharged within 1 1/4 hours or before the drum has revolved 300 times, whichever comes first, after the mixing water has been added.

1.14 CONVEYING

Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods which will prevent segregation or loss of ingredients. There shall be no vertical drop greater than five feet (5'), except where suitable equipment is provided, to prevent segregation and where specifically authorized by the Engineer. Chuting from towers or elevated positions of the mixer will be permitted, but the water content will be subject to the Engineer's control and excess water will not be allowed, in order to force the concrete to flow clean from the chutes, unless all flushing of chutes is discharged outside the forms.

Belt conveyors, chutes or other similar equipment in which the concrete is delivered to the structure in a thin, continuously exposed flow, will not be permitted, except for very limited or isolated sections of the work and only then if

approved in writing by the Engineer. Such equipment shall be arranged to prevent objectionable segregation.

Where wall forms exceed five feet (5') in height, suitable measures, such as the use of tremie tubes, where practicable, or portholes, shall be provided in the forms to limit the vertical drop of the concrete to a maximum of five feet (5'). Openings shall be spaced around the perimeter of the formed area so that lateral flow of fresh concrete will be limited to three feet (3'). Drop chutes which may be provided to convey the concrete through wall ports shall have an outside pocket under each form opening to stop the concrete and allow it to flow easily over into the form without separation.

No concrete shall be placed until the Engineer has given his approval of the subgrade, forms and reinforcing steel in place. If the reinforcing steel is not placed in accord with the drawings, the Engineer shall stop the Contractor from placing any concrete until the error is corrected. Under no circumstances will an attempt be made to correct errors by inserting additional unscheduled bars. No concrete shall be placed except in the presence of the Engineer or his representative, and the Contractor shall give reasonable notice of his intention to pour.

Before any concrete is placed, the forms and subgrade shall be free of chips, dirt, sawdust, or other extraneous materials.

1.15 PLACING

1.15.1 General. Concrete shall be placed within one and one-quarter (1-1/4) hours after the introduction of the water to the cement and aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, or where the temperature of the concrete is 85°F or above, the time shall be reduced to 45 minutes. The Engineer may allow a longer time, providing the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding mixture. Concrete shall be deposited as closely as possible to its final position in the forms so that flow within the mass and consequent segregation are reduced to a minimum.

Vibrators may be used to aid in the placement of the concrete provided they are used under experienced supervision, and the forms designed to withstand their action. The duration of vibration shall be limited to that necessary to produce satisfactory consolidation without causing objectionable segregation. Vibration shall not be applied directly to the reinforcement steel or the forms nor to concrete which has hardened to the degree that it does not become plastic when vibrated.

The Contractor shall keep at least one spare vibrator on the job during all concrete placing operations.

When a vibrator is used the Contractor shall also spade the concrete along form surfaces a sufficient amount to prevent excessive size or numbers of air-void pockets in the concrete surface, except where an approved absorptive form lining is used; in which case the spading specified above will not be permitted.

1.15.2 Lifts in Concrete. The permissible depth of concrete placed in each lift shall be as shown on the drawings or specified herein. All concrete shall be deposited in horizontal layers not exceeding twenty inches (20") in thickness, unless otherwise authorized or directed. The placement shall be carried on at such a rate that the formation of cold joints will be prevented. If a delay occurs in excess of a thirty (30) minute interval between any two (2) consecutive batches or loads, or in case of any delay between placing batches that allows previously placed concrete to take initial set, the Contractor shall discontinue the placing of concrete and make, at his own expense, a construction joint satisfactory to the Engineer before proceeding with the placing operations. He shall remove any portion of the previously placed concrete that is deemed necessary for the proper formation of the construction joint and no payment shall be made to the Contractor for the concrete removed. The thirty (30) minute limitation, cited immediately above, may be extended in those cases where an approved type retarder is added to the concrete mixture to delay the set of the concrete. Use of a retarder in the mix shall be subject to approval of the Engineer.

Hoppers, chutes, and pipes shall be used as necessary to prevent splashing of mortar on forms and reinforcing above the layer being placed.

1.15.3 Placing Temperature. Concrete shall be mixed and placed only when the temperature is at least forty (40) degrees F. and rising, unless permission to pour is obtained from the Engineer, in which event all material shall be heated and otherwise properly prepared so that batching and mixing can proceed in full accord with the provisions of this specification. The methods proposed for heating the materials and protecting the concrete shall be approved by the Engineer. Salt, chemicals, or other materials shall not be mixed with the concrete for the purpose of preventing freezing. Accelerating agents shall not be used.

Concrete placement will not be permitted when, in the opinion of the Engineer, the sun, heat, wind, or humidity prevents proper placement and consolidation.

When the atmospheric temperature may be expected to drop below 40°F at the time concrete is delivered to the work site, during placement or any time during the curing period, the following provisions also shall apply:

- (1) The temperature of the concrete at the time of placing shall not be less than 50°F nor more than 90°F. The temperature of neither aggregates nor mixing water shall be more than 100°F just prior to mixing with the cement.

- (2) When the daily minimum temperature is less than 40°F, concrete structures shall be insulated or housed and heated after placement. The temperature of the concrete and air adjacent to the concrete shall be maintained at not less than 50°F nor more than 90°F for the duration of the curing period.
- (3) Methods of insulating, housing and heating the structure shall conform, to "Recommended Practice for Cold Weather Concreting," ACI Standard 306.
- (4) When dry heat is used to protect concrete, means of maintaining an ambient humidity of at least 40 percent shall be provided unless the concrete has been coated with curing compound or is covered tightly with an approved impervious material.

For obtaining the proper curing conditions for the concrete poured, steam heating equipment, oil-fired blowers (airplane heaters) located outside the enclosure and blowing hot air into the enclosure, or other similar equipment of a capacity sufficient to maintain the required minimum temperature all over, will be required. In conjunction with forced air heaters, means of supplying moisture to the area being cured will also be required. Oil or coke burning salamanders and other fuel-burning heaters produce carbon dioxide which combines with calcium hydroxide in fresh concrete to form a weak layer of calcium carbonate. When this occurs, the surface of the concrete floor will dust under traffic. For this reason, carbon dioxide producing heaters shall not be used while placing concrete and for the first 24 to 36 hours of the curing period unless they are properly vented.

The Contractor must have a sufficient steam retaining canvas or other protective covering at the site to cover all sides and tops of forms to be poured and concrete to be cured, before pouring of concrete will be allowed. This covering must be placed over and around forms and concrete being cured in such a manner that circulation of curing air will prove effective to the tops of floors and to the outside, top and corners of concrete structures, as well as to their interiors. Concrete shall be moist cured in accordance with paragraph 18 of this section. The Contractor may strip forms during curing period with covering removed, provided atmospheric temperatures are above specified curing temperatures, concrete surfaces are kept moist, and time and labor is available for recovering for lower night temperatures.

When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 85°F at the time of delivery at the work site, during placement, or during the first 24 hours after placement, the following provisions also shall apply:

- (1) The Contractor shall maintain the temperature of the concrete below 85°F during mixing, conveying, and placing. Methods used shall conform to "Recommended Practice for Hot Weather Concreting," ACI Standard 605.
- (2) The concrete shall be placed in the work immediately after mixing. Truck mixing shall be delayed until only time enough remains to accomplish it before the concrete is placed.
- (3) Exposed concrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying during the time between placement and finishing, and after finishing.
- (4) Finishing of slabs and other exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay.
- (5) Concrete surfaces exposed to the air shall be covered as soon as the concrete has hardened sufficiently and shall be kept continuously wet for at least the first 24 hours of the curing period, and for the entire curing period unless curing compound is applied as specified in subsection 7, below.
- (6) Formed surfaces shall be kept completely and continuously wet for the duration of curing period (prior to, during and after form removal) or until curing compound is applied as specified in subsection 7, below.
- (7) If moist curing is discontinued before the end of the curing period, white pigmented curing compound shall be applied immediately.

1.15.4 Concrete on Rock Foundations. Rock surfaces upon which concrete is to be placed shall be clean, free from oil, standing or running water, mud, objectionable coatings, debris, loose semidetached, or unsound fragments. Faults or seams shall be cleaned to a depth satisfactory to the Engineer, and to firm rock on the sides. Immediately before concrete is placed, all such rock surfaces shall be cleaned thoroughly by use of high velocity air-water jets, wet sandblasting, or other means satisfactory to the Engineer. All rock surfaces shall be kept continuously wet for forty-eight (48) hours and all approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar of the same sand-cement ratio as used in the concrete.

1.15.5 Concrete on Earth Foundations. Unless otherwise authorized all concrete shall be placed upon clean, damp surfaces free from frost, ice, or deleterious materials, and standing or running water. Concrete shall not be placed in mud, dried porous earth or upon fill that has not been subject to approved rolling or tamping until optimum compaction has been obtained. The Contractor shall take all measures to accomplish the results specified in this paragraph.

1.15.6 Vertical Point Spacing. The layout of all monoliths shall be as shown on the drawings or as directed and approved by the Engineer before construction is started.

1.15.7 Placing Concrete through Reinforcement. In dropping concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs.

1.16 CONSTRUCTION JOINTS

Contractor shall furnish and install vinyl or plastic waterstops as manufactured by W.R. Meadows, Inc., Waterstops Inc., or B.F. Goodrich Inc., or approved equal quality. Waterstops shall be center bulb type 6 inches wide unless shown otherwise in the plans. Care and diligence shall be exercised in securing proper embedment in the concrete mix.

The waterstop shall be extruded from elastomeric polyvinyl-chloride material and joints shall be cemented as recommended by the manufacturer. The Contractor may use other waterstop materials subject to the Engineer's approval.

Construction joints shall be located as indicated on the contract drawings, or as approved by the Engineer. The surfaces of construction joints shall be clean when covered with fresh concrete. Cleaning shall consist of the removal of all laitance, loose or defective concrete and foreign material. Cleaning of the surface of construction joints shall be accomplished by the use of high velocity air-water jets, wet sandblasting, or other effective means satisfactory to the Engineer. Surfaces of construction joints that have been permitted to dry by reason of the succeeding lift or adjoining concrete not being placed within the specified post-curing period shall be moistened and kept continuously moist for at least forty-eight (48) hours immediately prior to the placing of the succeeding lift or adjoining concrete. All pools of water shall be removed from the surfaces of construction joints before the new concrete is placed.

1.17 FINISHING

1.17.1 Defective concrete, honeycombed areas, voids left by the removal of tie rods, ridges on all concrete surfaces permanently exposed to view or exposed to water on the finished structure, shall be repaired immediately after the removal of forms unless otherwise authorized or directed. Voids left by removal of tie rods shall be reamed and completely filled with dry-patching mortar.

Defective concrete shall be repaired by cutting out the unsatisfactory material and placing new concrete which shall be secured with keys, dovetails, or anchors. Defective areas shall be chipped away to a depth of not less than 1 inch with the edges perpendicular to the surface. The area to be patched and a space at least 6 inches wide entirely surrounding it shall be wetted to prevent

absorption of water from the patching mortar. A grout of equal parts Portland cement and sand, with sufficient water to produce a brushing consistency, shall then be well brushed into the surface, followed immediately by the patching mortar. The patch shall be made of the same material and of approximately the same proportions as used for the concrete except that the coarse aggregate shall be omitted. The mortar shall not be richer than 1 part cement to 3 parts sand. On exposed surfaces, white Portland cement shall be substituted for a part of the grey Portland cement to match the color of the surrounding concrete. The proportion of white and grey cements shall be determined by making a trial patch. The amount of mixing water shall be as little as consistent with the requirements of handling and placing. The mortar shall be re-tempered without the addition of water by allowing it to stand for a period of 1 hour during which time it shall be mixed occasionally with a trowel to prevent setting.

The mortar shall be thoroughly compacted into place and screeded off so as to leave the patch slightly higher than the surrounding surface. It shall then be left undisturbed for a period of 1 to 2 hours to permit initial shrinkage before being finally finished. The patch shall be finished in such a manner as to match the adjoining surface.

Excessive rubbing of formed surfaces will not be permitted. All unformed surfaces of concrete, exposed in the completed work, shall have a wood float finish without additional mortar.

1.17.2: When concrete is honeycombed, damaged or otherwise defective, the Contractor shall remove and replace the structure or structural member containing the defective concrete, or correct or repair the defective parts. The Engineer will determine the required extent of removal, replacement or repair.

Prior to starting repair work the Contractor shall obtain the Engineer's approval of his plan for making the repair. Such approval shall not be considered a waiver of the Contracting Officer's right to require complete removal of defective work if the completed repair does not produce concrete of the required quality and appearance. Repair work shall be performed only when the Engineer is present. Repair of formed surfaces shall be started within 24 hours after removal of the forms.

Joints and edges of unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

1.17.3: In order that the rubbing required by these specifications shall be effective, non-supporting forms may be stripped with 24 hours after concrete pouring is completed, and initial rubbing required completed with 48 hours. If possible, patching and rubbing shall be done at the same time. This requirement regarding form removal is secondary to heating requirements, and the

specifications heretofore included regarding heating of concrete shall take precedence.

After the required curing time has elapsed, support forms may be removed to allow finishing. Finish shall be Type I, II, or III as required by the "Concrete Finishes" section. In general, surfaces that will show in the finished work will be rubbed down with a coarse carborundum stone. Floors and slabs shall be float finished as soon as possible after pouring unless otherwise specified. Cement or mortar coating will not be permitted. The Contractor should refer to the section on "Concrete Finishes" for complete finish requirements for all concrete units.

Rubbing is not required lower than 6 inches below water levels in basins, but all fins must be removed and holes patched. Exposed inside surfaces to be painted must be rubbed smooth.

The surfaces of exposed concrete roofs, walks, and copings shall be finished with a wooden float and left with a gritty surface similar to that in general use for sidewalks. This finish and floating must be done at the proper period in the setting of the concrete. These outside exposed surfaces of floors and roofs must be finished as one piece of work without a separate top coat.

Basin and channel floors shall be struck off smooth and finished with a steel float to produce a surface easily cleaned. The inside exposed floors must be finished with a steel float to even surfaces and present a neat, smooth, and satisfactory appearance. Finish with bevel around all curbs, and other openings. Floors must be finished to drain to floor traps and sump with slopes as shown on the plans. Floors at the walls must be level except where shown otherwise on the plans.

Surfaces of precast concrete members that are to be painted shall have all air holes and other imperfections filled and dressed to present surfaces comparable in smoothness and appearance to rubbed concrete as set forth above.

1.17.4 Watertightness: All concrete when finished must be watertight. Exposed concrete surfaces shall show no dampness when the interior of basins or exterior of pits have been filled with water for seven days. To obtain this result, the foregoing specifications must be rigidly followed. In case any leakage or dampness shows on the surface of any such walls after testing the time stated, then such defects must be remedied by the Contractor and work will not be accepted until this is done.

1.17.5 Openings for Pipes and Joints to Pipes. Where pipes pass through concrete walls or floor pours they shall do so by the use of a mechanical joint wall sleeve. The sleeve shall be cast into the pour and it shall be of sufficient length to allow easy installation or removal of the main line pipe.

Where malleable pipe (steel, wrought iron, or copper), brittle pipe (hard rubber), rubber hose, or any pipe cut to fit on the job, passes through any concrete slab, floor or wall, a wrought or cast iron pipe nipple with about 1/2 inch greater diameter than the outside of the pipe shall be used as a sleeve and cast into the slab. In case of floors above ceilings, these sleeves shall extend 1/2 inch to 1 inch above floor surface, to prevent scouring water from running into them. If joint about pipe is required for watertightness or pipe support, the annular ring shall be caulked with dry, unbraided oakum to within 2 inches of surface. The ring at surface shall be filled with non-shrink grout, raked back 1/2 inch, and filled with 1/2 inch cap of Portland cement grout as previously mentioned.

Where holes greater than 10 inch diameter have to be cut for pipe in existing concrete slabs or walls, the space about the pipe shall be formed to original surfaces and the pipe wrapped with 1/2 inch braided hemp. In grouting this space, use a non-shrink grout, such as Sonneborn "Ferrolith G" or Masters Builders "Embeco". Where walls and spaces give sufficient room for safely using large aggregate, this may be added in a quantity equal to the sand specified. After removal of forms, the yarn shall be removed for a depth of 2 inches from water side and/or exposed surfaces, and the space refilled to surface with a non-shrink grout. Then the joint shall be raked back 1/2 inch from the surface and filled with a one to two mix grout of Portland cement and sand.

1.18 CURING AND PROTECTION

1.18.1 General. All concrete shall be cured for a period of not less than seven (7) consecutive days by an approved method, or combination of methods. The curing process shall be done so as to prevent loss of moisture from the concrete for the duration of the entire curing period. Unhardened concrete shall be protected from heavy rains and flowing water. All concrete shall be adequately protected from damage.

1.18.2 Moist Curing. Concrete shall be moist cured by maintaining all surfaces continuously (not periodically) wet for the duration of the entire curing period. Water for curing shall be clean and free from any elements which will cause staining or discoloration of the concrete. Where forms of wood are used and left in place during curing, the wood shall be kept wet at all times.

1.18.3 Membrane Curing. At the option of the Contractor and when approved by the Engineer, the concrete may be cured with an approved curing compound of the surface membrane type in lieu of moist curing with water provided a permanent stain is not produced and provided the concrete surface is not to receive rubbed finish, terrazzo, tile, paint, chemical hardening, grout, cement patch, or concrete topping. The curing compound shall be applied to formed surfaces immediately after the forms have been removed and the surfaces cleaned of any loose sand, mortar and debris. The surface to receive the

compound shall be moistened thoroughly with water and the compound applied as soon as the moisture film has disappeared but when the surface is still damp. On unformed surfaces the compound shall be applied immediately after the surface loses its free water and has a dull appearance.

The curing compound shall be applied in a two-coat continuous operation by approved spraying equipment and at a coverage of not more than two hundred (200) square feet per gallon for both coats. The second coat shall be applied to overlap the first coat in a direction at approximately right angles to the direction of the first application. Concrete surfaces which are subjected to heavy rainfall within three (3) hours after the curing compound has been applied shall be re-sprayed by the method and at the coverage herein specified. All concrete surfaces on which curing compound has been applied shall be adequately protected for the duration of the entire curing period from any damage that would disrupt the continuity of the curing membrane.

The curing compound shall conform to Type 2 or Type 3 of ASTM Designation: C-309.

All curing compound shall be delivered to the site of the work in the original sealed container bearing the name of the manufacturer, the brand name and the manufacturer's batch number. The compound shall be approved prior to use. The compound shall be stored so as to prevent damage to the containers, and water-emulsion types shall be protected from freezing.

1.18.4 Cold Weather. The air and forms in contact with the concrete shall be maintained at temperatures above forty (40) degrees for at least seven (7) days and at a temperature above freezing for at least 21 days. Concrete, permitted to be cured with curing compounds, shall be provided the same protection against freezing and low temperatures as provided herein. No fire or excessive heat shall be permitted near or in direct contact with concrete at any time.

1.19 FORMS

1.19.1 Material. Forms shall be wood, steel, or other approved material. Wood forms shall be tongue-and-groove lumber of uniform width and thickness, or plywood having a minimum of five (5) plies, a minimum thickness of 9/16 inch, and a type made especially for concrete forms. Steel forms shall be of a type acceptable to, and commonly used in the construction field. The type, shape, size, quality and strength of all material of which the forms are made shall be subject to the approval of the Engineer.

1.19.2 Construction. Forms shall be true to line and grade, mortar-tight, and sufficiently rigid to prevent objectionable deformation under load. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the complete surface so as to obtain accurate alignment of the

surface and to prevent leakage of mortar. Forms shall be constructed such that keyways, waterstops, and dowels can be placed as shown in the plans.

Responsibility for their adequacy shall rest with the Contractor. The form surfaces shall be smooth, free from irregularities, depressions, sags, or holes when used for permanently exposed faces. Bolts and rods used for internal ties shall be so arranged that, when all forms are removed, all metal will not be less than one inch (1") from any concrete surface. Wire ties will not be permitted. All forms shall be so constructed so that they can be removed without hammering or prying against the concrete. All exposed joints shall be chamfered and suitable molding shall be placed to bevel or round exposed edges or corners, unless otherwise directed by the Engineer.

Temporary openings shall be provided in the inside form of all wall forms and column forms to facilitate cleaning and inspection immediately before depositing concrete. When wood sheathing is used for the inside form, the bottom board shall be fitted and removed to provide a continuous cleanout space and if plywood is used, the forms shall be started with a 6-inch wide piece for the same purpose. Washing out of all forms and other concrete before pouring new materials must be done with water or air from a hose under pressure. The hose must be provided with a suitable nozzle for this work. The intent of these specifications is to produce a perfectly watertight structure in all cases, without any subsequent repair work. Forms shall be so assembled that their removal will not damage the concrete.

Contact surfaces of forms shall be divided into two categories; forms for exposed concrete, and forms for unexposed concrete. Exposed concrete shall mean concrete normally exposed to view and shall be considered extending 6 inches below planned re-grade or water level. Exposed concrete shall exclude interior surfaces of covered water holding basins and unpainted, unfinished, interior surfaces of manholes and vaults. Unexposed concrete shall be concrete not normally exposed to view and shall include all concrete not included by exposed concrete, unless otherwise noted on the plans or in the specifications. Either unlined forms or lined forms (as hereinafter specified) shall be used for exposed concrete. A combination of lined forms for exposed concrete and unlined forms for unexposed concrete may be used in a structure where only a part of the structure is exposed. When this combination occurs, the Engineer will determine, upon request of the Contractor, if that portion of the structure which requires lined forms can be reduced in section to accommodate the liner without offsetting the liner backing from the sheathing used for the unexposed portion of the structure.

(1) Forms for Exposed Concrete

- (a) Unlined. The contact surface of forms shall be constructed from 5/8 inch or 3/4 inch 5 ply structural plywood of concrete form grade. All concrete

form plywood shall be designated by grade marking each panel. Full sized sheets of plywood must be used except where smaller pieces will cover an entire area. The edges of all plywood sheets shall be straightened on the bench to insure close fitting, tight joints. All vertical joints shall be backed solidly and the edge of abutting sheet shall be nailed to the same stud.

When the one form is erected and reinforcement is in place, and before the other form is erected, the Engineer shall be notified and the other form shall not be placed until work already done is approved. Open joints which would permit leakage of grout shall be sufficient cause for rejection of forms. If, in the opinion of the Engineer, pointing of slightly open joints will prevent leakage, then such pointing shall be done with an approved mixture. Pointing shall be carefully done and there shall be no trace of the pointing mixture on the surface of the sheathing.

Contact surfaces of forms shall be in good condition. The Engineer has the right to reject forms which will not produce a smooth, uniform, concrete surface.

- (b) Lined. The backing for form lining shall be constructed of a good grade of form lumber that is solid, straight, and free from defects that might impair its strength but need not be of the quality used for contact forms. Square-edged, sized lumber may be used for form boarding in place of shiplap or tongue-and-groove.

The boarding for lined forms may be horizontal or vertical, depending upon convenience. Form sheathing shall be securely nailed to the studs and the edges of the boards shall be in contact to prevent any bulging of the lining.

Plywood faced panel or patented forms in good condition, with tight fitting joints, such as steel-ply forms, can be substituted for lined forms if a smooth wall surface, as required by these specifications, can be obtained. Minor variations in concrete texture at form joints will be permitted.

Lining material shall be 1/4 inch structural plywood securely nailed to the form sheathing. All lining material shall be used in as wide pieces as possible. Areas less than 4 feet in width shall be lined with a single width of plywood.

Joints in lining and backing shall not occur at the same place and butting edges of adjacent sheets shall be nailed to the same board. The lining material shall be nailed to the backing beginning at the center of the board and working toward the edges to prevent buckling. Lining material may be re-used, if it is in satisfactory condition and is approved by the Engineer.

Open joints which would permit leakage of grout shall be sufficient cause for rejection of forms. If, in the opinion of the Engineer, pointing of slightly open joints will prevent leakage, then such pointing shall be allowed.

In the case of lined circular forms where the backing for form lining is constructed in chords of a circle, the form lining shall be adequately supported by variable thickness shim strips on at least 6 inch centers so that the liner forms a circular surface within tolerances specified herein.

(2) Forms for Unexposed Concrete

Forms shall be constructed of a good grade of form lumber that is solid, straight and free from defects which might impair its strength, but need not be of the quality required for contact surfaces of forms for exposed concrete. Forms shall be of shiplap of T & G No. 2 wood sheathing, 3/4 inch plywood, 5/8 inch plywood or approved equal. Panel or patented forms may be used upon approval of the Engineer.

(3) Form Ties

Forms ties shall be as follows:

- (a) "Water-Seal" type of ties shall be used for water holding structures or structures subject to flooding.
- (b) Non-water holding structures, which are not subject to flooding, shall have ties approved by the Engineer.

Form ties shall have a minimum working strength when fully assembled of at least 3,000 pounds. Ties shall be so adjustable in length as to permit tightening of forms and of such type as to leave no metal closer than 1 inch from the surface and they shall not be fitted with any lugs, cones, washers or other device to act as a spreader within the form or for any other purpose which will leave a hole larger than 7/8 inch in diameter or a depression back of the exposed surface of the concrete. Wire ties shall not be permitted.

1.19.3 Construction Tolerance. The forms shall be constructed and rigidly braced in place within the following tolerances:

- (1) Variation from true alignment as shown on the drawings in the lines and surfaces of walls:

In 10 feet	1/4 inch
In 20 feet maximum	3/8 inch
In 40 feet or more	3/4 inch

(2) Variation from the level or from the grades indicated on the drawings in floors or slabs:

In 10 feet	1/4 inch
In 20 feet maximum	3/8 inch
In 40 feet or more	3/4 inch

(3) Variation in sizes and/or locations of floor and/or wall openings:

1/4 inch

(4) Variation in thickness of slabs and walls and in cross-sectional dimensions of columns and beams:

Minus	1/4 inch
Plus	1/2 inch

(5) Variation in plan dimension of footings:

Minus	1/2 inch
Plus	2 inches

1.19.4 Wetting and Oiling Forms. The inside surface of wood board forms shall be soaked with clean water and kept continuously wet for 12 hours before any concrete is placed. In case forms have been erected for some time and have become dry so that joints have opened, then the forms shall be thoroughly soaked at least twice each day for at least 3 days prior to placing concrete. If the forms cannot be tightened to the satisfaction of the Engineer, they shall be torn down and rebuilt. Plywood forms may be treated with a non-staining form oil, mineral oil or lacquer. If oil is used, all excess oil shall be wiped off with rags to leave the surface of the forms just oily to the touch. In freezing weather oil shall be used.

Coatings of dust shall be removed from contact surfaces of forms before placing concrete. Concrete shall not be placed in any form until inspected by the Engineer and permission is given to start placing.

1.19.5 Removal. Forms shall not be removed without approval of the Engineer. All form removal shall be accomplished in such a manner as to prevent injury to the concrete.

Forms shall not be removed sooner than the following minimum times after the concrete is placed. These periods represent cumulative number of days and fractions of days, not necessarily consecutive, during which the temperature of the air adjacent to the concrete is above 50°F.:

Element	Time
Beams, arches - supporting forms and shoring	14 days
Conduits, deck slabs - supporting (inside) forms and shoring	7 days
Conduits (outside forms), sides of beams, small structures	24 hours
Columns, walls, spillway risers - with side or vertical load	7 days
Columns, walls, spillway risers - with no side or vertical load	4 days
Concrete supporting more than 30 feet of wall in place above it.	7 days
Concrete supporting 20 to 30 feet of wall in place above it.*	4 days
Concrete supporting not more than 20 feet in place above it.*	24 hours

* Age of stripped concrete shall be at least 7 days before any load other than the weight of the column or wall itself is applied.

When conditions on the job are such as to justify the requirements, forms will be required to remain in place for longer periods. Forms for beams, girders, and flood slabs shall remain in place for at least seven (7) days and shall only be removed when test cylinders used under the same conditions as the members break with a compressive strength as required in these specifications.

1.19.6 Design, Inspection and Approval of Form Work. The design and engineering of the form work, as well as the construction, shall be the responsibility of the Contractor. The Engineer's approval of form work design and/or drawings, as submitted or as corrected in no way shall relieve the Contractor of his responsibility for adequately constructing and maintaining the forms so that they will function properly.

Forms, form joints, and reinforcing steel placement shall be checked by the Resident Engineer before closing up the forms. Concrete shall not be placed in any form until the placing of steel and erection of form work have been completed and approved in the completed state by the Resident Engineer. Immediately after completion of pouring, tops of all forms shall be adjusted to line and approved by the Resident Engineer as to conformity with the tolerances specified herein.

1.20 EXPANSION OR CONTRACTION JOINTS

1.20.1 General. Where required, joints shall be provided at the location indicated on the drawings and according to the details shown, or as otherwise approved.

The methods and materials used shall be subject to approval and the materials shall conform to the specification applicable. In no case shall any fixed metal, embedded in concrete be continuous through an expansion or contraction joint, except as specifically detailed in the drawings.

1.20.2 Expansion Joint Filler. At all expansion joints shown on the drawings, a pre-molded joint filler of the thickness specified, shall be provided to prevent bond between and allow for the expansion and contraction of adjacent parts. The filler material shall be of sufficient length and width, and shall be accurately cut, matched and placed to prevent contact of the concrete in the parts of the structure to be separated.

Preformed expansion joint filler shall conform to the requirements of ASTM Specification D 1752, Type I, Type II or Type III, unless bituminous type is specified.

Bituminous type preformed expansion joint filler shall conform to the requirements of ASTM Specification D 994.

1.20.3 Asphalt-Treated Roofing Felt. Two layers of heavy, smooth surface asphalt-treated roofing felt, approximate weight 55 pounds per 100 square feet, shall be placed at expansion joints, as shown on the drawings.

1.20.4 Waterstops. Where required, waterstops shall be installed in joints as shown on the drawings or as otherwise directed to provide a continuous water-tight diaphragm in the joint. All joints in metal waterstops shall be brazed or welded. Joints in rubber and plastic waterstops shall be cemented, fused, or vulcanized as recommended by the manufacturer. Adequate provisions shall be made to support and completely protect the waterstops during progress of the work. The Contractor shall replace or repair, at his own expense, any waterstops punctured, ruptured, or otherwise damaged before final acceptance of the work.

Copper used for waterstops shall conform to ASTM Designation: B-248.

Steel used for waterstops shall conform to ASTM Designation: A-366 or ASTM Designation: A-93.

Wrought iron used for waterstops shall conform to ASTM Designation: A-162 or ASTM Designation: A-163.

Plastic material used for waterstops shall conform to ASTM Designation: D-742.

The rubber waterstop material shall meet the following physical requirements when and if tested, in accordance with the appropriate sections of Federal Test Method Standard No. 601, ASTM Designation: D-395, and ASTM Designation: D-1432.

Hardness. The Shore A durometer hardness shall be 60 to 70.

Elongation. The elongation shall be a minimum of 400 percent.

Tensile Strength. The tensile strength shall be a minimum of 2,500 pounds per square inch.

Water Absorption. The water absorption shall be a maximum of 5 percent by weight after immersion in water for two (2) days at 158°F.

Tensile Strength after Aging. The tensile strength after accelerated aging for five (5) days at 158°F., shall not be less than 80 percent of the original tensile strength.

Compression Set. The compression set after 22 hours at 158°F., shall not be more than 30 percent.

Specific Gravity. The specific gravity shall be 1.20 plus or minus .05.

1.20.5 Dowel Bar Assembly. Where required, dowel bar assembly shall be installed at the expansion joints as shown on the drawings. The dowel bars shall be plain, smooth steel bars of the size specified on the drawings and shall conform to ASTM Designation: A-15. An expansion sleeve shall be provided on one end of each dowel bar. The sleeve shall be metal of an approved type, crimped or capped on one end, and provided a minimum of three (3) inch length of covering of the dowel bar with a minimum of three-quarters (3/4) of an inch expansion chamber beyond the end of the dowel bar. The portion of the dowel bar on the expansion sleeve side of the joint shall be coated with a heavy grease to prevent bond between the bar and the concrete. The dowel bar assembly shall be securely held in place by use of metal dowel chairs at each intersection of a dowel bar and spacer bar. The dowel bars shall be installed on proper horizontal and longitudinal alignment to assure a workable expansion device. The premolded joint filler at these expansion joints shall be held in a true vertical plane by means of a header board. The header board shall remain in place for a minimum of thirty (30) minutes after the concrete has been placed on one side or until the concrete has set sufficiently to prevent sloughing, before the header is removed and the work of placing concrete continued.

1.21 FURNISHING AND PLACING STEEL REINFORCEMENT

The furnishing and placing of reinforcing steel, when specified, is covered in a separate technical specifications.

1.22 EMBEDDED ITEMS

1.22.1 General. Before placing concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings or required by the Engineer. All embedded items shall be thoroughly clean and free of oil and other foreign matter such as loose coatings, of rust, paint, and scale. The embedding of wood or other perishable materials in concrete shall be prohibited unless specifically directed or authorized by the Engineer. Any air lines, water lines, wall sleeves, or other materials embedded in structures, as construction expedients authorized by the Engineer, shall conform to the above requirements and, upon completion of their use, shall be backfilled with concrete or grout as directed by the Engineer.

1.22.2 Pipe Embedded in Concrete. Where pipe is partially or wholly encased in concrete, care shall be taken that the pipe is firmly and securely held in place so that the alignment and grade of the pipe is not disturbed while the concrete is placed around the pipe.

1.23 CONSTRUCTION

Concrete work shall be performed in accordance with these specifications on concrete. The vertical surfaces of the cradle, expansion and contraction joints shall be formed. The cradle shall be poured with the pipe in place and to line and grade. Construction joints that are used shall conform to the requirements of item 1.16 of this section. Expansion and contraction joints shall conform to requirements of item 1.20 of this section.

1.24 SEALING JOINTS IN CONCRETE AND CONCRETE PIPE

1.24.1 General. This specification covers the requirements for sealing or filling joints in concrete pipe and concrete structures where expansion joint material is not used.

1.24.2 Type. The sealing compound shall be a cold-application mastic, single component or multiple component type.

The single component type shall be a ready-mixed nondrying compound furnished in troweling consistency or in preformed rope or strip form.

The multiple component type shall be composed of two or more substances that are to be mixed prior to application.

1.24.3 Quality. Sealing compound shall conform to the requirements of one of the following specifications:

ASTM Specification D 1850; Concrete Joint Sealer, Cold-Application Type. Penetration, determined as specified in ASTM D 1850, shall be not greater than 120.

Federal Specification SS-S-00210; Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints.

Federal Specification TT-S-227; Sealing Compound; Rubber base, Two Component (For Caulking, Sealing and Glazing in Building Construction), Type II.

1.24.4 Application. The compound will be applied using manufacturer's instructions to joints identified in the plans or as otherwise required in accordance with good construction practices.

1.25 MEASUREMENT AND PAYMENT

Payment will be based on one of the following criteria as specified and described in the Contract Bid Item Descriptions and on the Drawings:

- A. Cost shall be included in the work to which it is subsidiary and no separate measurement and payment will be made.
- B. Payment will be based on Plan Quantities or a percentage of concrete installed to complete the structure as computed by the Engineer or as shown on the Drawings.

Payment as specified above shall be considered as full compensation for all labor, materials, equipment and incidentals necessary to perform the work as required.

Payment for concrete placed outside the lines shown on the drawings due to over-excavation or Contractor error will not be made. Where extra concrete is authorized by the Engineer in writing, payment will be made at a price agreed upon by the Contractor and the Engineer.

SECTION 03002

CONCRETE REINFORCEMENT

1. GENERAL

1.1. Description of Work. This specification covers furnishing, cutting, bending, handling, and placing of steel reinforcement for all reinforced cast-in-place concrete included in this Contract.

1.2. Codes and Standards. The provisions of the following codes, specifications, and standards latest editions shall apply:

- (1) American Concrete Institute, ACI-315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
- (2) American Concrete Institute, ACI-318, "Building Code Requirements for Reinforced Concrete."
- (3) Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars."

1.3. Submittals.

1.3.1. Shop Drawings. Within 15 days after award of the Contract, the CONTRACTOR shall prepare and submit to the ENGINEER for review complete shop drawings in accordance with Section 1A of these Specifications. The CONTRACTOR shall not allow delivery of the reinforcing steel to the job site until a review of the shop drawings has been completed by the ENGINEER. Shop drawings shall include the following:

- (1) Reinforcement bar schedules complete with the quantity, shape and size, dimensions, weight per foot and total weights, and bending details.
- (2) Details of bar supports including types, sizes, and support spacing and sequence.
- (3) Plan and elevation views detailing reinforcing placement.
- (4) Location and arrangement of accessories.
- (5) All details and notes appearing on the Drawings.

1.3.2. Mill Tests. Mill tests of reinforcement shall be submitted prior to use for each 15 tons or less shipped to the job site. Tests shall be conducted in conformance with ASTM A-615, and the methods described therein. Cost of the

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test shall be borne by the CONTRACTOR. Three (3) copies of each test report shall be submitted to the ENGINEER. The bars shall be properly tagged so as to permit identification of the heat number shown on the mill test report for any and all steel delivered to the Work.

2. MATERIALS

2.1. Reinforcing Steel Bars. All bar reinforcement shall be new billet steel deformed bars of American manufacture conforming to ASTM Designation: A-615, Grade 60. Bars shall be plainly marked showing size, type and grade in accordance with these Specifications.

2.2. Bar Supports. Bar supports shall conform to ACI-3125.

2.3. Wire Ties. Ties shall be 16-gage or heavier black annealed wire.

2.4. Other Materials. All other materials, not specifically described but required for proper completion of concrete reinforcement, shall be as selected by the CONTRACTOR subject to the approval of the ENGINEER.

2.5. Rejection of Materials. Reinforcement with any of the following defects will not be permitted in the Work:

- (1) Bar lengths, depth and bends exceeding the specified fabrication tolerances.
- (2) Bends or kinks not indicated on the Drawings or Shop Drawings.
- (3) Bars with reduced cross-section due to excessive rusting or other cause.

3. EXECUTION

3.1. Bending. Reinforcing bars may be mill or field bent. No bars partially embedded in the concrete shall be field bent. All bends shall be made in compliance with requirements of the American Concrete Institute Standard 315 and by approved machine methods except as noted otherwise on the drawings. All bends shall be made without heating.

3.2. Handling and Protection.

3.2.1. Protection. The CONTRACTOR shall use all means necessary to protect concrete reinforcement before, during, and after installation and to protect the installed work.

3.2.2. Storage. Steel reinforcement shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected, as far as

practicable, from mechanical injury, surface deterioration caused by conditions producing rust, and fouling with dirt, grease and other bond breaking coatings.

3.2.3. Identification. All necessary precautions to maintain identification of bars after bundles are broken shall be exercised.

3.3. Placing.

3.3.1. Surface Coatings. All reinforcement shall be free from dirt, oil, grease, paint, mill scale, loose or thick rust, or other coating which might destroy or reduce its bond with the concrete when the surrounding concrete is placed.

3.3.2. Bracing Reinforcement. All reinforcement shall be placed in accordance with the Drawings and shall be held so securely in position by wiring and blocking from the forms and by wiring together at intersections that it will not be displaced during the depositing and compacting of the concrete. Tack welding of bars will not be permitted.

3.4. Splices.

3.4.1. General. All splices in reinforcement shall be as shown on the Drawings or as directed by the ENGINEER. Unless otherwise specified on the Drawings, by statement or scaled distance, splices shall overlap at least 40 times the diameter of the smaller bar but not less than 12 inches.

3.4.2. Method of Splicing. Splice by lapping ends, placing bars in contact, and tightly wire tying.

3.4.3. Splices in Adjacent Bars. Alternate sides for splices of horizontal reinforcing bars in the riser.

3.5. Openings.

3.5.1. Amount of Reinforcement Removed. Where reinforcing bars must be field cut to allow for thimbles, manholes and other required openings, the amount of steel removed shall be the absolute minimum necessary to provide the opening and maintain the minimum concrete cover as required.

3.5.2. Additional Reinforcement for Cracking. All openings shall be reinforced against potential cracking by placing No. 5 bars or other size bars designated in the Drawings in both faces normal to the plane of cracking. The bars shall not be less than 3'-0" in length, except where otherwise shown on the Drawings, and shall be placed inside the main reinforcement and tied to the main reinforcement.

3.5.3. Supplemental Reinforcement. Where reinforcing bars are removed to provide an opening, supplemental reinforcement shall be provided in the

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direction of the bars removed. This reinforcement shall have a minimum area of the total bars removed, and shall extend at least 18 inches past the edges of the opening, unless shown otherwise in the Drawings.

3.6. Tolerances.

3.6.1. Minimum Cover. The minimum cover for all main reinforcement shall conform to the dimensions shown on the Drawings which will indicate the clear distance from the edge of the reinforcement to the concrete surface.

3.6.2. Allowable Tolerances. The following tolerances will be allowed in the placement of reinforcing bars as shown on the Drawings:

(1) Variation in protective cover

1/4 inch for 2.5-inch cover
1/2 inch for 4-inch cover

(2) Variation of spacing

1/12 of indicated spacing

3.7. Inspections.

3.7.1. Notice. The ENGINEER or his representative shall have 24 hours notice and the opportunity to inspect and approve the placement of reinforcing steel before concrete is placed.

3.7.2. Purpose. Such inspections are in the nature of assisting the CONTRACTOR to minimize errors, and in no case will they relieve the CONTRACTOR of his responsibility to provide the materials and workmanship required by the Contract Documents.

4. MEASUREMENT AND PAYMENT

No direct measurement or payment will be made for any concrete reinforcing. Payment shall be included in the payment for the work to which it is subsidiary in the Bid Schedule.

SECTION 03003
CONCRETE FINISHES

1.0 GENERAL

These specifications are supplemental to the "Concrete" section and provide additional instructions to the requirements therein.

2.0 CONCRETE FINISHES (except floors)

Hardened concrete surfaces shall be finished in accordance with this section of the specifications and the instructions in the "Concrete" section. The various types of finishes described shall be applied as per the schedule shown in the "Special Conditions" section of the specifications.

2.1 TYPES

Type I - All holes left by removal of ends of ties, and all other holes, depressions or voids shall be filled solid with mortar after first being thoroughly wetted. Holes shall be filled with a small tool that will permit packing the hole solidly with mortar. Mortar shall consist of one part cement to three parts sand, and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of mortar shall match the adjacent wall surface.

Type II - After completing the Type I finish specified above, the Contractor shall also remove all fins, burrs and other projections left by the removed forms.

Type III - This finish shall be applied after the completion of the Type II finish. A smooth, uniform surface shall be obtained using the "carborundum-rub" finish which shall consist of the following procedure: Surfaces shall be rubbed with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities require it, the general surface of the concrete shall not be cut into. Bulging or protruding areas, which result from slipping or deflecting forms shall be ground flush or chipped out and re-dressed as directed by the Engineer. Brush finishing or painting with grout or neat cement will not be permitted. Corners and edges shall be slightly rounded by the use of the carborundum stone. No rubbing shall be done before the concrete is seven (7) days old or until the concrete is thoroughly hardened and the mortar used for patching is firmly set.

3.0 CONCRETE FLOOR FINISHES

The finish of all floors and slabs shall be as described below, by types, and further outlined on the final pages in this section of the Specifications. Listed below are descriptions of the various type finishes.

TYPE "A" SCREEDED - This finish shall be obtained by placing screeds at frequent intervals and striking off to the surface elevation required. Unless otherwise stipulated, this type of finish shall be used on slabs over which quarry tile, ceramic tile, terrazzo, bituminous mixtures, grout swept in by mechanism, or similar type wearing surface is subsequently to be applied.

TYPE "B" WOOD FLOATED - This type of integral finish shall be obtained by working a previously screeded surface with a wood float until the desired texture is reached. Unless otherwise stipulated, this type finish shall be used for exterior paved areas, sidewalks, ramps and steps. Care shall be taken to prevent the formation of laitance and excess water on the finished surface.

TYPE "C" STEEL TROWELED - This type of integral floor finish shall be obtained by first screeding and then giving a preliminary wood float finish which shall be true, even and free from depressions.

After this operation, and when the concrete has hardened sufficiently to prevent excess fine material from working to the surface, the surface shall be compacted and smoothed with not less than two thorough and complete steel troweling operations. The finish shall be brought to a smooth, dense surface, free from defects and blemishes. In areas that are to be covered with resilient flooring, one complete steel troweling operation will be sufficient.

TYPE "D" SWEPT-IN GROUT TOPPING - This finish shall be applied to certain tank floors as specified. Grout topping shall be placed and spread on a previously screeded and hardened concrete slab. Before placing the grout, the surface shall be properly cleaned, washed, and coated with a mixture of water and Portland Cement. The grout shall then be plowed and swept into neat conformance with the blades or arms of the apparatus by turning or rotating the previously positioned mechanical equipment. Special attention is to be paid to true grades, shapes and tolerances as specified by the manufacturer of the equipment. Before beginning this finish, the Contractor shall notify the Engineer and the equipment manufacturer of the details of the operation, and obtain approval and recommendations, respectively, before commencing work.

TYPE "E" HARDENED FINISH - Floor surfaces requiring a hardened finish shall receive a concrete hardener of a type scheduled on the final pages of this section. Concrete hardeners shall be either a liquid applied to the floor surface or a metallic compound which is troweled into the floor surface and made integral

with the floor. All concrete hardeners shall be applied in strict conformance with the manufacturer's directions and instructions.

TYPE "F" COLOR FINISH - Coloring agents shall be a product of an experienced manufacturer and shall be applied in complete accordance with the manufacturer's instructions. Colors and make will be specified on the final pages of this section, if their use is required.

4.0 PAYMENT

No separate payment will be made for this item. Cost for this work shall be included in the bid for work to which it is subsidiary.

SECTION 03400

PRECAST CONCRETE

1.0 GENERAL

1.01 REFERENCES

- A. The following is a list of standards, which may be referenced in this Section:
1. American Concrete Institute (ACI): 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 2. American Society for Testing and Materials (ASTM):
 - a. A36, Standard Specification for Structural Steel.
 - b. A416, Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
 - c. C3 1, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 3. Precast/Prestressed Concrete Institute (PCI):
 - a. MNL-117, Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
 - b. MNL- 120, Design Handbook for Precast and Prestressed Concrete, Third Edition.

1.02 SUBMITTALS

A. Shop Drawings:

1. Sealer for Exterior Surfaces: Product data with mixing/application instructions.
2. Calculations and Technical Data: Proposed details and design calculations for stresses in all critical sections of precast members for all loading conditions including transportation, handling, and erection.

B. Quality Control Submittals:

1. For Precasting Manufacturers Not Listed in Article 1.03 QUALITY ASSURANCE, below:
 - a. Experience record on production of precast concrete as shown, with information on precasting plant that will indicate capability to satisfactorily perform the Work.
 - b. Evidence of current PCI plant certification.

- c. Complete list of precast prestressed structural work accomplished in past two (2) years, including:
 - 1) Type of structure.
 - 2) Name of owner.
 - 3) Address of completed work.
2. Certificate of Compliance: Certify admixtures and concrete do not contain calcium chloride.
3. Test Reports:
 - a. For precast manufacturer's concrete test cylinders.
 - b. Inspection of installed elements.

C. Erector Certification:

1. The precast erector shall be certified by a nationally recognized institute based on the quality control records of the erector in the categories suitable this particular application. Submit a copy of the current certification for Engineer's review and approval. At the completion of erection of precast elements, the erector shall submit to the Engineer, a certificate of compliance addressed to the building official stating that the work was performed in accordance with the approved construction documents and Change/Field Orders.

1.03 QUALITY ASSURANCE

A. Qualifications of Precasting Manufacturers:

1. Precast Concrete and Precast Prestressed Concrete: Product of manufacturer with three (3) years of experience producing precast concrete products of quality specified.
2. Precast Plant: PCI certified plant with current certification.
3. Precast Concrete Manufacturers with Apparent Capability to Meet These Specifications:
 - a. De-Am-Ron Building Systems, Owensboro, Kentucky.
 - b. Kentucky Precast of Lexington, Inc, Lexington, Kentucky.
 - c. Flexicore Systems, Inc., Huber Heights, Ohio.
4. Calculations signed and sealed by a Structural Engineer licensed in the same state as the Project.

B. Special Inspection (Kentucky Building Code 2002, Section 1704):

1. If special inspection is required, Owner will retain the services of a Special Inspector of Record, at his/her cost, to inspect all applicable Work under this Contract. The Contractor is responsible for providing safe access to all areas of Work under this Contract to be inspected at no additional cost to the Owner or his/her agents. No

concrete fabrication Work for the Project shall take place without written approval of the Special Inspector of Record (SIR). Any progression of Work without the approval of the SIR will be subject to demolition at the Contractor's expense.

2. The extent of special inspection to be performed is listed in Table 1704.4 of the Kentucky Building Code 2002 (KBC 2002).

C. Manufacturer Certification:

1. The precast plant shall be certified by the Prestressed Concrete Institute (PCI) in the categories appropriate for this particular Project. At the completion of casting operations, the precast manufacturer shall submit a certificate of compliance addressed to the building official(s) stating that the Work was performed in accordance with the approved construction documents and Change/Field Orders.
2. If the manufacturer is not certified by the PCI, Special Inspection of the precast plant shall be performed by the Engineer-approved Special Inspector according to Article 1704.2 of the KBC 2002 and the cost of special inspection shall be back-charged to the Contractor.

D. Erector Certification:

1. The precast erector shall be certified by a nationally recognized institute in the categories appropriate for this particular project. At the completion of erection of the precast elements, the erector shall submit a certificate of compliance addressed to the building official(s) stating that the Work was performed in accordance with the approved construction documents and Change/Field Orders.
2. If the Erector is not certified by a nationally recognized institute, Special Inspection of the erection of the precast shall be performed by the Engineer-approved Special Inspector according to Article 1704.3 of the KBC 2002 and the cost of Special Inspection shall be back-charged to the Contractor.

2.0 PRODUCTS

2.01 MATERIALS

A. Formwork:

1. One-piece, full length and without seams.
2. As specified in Section 03310 – CONCRETE WORK.

- B. Reinforcing Steel: As specified in Section 03002 – CONCRETE REINFORCEMENT.
- C. Cement: As specified in Section 03310 – CONCRETE WORK.
- D. Pre-tensioning Strands: Seven-wire, uncoated, stress relieved, ASTM A416, Grade 270.
- E. Aggregates: As specified in Section 03310 – CONCRETE WORK, for ¾-inch maximum size aggregate. Furnish of consistent quality, gradation, and color for precast architectural panels to produce uniformity of appearance in all panels.
- F. Admixtures: As specified in Section 03310 – CONCRETE WORK.
- G. Embedded Items:
 - 1. ASTM A36 steel.
 - 2. Anchor Studs: Headed anchor studs (HAS), deformed bar anchors (DBA), or threaded studs as manufactured by Nelson Stud Welding Co., Lorain, OH.
 - 3. Furnish inserts for lifting tilt-up walls, bolting stiffeners, attaching braces, and as otherwise required.
- H. Grout: Non-shrink, nonmetallic Type H grout as specified in Section 03600 - GROUT.
- I. Sealer for Exterior Surfaces:
 - 1. Silane Sealer: One-component penetrating sealer, hydrophilic (isopropyl alcohol as a carrier) with 40 percent active ingredients.
 - 2. Manufacturers:
 - a. Master Builders Co.
 - b. Euclid Chemical Co.
 - c. Approved equal
- J. **ALL pre-cast and cast-in-place concrete that may be exposed to sanitary wastewater, or to gases produced by/from sanitary wastewater, shall be provided with XYPEX Admix C-5000 crystalline waterproofing additive as manufactured by Xypex Chemical Corporation, 13731 Mayfield Place, Richmond, British Columbia V6V 2G9, Telephone (800) 961-4477, or approved equal.**
 - 1. Dosage shall be as recommended by the additive manufacturer for use in the specific concrete mix(es) provided on the Project,

exposed to aged domestic sewage, subject to approval by the Engineer.

2. There shall be no substitutions, unless authorized in writing by the Engineer.
3. Structures to be treated include all Portland cement concrete structures that may be exposed continuously to raw sewage, or gasses released from raw sewage; including, but not necessarily limited to, all lift station wet well chambers and top slabs, lift station valve pits and top slabs, diversion chambers and top slabs, sanitary manholes including top cones, air/vacuum valve pits and top slabs, and all reinforced concrete pipe.
4. Concrete in structures that may be only infrequently exposed to minor sewage spills (i.e. operating deck, flow meter pit, etc.) is not required to include the waterproofing additive.

2.02 CONCRETE MIX

- A. As specified in Section 03310 – CONCRETE WORK, except as hereinafter modified.
- B. Design Strength: 5,000 psi at 28 days.
- C. Water/Cement Ratio: 0.38 maximum.

2.03 DESIGN REQUIREMENTS

- A. Structural Precast and Prestressed Members:
 1. Meet applicable sections of PCI MNL-120.
 2. Design for spans and superimposed live and dead loads shown plus dead loads of members.
- B. Prestressed Members:
 1. Calculated tension at full service loads shall not exceed six times the square root of design strength except that in wet or corrosive service conditions and in walkway elements exposed to exterior weather conditions the calculated tension due to live load and dead load shall not exceed zero.
 2. Limit long-term camber growth to span length divided by 360.

2.04 FABRICATION

- A. General:
 1. Comply with PCI MNL- 117.

2. Reinforcing Steel and Pretensioning Strands:
 - a. Place in position before concrete is cast.
 - b. Keep clean and free from form oil or other substances harmful to bond.
 3. Pre-tensioning Force, if used: Determine by elongation and by gauge pressure.
 - a. Method: Meet requirements of Prestressed Concrete Institute.
 4. Forms: Produce smooth surfaces.
 5. Concrete: Deposit, vibrate, finish, and cure in accordance with recommended practices of ACI 304R. Steam curing is permitted.
 6. Release Strength for Pretensioning Method: Minimum 4,000 psi, unless otherwise approved.
 7. Coordinate dimensions, determine type, quantity, size, and location of, and furnish necessary embedded items in precast concrete. Coordinate location of embedded items in cast-in-place concrete necessary to connect precast items.
- B. Surface Finish for Precast Structural Units: Furnish concrete finish, as specified in Section 03300 - CAST-IN-PLACE CONCRETE, to additional concrete field placed on precast units.
1. Other Surfaces: Smooth screeded finishes, unless otherwise shown.
- C. Sealer:
1. Apply to exterior surfaces exposed to weather at precast plant site in accordance with manufacturer's instructions.
 2. Protect surface until installed in the Work.
 3. Repair damage as approved by manufacturer.

2.05 SOURCE QUALITY CONTROL

- A. Prepare minimum three standard concrete test cylinders for each fifty (50) cubic yards, or fraction thereof, of concrete placed in the precast Work in accordance with ASTM C31.
- B. Test and record concrete strengths.

3.0 EXECUTION

3.01 ERECTION

- A. Verify that anchorage inserts are in correct locations.

- B. Handle and erect precast concrete with care as recommended by manufacturer.
- C. Erect precast units plumb, straight, level, square, and in proper alignment.
- D. Fasten units securely in place and brace to maintain position, stability, and alignment until permanently connected and structure is complete and stable.
- E. Field Cutting: Not allowed without prior approval of Engineer.

3.02 PATCHING

- A. Mix and place patching mixture to match color and texture of surrounding concrete and to minimize shrinkage.
- B. Demonstrate patching method and obtain acceptance and approval.

3.03 CLEANING

- A. After installation, clean soiled precast concrete surfaces with detergent and water, using fiber brush and sponge.
- B. Use acid solution only to clean particularly stubborn stains after more conservative methods have been tried unsuccessfully.
- C. Use extreme care to prevent damage to precast concrete surfaces and to adjacent materials.
- D. Rinse thoroughly with clean water immediately after using cleaner.

3.04 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. With Engineer, inspect precast structural elements for chips, cracks, discoloration, and other damage.
 - 2. Compare every element to approved sample panel and finish sample panel.
 - 3. Record location and condition of damaged or nonmatching panels.
- B. Resolution:
 - 1. Repair damage to satisfaction of Engineer and Owner.

2. Remove elements with damage or repairs not acceptable to Engineer.
3. Install new acceptable elements in place of those removed.
4. Perform reinspection and obtain acceptance by Engineer.

3.05 PROTECTION

- A. Protect precast units from chipping, spalling, cracking or other damage to the units after delivery to the site.
- B. After erection, protect units from damage.

4.0 **PAYMENT**

No separate measurements or payment will be made for precast concrete units. Payment for this Work shall be included in the Bid Price of the Bid Item to which it is most subsidiary.

END OF SECTION 03400

DIVISION 5: METALS

SECTION 05002

ANCHOR BOLTS AND EXPANSION ANCHORS

1. SCOPE. This section covers cast-in-place anchor bolts and expansion anchors to be installed in hardened concrete.

The General Equipment Stipulations set forth additional requirements for anchor bolts for equipment.

2. GENERAL. Unless otherwise specified or indicated on the drawings, all anchor bolts shall be cast-in-place bolts and shall have a minimum 3/4 inch diameter. Anchor bolts and expansion anchors for buried and immersion service and in splash zones shall be galvanized or zinc plated. All other anchor bolts and expansion anchors shall be carbon steel unless otherwise specified or indicated on the drawings.

3. MATERIALS.

Bolts and Nuts

Carbon Steel ASTM A307.

Stainless Steel IFI-104, Grade 303 or 305.

Galvanized Steel Carbon steel bolts and nuts; hot-dip galvanized ASTM A153 and A385, or zinc plated ASTM A164 Type GS.

Flat Washers ANSI B18.22.1; of the same material as bolts and nuts.

Expansion Anchors

For Concrete Fed Spec FF-S-325; wedge type, Group II, Type 4, Class 1 or 2; self-drilling type, Group III, Type 1; or nondrilling type, Group VIII, Type 1 or 2; Phillips, Hilti, Rawlplug, USM< or Wej-It.

4. ANCHOR BOLTS. Anchor bolts shall be delivered in time to permit setting when structural concrete is placed. Anchor bolts which are cast-in-place in concrete shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or supporting template.

Two nuts, a jam nut, and washer shall be furnished for anchor bolts indicated on the drawings to have lock nuts; two nuts and a washer shall be furnished for all other anchor bolts.

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5. EXPANSION ANCHORS. Expansion anchors shall be installed in conformity with the manufacturer's recommendations for maximum holding power, but in no case shall the depth of hole be less than four bolt hole diameters. Minimum distance between the center of any expansion anchor and an edge or exterior corner of concrete shall be at least 4-1/2 times the diameter of the hole in which the anchor is installed. Unless otherwise indicated on the drawings, the minimum distance between the centers of expansion anchors shall be at least 8 times the diameter of the hole in which the anchors are installed.

Nuts and washers for expansion anchors shall be as specified for anchor bolts.

6. PAYMENT

No separate payment will be made for any anchors. Cost for these items shall be included in the items to which they are subsidiary in the Bid Schedule and no measurement of the quantities will be made.

SECTION 05003

MISCELLANEOUS METALS

1.0 GENERAL

The Contractor shall furnish all labor, materials, equipment and services necessary for fabrication and erection of all miscellaneous steel angles, beams, plates and channels as shown on the Drawings and specified herein and not specifically included under other sections of these Specifications.

1.1 QUALITY ASSURANCE STANDARDS

A. Codes and Standards: All work shall comply with provisions of following, except as otherwise indicated:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges".
2. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence: "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings."
3. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.
4. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
5. AWS D1.1 "Structural Welding Code".
6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 - a) If recertification of welders is required, retesting will be Contractor's responsibility.

1.2 SUBMITTALS

Shop drawings, giving complete information necessary for fabrication, layout and installation of all metal work, shall be submitted to the Engineer for approval prior to fabrication.

The preparation of shop drawings for fabricated metal items shall be coordinated by the Contractor with the manufacturers of various equipment in order to comply with details, locations, openings, etc. required by the manufacturers.

Field measurements shall be made to verify all dimensions in the field, which may affect installation of work before shop drawings are made and/or fabrication is performed.

2.0 MATERIALS

2.1 STRUCTURAL METALS

2.1.1 Steel wide flange shapes shall conform to the requirements of ASTM A992, grade 50. All other shapes, plates and bars shall be ASTM A36, or ASTM A572, grade 50. (Non-exposed and interior)

2.1.2 Aluminum shall conform to the requirements of ASTM B209, alloy 6061-T6.

2.2 ANCHORAGE ITEMS

The Contractor shall furnish all bolts, nuts, shims, pins, screws, straps, nails and other anchors, which may be required by the Drawings or job conditions, to secure all items permanently in place, whether or not specifically called for or shown on the Drawings.

3.0 EXECUTION

3.1 FABRICATION AND INSTALLATION OF METAL WORK

All metal items shall be accurately fabricated and erected with exposed joints close fitting. All joints shall be of such character and so assembled that they will be as strong and rigid as adjoining sections. Joints shall be located where least conspicuous. Items shall have smooth finished surfaces except where otherwise shown or specified.

Where welding is required or permitted, it shall conform to the requirements for shielding metal arc welding of the Standard Code for Arc and Gas Welding in Building Construction of the American Welding Society. Shop drawings shall show welding and shall indicate the size, length, spacing and type of welds.

Joints required to be welded shall be continuously welded or spot-welded as specified and face of welds dressed flush and smooth where exposed to view.

Members or parts to be built in with masonry or concrete shall be in a form affording a suitable anchorage or shall be provided with approved anchors, expansion shields or other approved means of securing members.

Ferrous and non-ferrous metals shall be insulated at all contacts with felt washers, strips or sheets, bitumastic paints, or other approved means.

3.1.1 All required anchors, couplings, bolts, and nuts required to support miscellaneous metal work shall be furnished and installed as required.

3.1.2 Weights of connections and accessories shall be adequate to safely sustain and withstand stresses and strains to which they will be normally subjected.

3.1.3 Connections shall be bolted except where welding is called for in the Drawings. Bolts shall have a minimum of 1/2-inch diameter unless noted or required otherwise.

3.1.4 Accurately place all miscellaneous metal items in the locations and to the required elevations.

3.1.5 Adequately brace any items which are cast in concrete masonry work.

3.1.6 Use concealed anchors wherever possible.

3.2 CLEANING

Remove and properly dispose of all debris and litter; leave the work area in a clean condition.

END OF SECTION 05003

SECTION 05004

LADDERS

1.0 GENERAL

1.1 DESCRIPTION OF WORK

A. This section of the specifications shall include the furnishing of all materials, equipment and other labor necessary for the complete installation of Ladders as shown on the Contract Drawings.

1.2 PAYMENT

A. No separate payment will be made for ladders. Cost for this work shall be included in the work to which it is subsidiary.

1.3 QUALITY ASSURANCE

A. All ladders furnished and installed shall comply with all OSHA requirements.

B. Acceptable Manufacturers

1. Permac-Paragon, Inc.
2. Cotterman Co.
3. Approved Equal

1.4 SUBMITTALS

A. Refer to the General Specifications of the Contract Documents.

B. Shop Drawings

1. Shop Drawings shall include fabrication, assembly, foundation and installation drawings along with detailed specifications and data covering materials, parts and accessories used.
2. Shop Drawings shall include recommendations for maintenance and cleaning methods and precautions for use of materials which may be detrimental to finishes when improperly applied.

C. Certificates

1. The ladder manufacturer shall submit signed certificates of compliance that all fabrication and materials used meet, or exceed, all requirements of Paragraph 1.03 of this section.

D. Samples

1. Submit duplicate samples of side frames and rungs showing finish.

2.0 PRODUCTS

2.1 GENERAL

- A. All ladders shall be fixed, permanently, unless noted otherwise on the Contract Drawings.
- B. Materials of construction shall be as shown on the Contract Drawings.
- C. Ladder style, standard or walk-thru, shall be as shown on the Contract Drawings.
- D. Spacing between rungs shall not exceed 12 inches. Rungs shall be a minimum of 16 inches long. Spacing between ladder and wall shall not be less than 7 inches.
- E. Walk-thru ladders shall extend a minimum of 42" above the last rung. Safety chains shall be provided.
- F. Standard ladders shall extend to within 6" of the access openings.

2.2 MATERIALS

A. Carbon Steel

- 1. Side frame members shall be 1" minimum diameter, schedule 40 pipe and receive one coat of red oxide primer.
- 2. Side frames shall be 1/4" x 2" x 2" minimum angle iron and receive one coat of red oxide primer.
- 3. Rungs shall be 3/4" minimum diameter, schedule 40 pipe and shall be welded to side frames.

4. All metal surfaces shall receive one shop applied rust inhibitive prime coat.

B. Stainless Steel

1. Side frame members and rungs shall be 1" minimum diameter, schedule 40, type 304, grade ASTM A544 stainless steel with a 320 grit finish, and rungs shall be welded to the side frame members.

C. Aluminum

1. Aluminum shall be 6061-T6.

2. Side frame members shall be 3" x 2 1/2" minimum I-beams with a clear anodized finish.

3. Rungs shall be 1" minimum diameter bar aluminum, and shall be securely anchored to the side frames.

D. Plastic

1. Rungs shall be injection molded plastic, minimum 5" width and have an integral non-skid finish. Rungs shall be installed with the top surface level, with stainless steel hardware.

E. Mounting Hardware

1. Stainless steel ladders shall have type 304 stainless steel welded flanges with electropolished finish. Bolted flanges shall be cast bronze with chrome plated finish.

2. Carbon steel ladders shall have steel flanges and supports, either welded or bolted securely to the side frames.

3. Aluminum ladders shall have aluminum hardware.

3.0 EXECUTION

3.1 DELIVERY AND STORAGE

A. All deliveries and shipments shall be accompanied by a shipping list, bill of lading and invoice which describes all items in the lot. All items shall be inspected and marked as listed on the invoice.

- B. Store all materials on clean surfaces and protect from weather. Leave protective coatings intact until materials have been accepted and installed.
- C. The Contractor shall be responsible for carefully handling all materials during fabrication, storing, loading, transit, unloading, storage at the site and during installation.

3.2 INSTALLATION

- A. All ladders shall be installed in accordance with the manufacturer's written instructions, maintaining side frames in plumb position and the rungs level and parallel.
- B. Side frames used for hand railings shall be free of sharp edges, splinters or burs and afford an adequate gripping surface.
- C. Anchor and secure all ladders to insure a safe system.

3.3 ADJUSTMENT AND CLEANING

- A. Final Adjustment
 - 1. Remove and replace any defective materials or workmanship including dented or bent materials.
- B. Cleaning and Touch-up
 - 1. Wash thoroughly with clean water and soap, and rinse with clean water.
 - 2. Any damaged areas of finish shall be touched up in accordance with the manufacturer's written instructions for eliminating all evidence of repair.

SECTION 05005

METAL ACCESS HATCH

1.0 GENERAL

1.01 DESCRIPTION OF WORK

This Section of the Specifications shall include the furnishing of all materials, equipment, and labor necessary for the complete installation of access doors in sizes and locations shown on the Drawings and described in these Specifications.

1.02 SUBMITTALS

A. Refer to the General Specifications of the Contract Documents.

B. Shop Drawings

1. Shop Drawings shall include fabrication, assembly, foundation and installation drawings along with detailed specifications and data covering materials, parts and accessories used.
2. Shop Drawings shall include recommendations for maintenance and cleaning methods and precautions for use of materials, which may be detrimental to, finishes when improperly applied.

2.0 PRODUCT

2.01 ALUMINUM ACCESS HATCH

A. Locations and sizes shall be as shown on the Drawings. Furnish and install access frames and covers complete with hinge and flush locking mechanism and shall be as manufactured by U.S. Foundry, Bilco or approved equal. Door leaf shall be 1/4" aluminum, diamond pattern plate of skid proof design to withstand a live load of 300 pounds per square foot. Frame shall be 1/4" extruded aluminum with built-in neoprene cushion and with strap anchors bolted to exterior. Channel frames shall be 1/4" aluminum with an anchor flange around the perimeter. Doors shall be equipped with heavy forged brass hinges, stainless steel pins, spring operators for easy operation and an automatic hold-open arm with release handle. A snap lock with removable handle shall be provided. Hardware shall be cadmium plated and factory finish shall be mill finish with bituminous coating applied to exterior of frame. Channel frames shall be used in

installations where the access door leads to electrical equipment or where a watertight installation is needed. It shall be the responsibility of the Contractor to daylight the channel frame's drain.

- B. Installation shall be in accordance with manufacturer's instructions. Manufacturer shall guarantee against defects in material or workmanship for a period of five (5) years.
- C. Access hatches differing from that as specified above shall be as described on the Drawings. This shall apply to special hatches designed for heavier loadings, gas-tight hatches, bolt-down hatches, etc.
- D. Safety Gate: Access hatches scheduled to be installed with a safety grate (or net) assembly shall be designed and configured to accommodate the specified safety grate (or net), including the full range of operation of both the hatch and grate (net), as specified by the respective equipment manufacturer. It is the Contractor's responsibility to coordinate the materials, equipment and installation of the hatch and grate (net) to provide safe operation and unimpeded access to the interior of the subject chamber.

3.0 EXECUTION

3.01 DELIVERY AND STORAGE

- A. All deliveries and shipments shall be accompanied by a shipping list, bill of lading and invoice, which describe all items in the lot. All items shall be inspected and marked as listed on the invoice.
- B. Store all materials on clean surfaces and protect from weather. Leave protective coatings intact until materials have been accepted and installed.
- C. The Contractor shall be responsible for carefully handling all materials during fabrication, loading, transit, unloading, and storage at the site and during installation.

3.02 INSTALLATION

All hatches shall be installed in accordance with the manufacturer's written instructions.

3.03 ADJUSTMENT AND CLEANING

- A. Final Adjustment

1. Remove and replace any defective materials or workmanship including dented or bent materials.

B. Cleaning and Touch-up

1. Wash thoroughly with clean water and soap, and rinse with clean water.
2. Any damaged areas of finish shall be touched up in accordance with the manufacturer's written instructions for eliminating all evidence of repair.

4.0 PAYMENT

Cost shall be included in the Work to which it is subsidiary. No separate measurement and payment will be made.

END OF SECTION 05005

DIVISION 11: EQUIPMENT

SECTION 11900

INTEGRATION OF TELEMETRY CONTROLS

1.0 GENERAL

This specification section is to clarify the Contractor's responsibility regarding the telemetry controls.

2.0 INTEGRATION OF TELEMETRY CONTROLS

Once the new transmission main, pump stations, and water storage tanks are ready to be fully integrated into the existing water distribution system, the existing SCADA system will be transferred from the old pump stations and water storage tanks to the new pump stations and water storage tanks that will be replacing them. Specifically, the old Morrill P.S. RTU and old Morrill Tank RTU will be transported by Owner to the new Morrill P.S. and Morrill Tank. The old Sandgap P.S. RTU will be moved to the new Sandgap P.S. Finally, the old Burch Lick P.S. RTU and old Burch Lick Tank RTU will be relocated to the new Master Meter at McKee and the new McCammon Ridge Tank, respectfully. Jackson County Water Association will be responsible for furnishing the RTU panels at the listed locations for the telemetry facilities required for the operational control of the pump stations and water storage tanks, alarms, data acquisition and integration within the current SCADA system at their new locations. Contractor shall be responsible for installing the RTU panels and providing wiring terminations. Contractor shall also supply electrician support for startup/commissioning of the SCADA system to ensure that all signals are functioning properly. Owner will install the antenna and antenna cable, and Owner will be responsible for proper operation of the radio telemetry and SCADA software functionality.

3.0 PUMP STATION START-UP

The Water Association and the telemetry provider will be present during pump station start-up to coordinate the telemetry equipment operation with the operational elements of the pump station.

END OF SECTION

DIVISION 13: SPECIAL CONSTRUCTION

SECTION 13104

YARD PIPING AND VALVES

1.0 GENERAL

1.1 SCOPE OF WORK

Provide all labor, materials, equipment and services required for furnishing and installing all yard piping and appurtenances specified herein.

2.0 PRODUCTS

2.1 DUCTILE IRON PIPE

Ductile iron pipe shall conform to AWWA C151, (ANSI A21.51), Class 350, with push-on or mechanical joints.

The interior of the pipe shall be cement-mortar lined with bituminous seal coat in accordance with AWWA C104 (ANSI A21.4). Thickness of the lining shall be set forth in Section 4.10.1 of the aforementioned specification unless otherwise directed by the Engineer. The exterior of all pipe, unless otherwise specified, shall receive either coal tar or asphalt base coating a minimum of 1 mil thick.

Each piece of pipe shall bear the manufacturer's name or trademark, the year in which it was produced and the letters "DI" or the word "DUCTILE". Pipe manufacturer shall furnish notarized certificate of compliance to the above AWWA or ANSI specifications.

Fittings shall be 350 psi rated (through 24" size) ductile iron in accordance with AWWA C110 (ANSI A 21.10) and shall conform to the details and dimensions shown therein. Fittings shall have mechanical joints meeting the requirements of AWWA C111 (ANSI A 21.11). Fittings shall have the same interior cement-mortar lining and exterior coating as specified for the pipe.

Joints shall be of the mechanical joint type conforming to AWWA C111 (ANSI A21-11). Mechanical joints shall be bolted and of the stuffing box type and shall consist of a bell, with exterior flange and interior recess for sealing gasket, a pipe or fitting plain end, a sealing gasket, a follower gland, tee-head bolts and hexagon nuts. Below floor slabs and on all high pressure lines, the mechanical joints shall also be fitted with retainer glands.

The cleaning and assembly of pipe and fitting joints shall be in accordance with the manufacturer's recommendations.

2.2 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

Polyvinyl chloride plastic pipe shall be Class 200 (SDR 21) pressure rated pipe. All PVC pipe shall conform to the latest revisions of the following:

ASTM Specification D2241

Department of Commerce PS22-70 (SDR-PR) (pressure rate pipe)

National Sanitation Foundation (NSF) Testing Laboratories

Standard Dimensional Ratio SDR-21 (200 psi)

Health Properties - The seal of the National Sanitation Foundation Testing Laboratory must appear on each pipe.

Cast or ductile iron mechanical joint or push-on type fittings shall be used with PVC pipe.

Adapters or specials shall be furnished, as required, to connect the plastic pipe to the cast iron mechanical joint valves, fittings and pipe.

Jointing material shall be non-toxic. Joints shall be made with the use of rubber gasket couplings. Couplings shall be supplied with the pipe (not a pay item).

Pipe and fittings shall be visually inspected on the project site for proper markings which shall include manufacturer's name or trademark, nominal pipe size, class pressure rating for water at 73.4°F, plastic pipe material designation (e.g. PVC 1120), ASTM Designation D2241 and the NSF Logo.

2.3 POST HYDRANTS

Post hydrants shall be Dresser/M & H Style 133 or equal. Hydrants shall be 2-1/4" post type designed for 150 PSI working pressure. Hydrants shall have 3-9 inch mechanical joint bottom connection and 1-1/2" hose nozzle with cap and cap chain.

2.4 FIRE HYDRANTS

The Contractor shall furnish and install fire hydrants where shown on the Drawings or directed by the Engineer.

2.5 BUTTERFLY VALVES

Butterfly valves shall conform to the specifications of Section 13500 except be designed for buried service, have mechanical joint ends, have all exterior surfaces shop painted with two coats of Fed. Spec. TT-V-51F Asphalt Varnish, with 2-inch square AWWA Class 150B nut operator in a vertical position for use in a valve box.

2.6 GATE VALVES

Gate Valves shall conform to the specifications of Section 13500 except be designed for buried service, have mechanical joint ends, have all exterior surfaces shop painted with two coats of Fed. Spec. TT-V-51F Asphalt Varnish, with 2-inch square nut operator in a vertical position for use in a valve box.

2.7 FLAP VALVES

Flap valves shall be flanged (or other suitable connection for headwall mounting), iron body, bronze mounted, Mueller A-2540-6, M & H Style 47-02, Clow F-3012 or equal.

2.8 PLUG VALVES

Plug valves shall conform to the specifications of Section 13500 except be designed for buried service; have mechanical joint ends; have all exterior surfaces shop painted with two coats of Fed. Spec. TTV-51F Asphalt varnish, with 2-inch square nut operator in a vertical position for use in a valve box.

2.9 VALVE BOXES

Valve boxes shall be of 5-1/4 inch standard cast iron, two-piece, screw type valve box with drop cover marked "WATER", "SEWER", "DRAIN", as applicable. Valve boxes shall be accurately centered over valve operating nut, and backfill thoroughly tamped about them. Valve box bases shall not rest on the valves but shall be supported on crushed stone fill. They shall be set vertically and properly cut and/or adjusted so that the tops of boxes will be at grade in any paving, walk or road surface, and 2 to 3 inches above ground in grass plots, fields, woods or other open terrain. In grass areas, provide concrete pad around valve box; slightly crown in all directions to shed water.

3.0 **EXECUTION**

3.1 LINES AND GRADES

The CONTRACTOR will be required to accomplish any detailed layout, including that required for establishing the grade of the pipe line.

3.2 TRENCH EXCAVATION

3.2.1 General. The CONTRACTOR shall include in his bid, all trenching necessary for installation of all pipelines as planned and specified. Trenching shall include all clearing and grubbing, including all weeds, briars, small trees, stumps, etc. encountered in the trenching. The Contractor shall dispose of any such material by burning, burial, or hauling away (or as noted on the drawings),

at no extra cost to the Owner. It shall be the Contractor's responsibility to notify the appropriate State and local Air Pollution Control agencies when he conducts open burning of refuse.

The Contractor shall protect existing facilities against danger or damage while pipeline is being constructed and backfilled, or from damage due to settlement of this backfill. In case of damage to any existing structures, repair and restoration shall be made at once and backfill shall not be replaced until this is done. In all cases, restoration and repair shall be such that the damaged structures will be in as good condition and serve its purpose as completely as before and such restoration and repair shall be done without extra cost to the Owner. The use of trench-digging machinery will be permitted except where its operations will cause damage to trees, buildings or existing structures above or below the ground. At such locations hand methods shall be employed to avoid such damage. All excavated material shall be piled in a manner that will not endanger the work or cause obstruction.

All excavation shall be open trenches, except where the drawings call for tunneling, boring, or jacking under structures, railroads, sidewalks and roads.

3.2.2 Clearing. The Contractor shall accomplish all clearing and/or grubbing as required for the construction under this contract. Clearing and grubbing shall include the cutting and removal of trees, stumps, brush, roots, logs, fences and other loose or projecting material and natural obstructions which, in the opinion of the Engineer, must be removed to properly prosecute the construction and operate the facilities upon completion of construction. Trees, unless designated otherwise on the plans, shall remain and be properly protected. Ornamental shrubs, plantings, fences, walls, etc. shall be removed and replanted or replaced or protected from the construction activity. Clearing and/or grubbing shall be incidental to the various bid items and no additional compensation will be paid for same.

3.2.3 Trench Depth. Trenches shall be excavated to the line and grade required for the installation of pipe at the elevations indicated on the plans. The minimum depth of cover shall be 30 inches above the top of the pipe, unless shown otherwise on the plans or on the Standard Details. When the pipe is laying in or on solid rock, the minimum depth of cover shall also be 30 inches above the top of the pipe. No additional compensation will be made for extra depth where required by the plans or due to Contractor error. Excavation, except as required for exploration, shall not begin until the proposed work has been staked out. Materials which are not required for backfill and site grading shall be removed and disposed of as directed by the Engineer. Hauling, bedding, and backfilling shall be considered incidental to the various bid items and will not be paid for directly. Excavation shall be of sufficient depth to allow the piping to be laid on the standard pipe bedding in accordance with the Section 6 of this section. The trenches shall be excavated to a minimum of six inches (6") below

the bottom of the pipe barrel in rock. In all cases where lines are under traffic a minimum cover of forty-two inches (42") shall be provided. Should it be necessary to avoid existing utilities, culverts, outlets, or other structures, the water line shall be carried deeper at no additional expense to the Owner.

Where the plans call for extra trench depth, this extra depth shall be provided at no extra cost.

3.2.4 Trench Width. Trench widths shall exceed the minimum width that will provide free working space on each side of the pipe and to permit proper backfilling around the pipe as shown in the accompanying table and unless specifically authorized by the Engineer, shall not be excavated to wider than two feet (2') plus the nominal diameter of the pipe at the top of the trench. Before laying the pipe, the trench shall be opened far enough ahead to reveal any obstruction that may necessitate changing the line and grade of the pipe. Should the Contractor fail to accomplish this, and changes are required, they shall be at his sole expense. In rock, all ledge rocks, boulders and large stones shall be removed to provide six inches (6") of clearance on each side and below all pipe and fittings.

MINIMUM TRENCH WIDTH
IN EARTH AND PAY WIDTH
FOR ROCK EXCAVATION

Size	Width	Size	Width
Up to 4" Pipe	1'-6"	16" Pipe	2'-8"
6" Pipe	2'-0"	18" Pipe	3'-0"
8" Pipe	2'-0"	20" Pipe	3'-2"
10" Pipe	2'-4"	24" Pipe	3'-8"
12" Pipe	2'-6"		
14" Pipe	2'-6"		

3.2.5 Shoring, Sheet piling, and Bracing of Excavation. Where unstable material is encountered, or where the depth of the excavation in earth exceeds five feet (5'), the sides of the trench or excavation shall be supported by substantial sheet piling, bracing, or shoring. The design and installation of all sheet piling, sheet piling, bracing or shoring shall be based on computations of pressure exerted by the materials to be retained under retaining conditions. Adequate and proper shoring of all excavations will be the entire responsibility of the Contractor. The Standards of the Federal Occupational Safety and Health Act and the Kentucky Department of Labor shall be followed.

3.2.6 Removal of Water. The Contractor shall provide for adequate removal of all water and the prevention of surface water from entering the excavation. The Contractor shall maintain dry conditions within the excavations until the backfill is

placed. No additional compensation will be paid for replacement and/or stabilization of prepared excavations due to flooding and/or deterioration from extended exposure. All water pumped or drained from the excavation shall be disposed of in a suitable manner without damage to adjacent property or to other work under construction.

3.2.7 Pavement Removal. Pavement removal shall be as indicated on the plans or directed by the Engineer. When so required, or when directed by the Engineer, only one-half (1/2) of the street crossings or road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such a manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property Owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer. Pavement replacement shall be in accordance with Standard Drawings of these specifications. Excavated materials shall be disposed of so as to cause the least interference and in every case the disposition of excavated materials shall be satisfactory to the Engineer.

3.2.8 Traffic Maintenance. The Contractor must "red light" and guard all open trenches or obstructions placed on the streets or sidewalks. The lights must be burning from sunset to sunrise in order to effectually warn and safeguard the public against dangers connected with open trenches, excavations and other obstructions. The Contractor shall be held responsible for any damage that may occur to persons or property by reason of the failure of the Contractor to properly "red light" and guard all open trenches or obstructions along the routes of the water lines. This Contractor at his own expense shall also maintain warning signs, barricades and a watchmen or flagmen to control traffic at such times as his work would interfere with the flow of traffic. No excavation shall begin that may present a safety hazard unless the signs, barricades, lights, etc. are available to protect the open excavation at the conclusion of the day. The Contractor will comply with all Federal and State Occupational Safety and Health requirements for this type of construction. The Contractor shall also comply with all local and Kentucky Department of Highways requirements for signing and traffic control.

3.2.9 Line Location. The location of pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before construction on any line is started that would indicate desirable changes in location. In such cases, the Owner reserves the right to make reasonable changes in line and structure locations without extra cost, except as may be determined by extra units of materials and construction actually involved. The Owner is under no obligation to locate pipelines so they can be excavated by machine.

3.2.10 Solid Rock Excavation. No extra payment will be made for rock excavation. Cost shall be included in the work to which it is subsidiary.

3.3 BEDDING OF PIPELINE

In all cases the foundation for pipe shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. The bells of the pipe shall not carry any of the load of the backfill. The Contractor should refer to the Standard Details for pipe bedding shown in the plans. The bedding specifications shall govern the backfill from the bottom of the trench up to the centerline or spring line of the pipe.

3.3.1 STABLE EARTH FOUNDATION. On all galvanized or copper lines, the Contractor may use either the "solid trench bottom method" or the "undercutting method" as shown in the Standard Details. The solid trench bottom method allows support of the pipe barrel by the trench bottom with holes dug out for the bells. The bottom must be leveled with soil and free of irregularities. The undercutting method calls for 4 inches of excavation below the barrel and then refill with evenly spread earth cushion or other standard bedding.

On all PVC pipelines, the trench bottoms shall be smooth and free of frozen material, clodded dirt and stones over 1/2" diameter. Bottom dirt left by trenching equipment will usually provide adequate material to level the trench bottom and provide bedding support for the pipe barrel. If the trench bottom is free of dirt, soft material may be shoveled off the side walls or shoveled under the pipe to insure proper pipe barrel bedding. In areas where the trench bottom is hard, a layer of soft backfill must be provided to insure the pipe barrel is properly cushioned. See the plans for proper bedding material depth.

If the foundation is good firm earth the pipe may be laid directly on the undisturbed earth provided the pipe barrel is supported for its full length.

Bedding of No. 9 stone, fine gravel, sand or compacted finely graded select earth shall be used to correct irregularities in the subgrade. Where bell and spigot is involved, bell holes shall be excavated to prevent the bells from being supported on undisturbed earth.

As an alternative to the above method, excavation in earth may be undercut to a depth below the required invert elevation that will permit laying the pipe on a bed of granular material or finely graded select earth to provide continuous support for the pipe barrel. Bedding depth shall be as shown on the plans. All ductile iron pipe will be installed using the undercutting method and a crushed stone or clean earth refill bedding in accordance with the Standard Details. The bedding is not a separate pay item and shall be included as incidental expense in the unit price for the pipe bid per foot of pipe or lump sum cost for the item to which it is subsidiary.

3.3.2 TRENCHES IN ROCK. All installation in rock will utilize the undercutting method. Bedding will be with 6 inches crushed stone as shown in the Standard Details. The only exception to this will be with PVC, copper, or galvanized iron pipe 4 inches in diameter or smaller. These may be bedded on 6 inches of evenly spread earth backfill.

3.3.3 UNSTABLE TRENCHES. If unstable material is encountered which may not provide a suitable foundation for the pipe, the unstable material will be removed and an adequate layer of encasement concrete or other special bedding shall be placed for the pipe foundation in accordance with the Standard Details in the plans. Such "special pipe foundation" shall only be installed if directed by the Engineer in writing or on the plans. This special pipe foundation shall be considered a pay item and shall be paid for at the unit contract price for the type of bedding required.

3.4 PIPE LAYING

3.4.1 GENERAL. Proper instruments, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Each pipe manufacturer shall have an experienced representative on the job for at least one day at the commencement of jointing and laying operations.

Before any length of pipe is placed in the trench, a careful inspection shall be made of the interior of the pipe to see that no foreign material is in the pipe. In order to properly remove any foreign materials, a swab of necessary length is to be available at all times.

All pipe shall be lowered carefully into the trench, properly aligned and properly jointed by use of suitable tools and equipment, in such a manner as to prevent damage to water line materials and protective coatings and linings. Excessive scratching of the exterior surface of the pipe will be cause for rejection of the pipe.

Under no circumstances shall pipeline materials be dropped or dumped into the trench. The pipe and fittings shall also be inspected for the purpose of determining if they are sound and free from cracks. Laying of pipe shall be commenced immediately after excavation is started. Pipe shall be laid with bell ends facing in the direction of laying.

When pipe laying is not in progress, the open ends of pipe shall be closed by approved means to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and re-laid as directed by the Engineer. No pipe shall be laid in water or on frozen trench bottom, or whenever the trench conditions or the weather are unsuitable for such work.

If any defective pipe and fittings shall be discovered after the pipeline is laid, they shall be removed and replaced with a satisfactory pipe or fitting without additional charge to the Owner. Open ends of unfinished pipe lines shall be securely plugged or closed at the end of each day's work or when the line is left temporarily at any other time.

3.4.2 LAYING DUCTILE IRON PIPE. Ductile iron bolted joint, rubber ring slip joint, and ball and socket river crossing pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the manufacturer. Three (3) copies of instructions shall be furnished the Engineer and one (1) copy shall be available at all times at the site of the work. The lining inside ductile iron pipe must not be damaged by handling.

All pipes must be forced and held together, or "homed" at the joints, before sealing or bolting. Pipe must be aligned as each joint is placed, so as to present as nearly true, straight lines and grades as is practical, and all curves and changes in grades must be laid in such a manner that the manufacturer's recommended maximum deflection is not exceeded at any joint.

Cutting of pipe may be done by wheeled pipe cutters or saws, or by hammer and chisel, as the Contractor may elect, but the Contractor will be held responsible for breakage or damage caused by careless cutting or handling.

Ductile iron pipe shall be laid in accordance with Standard ANSI/AWWA C150/A21.50 Laying Conditions, Type 3 as shown in the Standard Drawings in these Specifications. Six inches (6") crushed stone bedding shall be used in rock. Sufficient space (limited to 2 feet longitudinally) shall be left out of 4 or 6 inch cushion for tightening of bolts where bolted joints are used. No pipe shall be laid resting on rock, blocking, or other unyielding objects. Jointing before placing in trench, and subsequent lowering of more than one section jointed together may be allowed, subject to the Engineer's approval and direction.

When using pipe with push-on joints care must be exercised to make certain that the correct gasket is being used for the type of joint installed and that the gasket faces the proper direction. Before inserting the gasket, the groove and bell socket should be carefully cleaned of all dirt. If sand or dirt is permitted to remain in the groove, leaks may occur. Lubricant must be applied to bell socket, gasket and plain- end of pipe as required by manufacturer. Plain-end must be beveled before joint is made. Deflection required at the joint shall be obtained after the joint is made.

Cut pieces of ductile iron pipe 18 inches or more in length, shall be used in fitting to special conditions, and valves and fitting changes in grade and alignment, provided cutting is even enough to make first class joints and no cracks are evident.

Bell and spigot pipe with caulked joints may be used for special cases only. Where this type of pipe is required the joints shall be made as described in this paragraph. After placing a length of pipe on the prepared grade in the trench, the yarning material shall be held around the bottom of the spigot end of the next length so that it will enter the bell of the previously laid pipe as the pipe is shoved into position. The spigot shall be centered there with earth carefully tamped under and on each side of it, excepting at the bell holes. Care shall be taken to prevent dirt from entering the joint space. Two or more joints of pipe shall be in place ahead of each joint before it is poured. Yarning material for bell and spigot joints shall be rubber rings, asbestos rope, or treated paper rope. Joint material for bell and spigot pipe, unless otherwise shown on the drawings, shall be of the sulfur compound type "Leadite," "Mineralead", or approved equal. Jute shall not be used for joint material. Yarning material shall be thoroughly caulked into the joint to insure centering of the spigot and within the ball and prevent loss of molten joint material into the interior of the pipe, but in no event shall a depth of less than 2-1/2 inches be left for the joint compound. Each length of material shall be such as to pass completely around the pipe and provide a lap of two inches. Joint compound shall be heated in accordance with the directions of the manufacturer, care being taken to prevent under and over heating and burning. Joints shall be run with the aid of a runner and metal pouring gate thoroughly clayed to the pipe to prevent the molten compound from breaking out of the joint. Each joint shall be run full to the top of the pouring gate in one continuous pour. Material contained in the pouring gate when it is cut free from the joint may be reused. No joint shall be run in a wet trench and no water shall be allowed to come in contact with the joint until it is thoroughly hardened. If, upon inspection by the Engineers, imperfect joints are disclosed, the compound shall be cut out or otherwise removed and the joint re-run.

3.4.3 LAYING PLASTIC PIPE. The trench bottom must be smooth and uniform and the alignment must conform to the plans. Bedding and cover as specified herein and shown in the Standard Details is required.

To make a clean and unobstructed joint, it is necessary to wipe the ring, groove and pipe spigot free from all foreign materials at the time of assembly (welded joints will be allowed only in special cases and will be required as shown on the plans). The ring must be positioned properly in the fitting to receive the pipe by a worker who is not in contact with the lubricant. In general, the lubricant is applied to the spigot (not the ring or groove). However, the manufacturer's instructions are to be followed in all cases. Only an approved lubricant may be used in accordance with the manufacturer's recommendations. All plastic pipe shall be joined by hand.

Where good bedding conditions are attained PVC pipe smaller than 4 inches may be assembled outside the trench in longer sections (as conditions allow) and then lowered into the trench. At any time when improper bedding is discovered or the pipe is severely deflected the pipe will be removed from the trench and the

condition corrected. Pipe in sizes 4 inch and above may be assembled outside the trench but must be lowered into the trench as each joint is assembled. Regardless of installation methods all couplings must be inspected after laying in trench for proper insertion and alignment. Field cuts and bevels will be allowed in accordance with the manufacturer's recommendations for these operations. A new reference mark shall be installed before joining any field cut pipe. The same requirements for clearance from rock or other objects, thrust blocking and deflections shall apply to PVC pipe as for other pipe materials.

Municipal PVC pipe of all sizes must be assembled in the trench in strict accordance with the manufacturer's requirements.

3.5 BACKFILLING

Backfilling must be started as soon as practicable after pipe has been laid and joints hardened sufficiently, and jointing and alignment approved. Spading of crushed rock, sand, or mechanical tamping of earth, around pipe (as specifically required) between joints shall be the usual procedure as the laying progresses. This is in order to avoid danger or misalignment from slides, flooding or other causes. The Engineer shall be given a minimum of 24 hours for inspection before backfilling. The backfill shall be crushed rock, sand, or finely divided earth free from debris, organic material and stones, places simultaneously on both sides of pipe to the same level by hand.

In backfilling of the lower part of the trench beginning at the top of the bedding, the backfill material shall be carefully and solidly tamped by hand or approved mechanical methods in 6" layers around the pipe and up to a point 8 inches higher than the top of the pipe. For PVC only the backfill shall be select material and may be walked-in. Walking or working on the completed pipe line, except as necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a point one diameter higher than the top of the pipe. The filling of the trench and the tamping of the backfill shall be carried on simultaneously on both sides of the pipe in such a manner that the completed pipe line will not be disturbed and injurious side pressures do not occur.

After the above specified backfill is hand placed, rock may be used in the backfill in pieces no larger than 18 inches in any dimension and to an extent not greater than one-half (1/2) the backfill materials used. If additional earth is required, it must be obtained and placed by the Contractor. Filling with rock and earth shall proceed simultaneously, in order that all voids between rocks may be filled with earth. Above the hand placed backfill, machine backfilling may be employed without tamping, (if not contrary to specified conditions for the location) provided caution is used in quantity per dump and uniformity of level of backfilling. Backfill material must be uniformly ridged over trench and excess hauled away, with no excavated rock over 1-1/2 inch in diameter or pockets of crushed rock or gravel in top 6 inches of backfill. Ridged backfill shall be confined to the width of the

trench and not allowed to overlap onto firm original earth and its height shall not be in excess of needs for replacement of settlement of backfill. All rock, including crushed rock or gravel from construction, must be removed from yards and fields. Streets, roadways and walks shall be swept to remove all earth and loose rock immediately following backfilling.

In the case of street, highway, railroad, sidewalk and driveway crossings or within any roadway paving or about manholes, valve and meter boxes, the backfill must be machine tamped in not over 4-inch layers, measured loose in accordance with the standard details. Where backfill is under paved driveways, streets, highways, railroads, sidewalks, paved parking areas and other areas where settlement is not allowed, crushed stone or coarse sand backfill only shall be used up to the paving surface. Crushed stone shall be Kentucky Department of Highways Standard Specification No. 78 or finer. Coarse sand backfill shall be spread in layers not over 4 inches thick and thoroughly compacted. Sand may be moistened to aide compaction. Tunnels shall be backfilled in not over 3-inch layers, measured loose, with selected material suitable for mechanically tamping. If material suitable for tamping cannot be obtained, sand, gravel or crushed rock (No. 78) shall be blown, packed or sluiced to complete fill all void spaces.

Where local conditions permit, pavement shall not be placed until 30 days have passed since placing backfill. Crushed stone is specified for roads and parking areas and sidewalks or their bases, shall be placed and compacted to the top of trench. Backfills shall be maintained easily passable to traffic at original ground level, until acceptance of project or replacement of paving or sidewalks.

Where the final surfacing is to be crushed stone, compacted earth backfill may be used in the trench to within 6 inches of the top as shown in the Standard Details.

Railroad Company and Highway Department requirements in regard to backfilling will take precedence over the above general specification where they are involved.

Excavated materials from trenches and tunnels in excess of quantity required for trench backfill shall be disposed as shown on the plans or as directed by the Engineer.

The Contractor shall protect all sewer, gas, electric, telephone, water and drain pipes or conduits, power and telephone poles and guy wires from danger of damage while pipelines are being constructed and backfilled, or from danger due to settlement of his backfill.

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

condition and serve its purpose as completely as before uncovering and such restoration and repair shall be done without extra charge.

No extra charge shall be made for backfilling of any kind, except as provided in the Bid. Backfilling shall be included as a part of the unit price bid for which it is subsidiary. No extra charge shall be made for supplying outside materials for backfill.

Before completion of contract, all backfills shall be reshaped, holes filled and surplus material hauled away, and all permanent walks, street, driveway and highway paving, and sod, replaced (if such surface replacement items are included in the contract) and reseeding performed.

Any deficiency in the quantity of material for backfilling the trenches or for filling depressions caused by settlement, shall be supplied by the Contractor.

3.6 TIE-INS TO EXISTING PIPELINES

This work shall consist of connecting new water pipes to the existing system where shown on the plans and shall include the necessary fittings, tapping sleeves, valves and necessary equipment and material required to complete the connection.

Knowledge of pipe sizes in the existing system may not be accurate, therefore, it is recommended that the Contractor check outside diameters of existing pipe and types of pipe prior to ordering the required accessories. No additional payment will be allowed for matching pipe and/or accessories when the proper size is not ordered.

Neither the Owner nor the Engineer can guarantee the location of the existing lines. The Contractor shall verify the location of all existing water mains and valves pertaining to the proposed improvements before excavation is started.

The necessary regulation or operation of the valves on existing mains, to allow for the connections being made, shall be supervised by the Engineer. Before shutting down an existing water main or branch main for a proposed connection, prior approval for a specific time and time interval shall be obtained from a representative of the Owner. At no time shall an existing main be shut down without the Owner's knowledge and permission.

Excavation to existing water mains shall be carefully made, care being exercised not to damage the pipe. The excavation shall not be of excessive size or depth beneath the pipe. The sides of the excavation shall be as nearly vertical as possible.

The Contractor shall be responsible for any damage to the existing system and any such damage shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

The Contractor shall verify, by field inspection, the necessary sizes, lengths and the types of fittings needed for each inter-connection. Typical connections are shown on the plans and any modifications or changes shall be subject to the approval of the Engineer. The exact length of the proposed water main needed for this work shall also be determined by field measurement as required.

The probing required to locate existing mains is not a separate pay item.

3.7 PIPE ENTERING STRUCTURES

Ductile iron, steel or PVC pressure pipe, 4-inch diameter or larger, entering structure below original earth level, unsupported by original earth for a distance of more than six feet (6'), shall be supported by Class B concrete, where depth of such support does not exceed three feet (3'), and by Class B Concrete piers where depth exceeds three feet (3'). All other pressure pipe entering buildings or basins below original earth level, which have more than 3 feet span between wall and original earth and having a cover of more than 24 inches of earth, or under roadway, shall be supported on compacted granular fill, in order to prevent breakage from settlement of backfill about the structure. Concrete and reinforcing steel for such supports are to be included in the unit price of work to which it is subsidiary, and not as extra concrete, in order to discourage excessive excavation outside the limits of structures. Pipe entering structures shall have flexible joint within 16 inches of exterior of structure.

3.8 OWNERSHIP OF OLD MATERIALS

A. Pipe - Unless otherwise indicated, all existing pipe that is to be abandoned that interferes with construction or is easily removed shall become the property of the Contractor. All pipe that is not easily removed or not required to be removed as a result of the new construction, shall be abandoned in place by this Contractor.

B. Pipe Line Fittings and Appurtenances - All pipe line fittings, valves, hydrants and other like appurtenances that are removed as a result of new construction shall be removed by this Contractor but shall become the property of the Owner. All such fittings and appurtenances shall be delivered to a point by the Contractor. Said point shall be on the Owner's property and shall be designated by the Engineer.

C. Other Materials - All other materials or items that are to be removed, demolished, or abandoned as a part of this contract shall become the property of the Contractor and shall be disposed of by him.

3.9 THRUST BLOCKING AND ANCHORAGE

All angles or bends in the pipe line, either vertical or horizontal, shall be braced or anchored against the tendency of movement with concrete thrust blocking per the Standard Details, or approved equivalent joint harness or anchors to the satisfaction of the Engineer. Where joint harness is used, all component parts shall be stainless steel. Concrete thrust blocking or joint harness materials shall be considered incidental to the expense of installing the line and shall be included in the cost for the pipe line. No separate payment will be made for these items.

Thrust blocks for plastic pipe will not be attached to couplings.

Where thrust blocks are used for extra fittings ordered by the Engineer, payment shall be made using the bid price for Class "B" concrete and the thrust block dimensions shown in the Standard Details. This payment shall cover all work required for extra thrust blocks.

3.10 TESTING PRESSURE LINES

The Contractor will be required to test all pipelines and appurtenances, with water, at pressure class of pipe installed.

The pipe shall be slowly filled with water, care being taken to expel all air from the pipes. If necessary, the pipe shall be tapped at high points to vent the air. Pressure at least equal to 200 PSIG (or the operating pressure if higher) as measured at the point of lowest elevation shall be applied.

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. No pipe shall be accepted unless or until the leakage, determined by this test, is less than 0.08 U.S. gallons per hour, per 1,000 feet, per inch nominal diameter of pipe. The leakage test shall be applied to the pipe for a period of not less than 4 hours.

To determine the rate of leakage, the Contractor shall, as required, furnish a suitable pump, pressure gauge and water meter or other appliance for measuring the amount of water pumped. The instrument used to measure leakage shall be tested for accuracy as frequently as directed by the Engineer. The Contractor shall furnish all necessary labor and materials to make the test and to perform any work incidental thereto. Where it is impractical to test between the valves, the Contractor shall as directed, at his own expense and cost, temporarily place caps and plugs on the lines and test sections of the new line.

Where any section of the main is provided with concrete reaction blocking, the hydrostatic pressure test shall not be made until at least five days have elapsed

after the concrete reaction blocking was installed. If high early strength cement is used in the reaction blocking, the hydrostatic pressure test shall not be made until at least two days have elapsed.

Should there be leakage over the allowable amount, the Contractor will be required to locate and repair the leaks and retest the section. It is suggested, but not required, that the Contractor have a geophone (underground listening device) on the job at the time of testing.

If the leakage of the section of pipeline being tested is below the allowable amount, but leakage is obvious in the opinion of the Engineer, due to water at the surface of the ground, or by listening the leak can be heard underground with a geophone, or any other means of determining a leak, the Contractor will be required to repair these leaks.

The Contractor shall furnish a meter or suction tank, pipe test plugs and by-pass piping and make all connections for conducting the above tests. The pumping equipment used shall be centrifugal pump, or other pumping equipment which will not place shock pressures on the pipeline. Power plunger or positive displacement pumps will not be permitted for use on closed pipe systems for any purpose.

Inspection of pipe laying shall in no way relieve the Contractor of the responsibility for stopping leakage or correcting poor workmanship.

3.11 DISINFECTION OF POTABLE WATER LINES

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

After testing, a solution of hypochlorite using HTH or equal shall be introduced into the section of the line being disinfected sufficient to insure a chlorine dosage of at least 50 ppm in the main. While the solution is being applied, the water should be allowed to escape at the ends of the line until tests indicate that a dosage of at least 50 ppm has been obtained throughout the pipe. Open and close all valves and cocks while chlorinating agent is in the piping system. The chlorinated water shall be allowed to remain in the pipe for 24 hours, after which a residual of at least 25 ppm shall be obtained. The disinfection shall be repeated until 25 ppm is obtained after which time the main shall be thoroughly flushed until the residual chlorine content is not greater than 1.0 ppm, and then may be connected to the system.

3.12 MAINTENANCE OF FLOW OF DRAINS AND SEWERS

Adequate provision shall be made for the flow of sewers, drains and water courses encountered during construction. Any structures which are disturbed shall be satisfactorily restored by the Contractor.

3.13 INTERRUPTION OF UTILITY SERVICES

No valve, switch or other control on any existing utility system shall be operated for any purpose by the Contractor without approval of the Engineer and the Utility. All consumers affected by such operations shall be notified by the Contractor as directed by the Engineer and utility before the operation and advised of the probable time when service will be restored.

3.14 CLEAN-UP

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

4.0 MEASUREMENT AND PAYMENT

Yard piping and valves are generally not a separate pay item. The cost for this work shall be included in the work to which it is subsidiary unless otherwise shown in the Bid Schedule.

SECTION 13105

TANK VAULT ACCESSORIES

1.0 GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish and install a sump pump in a reinforced concrete manhole (vault) at the location(s) shown and specified in the Contract Documents and shown on the Engineering Plans. The Work shall include all excavation, backfilling, vault placement including access hatch, piping, electrical work, and any other ancillary work necessary to sufficient installation in the system.

1.02 RELATED WORK

- A. Section 03400 – PRECAST CONCRETE
- B. Section 05004 – LADDERS
- C. Section 05005 – METAL ACCESS HATCH
- D. Section 13104 – YARD PIPING AND VALVES
- E. Section 13200 – ELEVATED TANK
- F. INDEX – Division 16: ELECTRICAL

1.03 SUBMITTALS

Descriptive literature, data sheets, catalogue literature for the sump pump, connection diagrams for equipment wiring, and a list of spare parts and optional equipment, and installation, operation and maintenance instructions shall be submitted to the Engineer for review before manufacture.

2.0 PRODUCTS

2.01 SUMP PUMP

A submersible sump pump shall be installed in the chamber sump pit. It shall have a heavy duty, oil filled, close-coupled motor, in a cast iron housing and shall operate on 1 phase, 60 hertz, 115 volt power. The minimum capacity of the sump pump shall be 1200 gallons per hour at 20' total dynamic head. A mercury float switch, capable of operation in the depth of the sump pit, shall control the sump pump. The sump pump shall have 1 1/2 inch 80 PVC discharge piping.

3.0 INSTALLATION

The Contractor shall follow manufacturer's recommendation for the installation requirements for the sump pump. After completion of installation, the equipment shall be inspected and certified by a representative of the manufacturer as being in compliance with the manufacturer's recommendations and requirements. After such inspection, the equipment shall be given any required adjustment and, when complete, the various items of equipment shall be placed into operation under the supervision of the manufacturer's representative. All equipment shall be placed into operation in accordance with a schedule properly coordinated with the Engineer. Equipment manufacturer shall provide a written report covering his findings and installation approval. The report shall include description of all inspections and any deficiencies noted and shall be mailed directly to the Engineer. Sump pump, piping, wiring and vault construction shall be provided as shown and specified on the Drawings, and elsewhere in these Technical Specifications.

4.0 PAYMENT

The equipment as described in this Section shall be bid and paid as a lump sum, under the Check Valve Station Bid Item in Contract 2 and 3, complete and functional. Work to be provided and paid for under this Bid Item includes furnishing and installing the specified equipment in the check valve station, equipment panel enclosure, reinforced concrete meter vault, meter connection pipe and fittings, unclassified excavation and pipe removal (if required), electric and control wiring, motor control enclosure mounting, calibration and set-up, final cleanup, operations and maintenance manuals and Owner instruction, and any and all other incidental Work required to complete the installation as shown and specified in the Contract Documents.

END OF SECTION 13105

SECTION 13200

COLUMN SUPPORTED ELEVATED STORAGE TANK

1.0 SCOPE OF WORK, MATERIALS AND INSTALLATION

1.1 WORK INCLUDED

Under this item, the Contractor shall furnish all labor, tools, materials and equipment to erect a storage tank for water as specified on the Plans and Bid Documents complete with foundation and appurtenances.

Each Bidder is to submit with his proposal a preliminary design sketch showing sizes of supporting and bracing members, plate thickness and dimensions of the tank.

1.2 STANDARD WATER STORAGE TANK SPECIFICATIONS

The materials, design, fabrication and erection of the storage tank shall conform to current AWWA Standard for Welded Steel Tanks for Water Storage, "AWWA D100" of the American Water Works Association.

1.3 TANK

The tanks shall be of the elevated type and of all-welded metal construction.

1.4 GENERAL INFORMATION

Information to be furnished by Purchaser for a storage tank, as outlined in Part IV of the Foreword, AWWA D100, is made a part of this specification, and is as follows:

- A. The tanks shall be nominal 100,000 and 500,000 gallon capacity. Dimensions are shown on the plans.
- B. The tanks shall have a maximum head ranges of 22' and 30'.
- C. Earthquake Design. The tank shall be designed to withstand earthquake loading as specified in Section 3.1.5 of AWWA D100. The design percentages shall be based upon the tanks' location in the appropriate earthquake zone.
- D. Location. The tanks shall be located as shown on the plans.
- E. The snow load design shall be a minimum of 25 lb./sq.ft.

F. The tanks shall be designed to withstand wind loads produced by a 100 mile per hour wind.

G. Foundation Bearing. Subsurface investigation has been done at the tank site and that report is contained in these Specifications. Boring layout and logs are contained in the Drawings.

H. Welds shall be inspected using radio-graphic methods as outlined in Section 11.4 of AWWA D100 specifications. The Contractor shall furnish a person experienced in radio-graphic inspection of welds to review and approve welds based upon the radio-graphs and who shall also submit a copy of the radio-graphs to the Engineer. The Contractor shall submit a Certification of Compliance statement to the Engineer as outlined in AWWA D100 specifications. Trepanned sections will not be allowed.

I. Pipe connections shall be as shown on the Drawings.

J. Each steel overflow pipe shall be equipped with a weir box. Overflow shall extend down the outside of the tank and terminate at least ten (10) feet from the side of the tank. A 24 mesh stainless steel screen and flap valve shall be installed on the end of the overflow pipe.

K. The inlet/outlet pipe shall have a minimum of 3 feet of cover.

L. All steel surfaces shall be cleaned by blasting (see painting of tank).

M. The tank contractor shall provide the structural design of the tank and foundation and detailed drawings of the tank foundation and associated appurtenances. The design and drawings shall be stamped by a Professional Engineer registered in Kentucky.

N. All seams shall be continuous weld.

O. All primer coats and painting shall be done in the field after the required abrasive blasting. No factory shop primer will be accepted.

1.5 DRAWINGS

All tank construction shall be sufficient to meet the OSHA Standards. After the award of the contract, the Contractor shall furnish detailed plans of the structures. The shop drawings shall show the thickness of plate and other data in connection with the work, and shall be submitted to the Engineer for review, and said review must be completed before any work is commenced. Six (6) sets of the shop drawings and one (1) set of the design calculations shall be furnished. These Drawings and calculations shall be sealed by a Professional Engineer with registration in the State of Kentucky.

1.6 TANK FOUNDATION

The entire work area shall be stripped of all vegetation, roots, and boulders, and the area within which foundations are to be constructed shall be stripped of all top soil to a minimum of six inches deep and excavated until level within three inches. The entire leveled area shall be either in cut (that is original, undisturbed soil) or filled in layers not exceeding six inches in depth loose and compacted to 98% Modified Proctor. No filling to obtain grade shall be done without the Engineer's supervision.

The Contractor shall submit to the Engineer for approval the dimensions, layout, details, and recommended design of the foundation and footings for the proposed tank. A subsurface investigation has been done by American Engineers, Inc., Glasgow, KY and the indicated results of these investigations are included at the end of the Plans and Specifications. The Owner does not guarantee that materials other than those disclosed by the borings will not be encountered nor that the proportions of the various materials encountered will not vary from those indicated by the borings. The Contractor may, at his option and expense, undertake such additional subsurface explorations as he may deem necessary to insure a proper foundation design.

Concrete foundations from the top of the foundation to a depth of six inches below grade shall be formed with removable forms. From six inches below grade and downward, the foundations may be formed using the sides of the excavation.

The tops of all foundations shall be level and plane within one-quarter inch.

All areas that have been disturbed by construction or noted to be cleared on the Drawings shall be cleared of underbrush and graded in a uniform and neat manner leaving the lot in a shape as near possible to the contours as shown on the construction drawings. All graded areas shall be left smooth and shall be sown with grasses as specified in other portions of these Specifications.

Upon the completion of all construction of tank and tank foundations, the Contractor shall remove all debris and surplus construction material resulting from the work.

1.7 STEEL STORAGE TANK

Each tank shall be furnished and erected in strict conformity with the current requirements of AWWA "Standard Specifications for Steel Tanks, Stand Pipes, Reservoirs and Elevated Tanks for Water Storage" latest revision. The tank shall be welded construction.

Each storage tank shall be fabricated, transported and erected on the prepared foundation, as shown on the plans and as specified herein. Bottom plates, shell plates and top plates shall be of the thickness required, but in no case shall be less than one fourth (1/4) inch in thickness.

A manufacturer's nameplate shall list the tank serial number, tank diameter and height, maximum design capacity, overflow elevation, intended storage use, and date of installation. The nameplate shall be affixed to the tank exterior sidewall at a location approximately five (5') from grade elevation in a position of unobstructed view.

1.7.1 Tower. The tanks shall be supported on a suitable tower of structural tubular columns thoroughly braced by tie rods and struts to provide for maximum wind loading.

1.8 ACCESSORIES

1.8.1 Balcony. The tank shall be equipped with a balcony not less than 24 inches wide with a handrail not less than 42 inches high. The floor of the balcony shall be designed for a minimum vertical load of 1000 pounds assumed to be applied to any point. The floor shall be perforated for drainage. The handrail shall be capable of withstanding a 300 pound load applied laterally at the top rail.

1.8.2 Ladders. The ladder shall begin 8 feet from the ground and terminate at the balcony. The configuration of the ladder and balcony handrail to be such as to allow easy access onto the balcony. A locking ladder guard shall be installed at the bottom of the ladder.

There shall be an outside ladder from the balcony to the roof hatch.

There shall be an inside ladder from the roof hatch to the inside bottom of the tank.

Each ladder shall be equipped with an OSHA approved safety climbing device. The Tank Contractor shall furnish to the Owner a full body safety harness with shock cord for use with the climbing device.

1.8.3 Roof Openings.

1.8.3.1 Roof Manhole: A roof manhole shall be 30 inches clear in dimension or diameter and shall have a rainproof cover in accordance with AWWA D100. The manhole shall be lockable.

- 1.8.3.2 Exhaust Manhole: An additional opening with a removable cover and stainless steel bolts having an opening dimension or diameter of at least 20 inches shall be provided in accordance with AWWA D100.
- 1.8.3.3 Balcony Shell Manhole: An additional opening with a removable cover and stainless steel bolts having an opening dimension or diameter of at least 20 inches shall be provided in accordance with AWWA D100.
- 1.8.3.4 Roof Vent: A vent with non-corrodible screen shall be provided at the apex of the roof and shall be of adequate size to safely vent the tank during periods of maximum inflow or withdrawal without using the overflow pipe as a vent. Contract 2 shall be designed for a flow rate of 15,000 gpm. Contract 3 shall be designed for a flow rate of 5,500 gpm.
- 1.8.4 Overflow Pipe. An overflow pipe shall be provided which extends from the high water level to at least 10 feet away from the foundation. The diameter of the overflow pipe shall be as shown on the drawings with a 24 mesh non-corrodible screen and flap valve to prevent the ingress of foreign objects.
- 1.8.5 Inlet/Outlet Connection. The inlet connection to the bottom of the riser shall be steel pipe with appropriate transition to mechanical joint ductile iron elbow of same diameter with a concrete thrust block.
- 1.8.6 Ladder Guard Gate. The ladder attached to the tower shall be equipped with a ladder guard gate as manufactured by RB Industries of Greensboro, North Carolina, or equal.
- 1.8.7 Safety Grill. At the top of the center riser, a removable safety grill shall be installed. The grill shall be designed to hold a 150 psf load.
- 1.8.8 Hinged Riser Manhole. A hinged riser manhole shall be provided in the riser pipe and shall have a clear dimension of at least 24 inches diameter. All bolts shall be stainless steel.

1.9 TESTING & STERILIZATION

Before painting, the tank shall be filled with water furnished by the Contractor and tested according to the provisions contained in AWWA Standard D100 - latest revision. The Contractor shall furnish all materials, equipment and labor for conducting the tests.

After painting has been completed and allowed to dry in strict accordance with the paint manufacturer's recommendations, the tank shall be sterilized in accordance with the provisions specified herein.

1.10 WELDING

All welding shall be done by the electric shielded arc process, adaptable to welding in any direction on both sides of horizontal, vertical and inclined surfaces. The Contractor, before commencing work, shall submit proper witnessed certification that welding procedures for use in the structures and welding operators have been qualified in accordance with American Welding Society Standard Qualification Procedures. Surfaces to be welded shall be free from rust, grease, paint and other foreign material. No welding shall be done when the temperature of the base metal is lower than 32°F.

2.0 **CLEANING AND PAINTING**

2.1 WORK INCLUDED

Provide all labor, materials, equipment and services required to do all painting including preparation, priming and protection of finished surfaces.

All paint, materials, and methods of cleaning to be used shall conform to the latest edition of AWWA D-102 and as specified herein.

2.2 QUALITY ASSURANCE

A. All materials specified herein are manufactured by the Tnemec Co., Inc., North Kansas City, Missouri, or equal. These products are specified to establish standards of quality and are approved for use on this project.

B. Equivalent materials of other manufacturers may be substituted on approval of the Engineer. Requests for substitution shall include manufacturer's literature for each product, given the name, generic type, descriptive information, and evidence of satisfactory past performance. SUBMITTALS SHALL INCLUDE THE PERFORMANCE DATA AS CERTIFIED BY A QUALIFIED TESTING LABORATORY.

C. Bidders desiring to use coatings other than those specified shall submit their proposal in writing to the Engineer prior to surface preparation or application. Substitutions which decrease the film thickness, the number of coats applied, change the generic type of coating, or fail to meet the performance criteria of the specified materials will not be approved. Prime and finish coats of all surfaces shall be furnished by the same manufacturer.

2.3 EXPERIENCE

A. The Contractor shall submit a list of not less than five (5) utility or industrial installations which he has painted during the last five (5) years. This list shall include the names of the Owners, the installations painted, responsible officials, architects or engineers of record for the project.

B. Applicators and/or manufacturers whose submissions indicate, in the judgment of the Engineer, that they have not had the experiences required to perform the work will not be acceptable.

C. Shortly after the award of the Contract, the Contractor shall submit experience records of the paint applicator and that of the paint manufacturer.

D. All painting shall be done by qualified, skilled, experienced craftsmen. In the acceptance or rejection of completed painting, no allowance will be made for lack of skills on the part of the craftsmen.

2.4 PAINT LABELS

Labels on paint containers shall include the following:

1. Manufacturer's name.
2. Generic type of paint.
3. Manufacturer's stock number.
4. Color.
5. Instructions for thinning where applicable.

2.5 FIELD QUALITY CONTROL

Paint film thickness shall be subject to measurement by the Engineer with elcometer, wet film gauge, low or high voltage meter, and/or applicable measuring instruments acceptable to the Engineer. If dry film thickness is found to be less than specified, or coverage is not uniform, the Contractor shall apply additional paint to correct thickness or appearance at no additional cost to the Owner.

2.6 COMPATIBILITY

Where thinning is necessary, only the products of the manufacturer furnishing the paint, and products for thinning purposes only, will be allowed.

2.7 THICKNESS AND SPREADING RATES

A. Minimum dry mil thickness per coat (MDMTPC) and/or spreading rates in square feet per gallon shall be governed by the manufacturer's current data

sheets or literature containing recommendations or instructions regarding these values. These recommended dry mil thickness and/or spreading rate values will be considered requirements to be met same as if set out herein these Specifications and Contract Documents and must be included with material list submittals before Engineer grants approval to use any paint materials. Do not exceed manufacturer's recommended coverage rates.

B. The number of coats to be applied are specified herein and shall govern. Where the total dry film thickness is specified, this thickness shall govern over the MDMTPC.

2.8 TECHNICAL SERVICES

The Contractor shall provide assurance that a qualified representative of the paint manufacturer makes periodic visits to the project site during painting to verify proper application procedures, quality and progress of work.

2.9 SUBMITTALS

A. Submittals shall be as specified in the General Conditions.

B. Before any materials are delivered to the job site, submit to the Engineer a complete list of all materials proposed to be furnished including quantities, types and descriptions of paint for each part of the project. Submit the following:

1. Coating manufacturer's certificate for each coating proposed for use attesting that the coatings meet the specifications in this Section and are proper for the proposed application.
2. Coating manufacturer's specifications and data sheets and application instructions for each coating proposed for use on the interior and exterior of the tank including the coating for the logo.
3. Color chart for Engineer's selection of colors.
4. Certificate of compliance to each product performance requirement.

2.10 PRODUCT DELIVERY, STORAGE AND HANDLING

A. The Contractor shall be responsible for the delivery, storage and handling of coating products.

B. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label.

C. Provide labels on each container with the following information:

1. Name or title of material
2. Manufacturer's stock number
3. Manufacturer's name
4. Contents by volume, for major pigment and vehicle constituents.
5. Expiration date after which the material should not be used.
6. Thinning instructions
7. Application instructions
8. Batch numbers

D. Store coating products in sealed and labeled containers. Properly store coatings to prevent degradation of the coating products. Do not use coating products which have been damaged during storage, which have not been applied prior to the applicable expiration date, or which do not otherwise comply with the specifications. Promptly remove damaged coating products from the job site.

E. Restrict storage to coating materials and related equipment. Store materials in an area protected in accordance with NFPA Bulletin No. 101.

F. Storage of material shall comply with manufacturer's recommendations; however, storage shall be at a minimum temperature of 50^o degrees F.

G. Product delivery, storage and handling shall meet the requirements of safety, health and fire regulations. Remove used rags from the job site and take all necessary steps to prevent spontaneous combustion.

2.11 JOB CONDITIONS

A. The Contractor shall ascertain that job conditions are suitable for the application of coatings.

B. The Contractor shall not operate valves or controls in the existing waterworks. The Owner will operate all existing valves, hydrants, blow-offs and controls.

2.12 PROTECTION

A. Take all precautions necessary to prevent damage of adjoining properties due to coating work.

B. Protect all surfaces which could be damaged in function or appearance by paint, including surfaces not being painted concurrently and surfaces not to be painted.

C. Spray painting will not be permitted when it will cause damage to adjacent or otherwise located surfaces.

D. Contractor shall be solely liable for damages to adjacent and/or surrounding items.

2.13 ACCEPTABLE MANUFACTURERS

A. The paints listed are products of the Tnemec Co., Inc. (North Kansas City, MO) and are specified as a "standard of quality" only. Similar products and painting systems may be substituted subject to approval by the Engineer and subject to the provisions contained herein in Section 2.2 of this Specification.

2.14 PAINT SYSTEMS

A. General

1. All paints of a system shall be by one (1) manufacturer.
2. "Lift" tests may be requested by the Engineer on various surfaces to be painted to assure bonding compatibility.
3. Paints containing lead, or other "dangerous" materials, that surpass federal maximum levels shall not be allowed. Oil shall be pure boiled linseed oil.
4. All paints must be approved by AWWA for potable water service.

B. Exterior Coatings

The exterior coatings shall be as follows:

<u>COAT</u>	<u>SPECIFICATION</u>
Shop Prime	Tnemec N69 Shop Prime RED (DFT 3.0-5.0 mils)
Field Prime	Tnemec N69 Field Prime RED (DFT 2.0-3.0 mils)
Intermediate	Tnemec N69 BEIGE (DFT 3.0-5.0 mils)
Finish	Tnemec 1074 WHITE (DFT 2.0-3.0 mils)

C. Interior Coatings

The interior coating shall be as follows:

<u>COAT</u>	<u>SPECIFICATION</u>
Primer	Tnemec 20-1255 RED (DFT 3.0-5.0 mils)
Intermediate	Tnemec 20-1255 BEIGE (DFT 3.0-5.0 mils)
Finish	Tnemec WHO2 WHITE (DFT 4.0-6.0 mils)

D. Colors

1. Vary the color of alternate coats to provide a contrast.
2. Finish color of tank exterior shall be as selected the Owner.

2.15 ABRASIVE

Abrasive shall be a non-metallic type of a grit size to produce the surface profile specified by the paint manufacturer for the coating system being applied or a minimum of 1.5-2.0 mils. It shall be a low silica abrasive with a free silica content less than 0.010%. It shall be properly stored and shall be free from contaminants. The Contractor shall provide verification of the quantity of abrasive delivered to the site.

2.16 SEALER

Sealer shall be a polyurethane type equivalent to SIKA-FLEX.

3.0 EXECUTION

The painter shall apply each coating at the rate and in the manner specified by the manufacturer. If material has thickened or must be diluted for application by spray gun, the coating shall be built up to the same film thickness achieved with undiluted material. Deficiencies in film thickness shall be corrected by the application of an additional coat of paint. Where thinning is necessary, only the products of the manufacturer furnishing the paint, and for the particular purpose, shall be allowed. All thinning shall be done strictly in accordance with the manufacturer's instructions, as well as with the full knowledge and approval of the Engineer. No paint shall be applied when the surrounding air temperature, as measured in the shade, is below 40°F. No paint shall be applied when the temperature of the surface to be painted is below 35°F. Paint shall not be applied to wet or damp surfaces, and shall not be applied in rain, snow, fog or mist, or when the relative humidity exceeds 85%. No paint shall be applied when it is expected that the relative humidity will exceed 85% or that the air temperature will drop below 40°F within 18 hours after the application of the

paint. Dew or moisture condensation should be anticipated, and if such conditions are prevalent, painting shall be delayed until mid-morning to be certain that the surfaces are dry. Further, the day's painting should be completed well in advance of the probable time of day when condensation will occur, in order to permit the film an appreciable drying time prior to the formation of moisture.

The Contractor shall submit to the Engineer, immediately upon completion of the job, certification from the manufacturer indicating that the quantity of each coating purchased was sufficient to properly coat all surfaces. Such certification shall make reference to the square footage figures provided to the manufacturer and the Engineer by the Contractor.

3.1 EXTERIOR TANK SERVICES

All Exterior painting shall conform to the latest revision of AWWA D-102. The steel surface shall be abrasive blasted in the field in accordance with the Steel Structures Painting Council Specifications SSPC-SP6 commercial blast cleaning.

The profile of the steel prepared for painting shall not exceed 2 mils.

Within eight (8) hours after the surface preparation, apply one (1) coat of Tnemec Series N69 Field Prime RED to a minimum dry film thickness of 3.0 to 5.0 mils. This coat shall be spray applied under constant agitation. This primer shall be as otherwise specified herein or an approved equal. Allow 12 hours for curing of the prime coat.

Prior to applying subsequent field coats make sure all surfaces are clean and dry.

Apply one intermediate coat of TNEMEC Series N69 BEIGE, or equal, to a dry film thickness of 3.0-5.0 mils.

Apply one finish coat of Tnemec Series 1074 WHITE, or equal, to a dry film thickness of 2.0-3.0 mils.

The total dry film thickness of the exterior coating system shall be between 8.0-13.0 mils.

3.2 INTERIOR TANK SURFACES

All interior painting shall conform to the latest revision of AWWA D-102. The steel surface shall be abrasive blasted in the field in accordance with the steel structures painting council specifications SSPC-SP10.

The profile of the steel prepared for painting shall not exceed 2 mils.

Within eight (8) hours after the surface preparation, apply one (1) field coat of Tnemec Series 20-1255 RED primer to a minimum dry film thickness of 3.0-5.0 mils. This primer shall be as otherwise specified herein or an approved equal. If more than one (1) coat is necessary to obtain the specified thickness, a second coat shall be tinted to contrast with the first coat to indicate coverage.

Apply one intermediate coat of Tnemec Series 20-1255 BEIGE, or equal, to a dry film thickness of 3.0-5.0 mils.

Prior to applying subsequent finish coat, make sure all surfaces are clean and dry.

Apply one finish coat of Tnemec Series WHO2 WHITE, or equal, to dry film thickness of 4.0-6.0 mils.

The total dry film thickness of the interior coating system shall be between 10-16 mils.

All weld seams shall receive an additional 5 mil roll coat.

After final coat has been applied on interior, provide continuous exhaust for 48 hours from the lowest portion of the tank, i.e., manway at bottom of riser, to provide a proper curing environment. The volume of air to be provided shall be equal to at least one exchange of air volume every two hours.

4.0 INSPECTION

The Owner reserves the right to engage an independent inspection or testing service to make mill, shop and field inspections as specified in Section 11 of American Water Works Association Standard Specifications for Steel Tanks, Standpipes, Reservoirs, and Elevated Tanks for Water Storage (D-100, latest revision).

On-site inspections will be made by the Engineer at various intervals during construction of the tank. The Contractor shall notify the Engineer a reasonable time in advance of any field sandblasting and painting so that surface preparation for painting may be inspected. After all painting has been completed, the total thickness of the paint film will be checked by the Engineer with an elcometer. If thicknesses of coatings are less than specified, additional coats of paint shall be applied as necessary to provide paint thicknesses within the limits of the specifications. The Contractor should also check paint thickness as the work progresses.

5.0 PAYMENT FOR WATER

All water used from the Association's supply shall be metered by meters supplied by the Contractor. The rates for water shall be the regular monthly rates charged by the Utility. Disposal of water shall be the responsibility of the Contractor.

6.0 DISINFECTION

All water piping and storage tanks shall be thoroughly disinfected before being placed in service, by the use of chlorine or chlorine compounds in such amounts as to produce an initial concentration of at least 50 ppm and a residual of at least 25 ppm at the end of 24 hours followed by thorough flushing. If for some reason, the initial disinfection does not achieve at least 50 ppm, the process shall be repeated until said 25 ppm is obtained after 24 hours. All disinfection shall be accomplished in accordance with AWWA C651 and C652 and in a manner satisfactory to the Engineer.

An alternative disinfection method for storage tanks involves the thorough spraying of a water solution containing 100 ppm of residual chlorine so as to cover the entire internal surface of the tank. This shall be accomplished three times over a period of 24 hours, followed by a thorough flushing with potable water.

7.0 DISPOSING OF HEAVILY CHLORINATED WATER

The environment into which the chlorinated water is to be discharged shall be inspected if there is any possibility that the chlorinated discharge will cause damage to the environment, then a neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See Appendix B of ANSI/AWWA C651 for neutralizing chemicals.) Federal, state, provincial, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

8.0 PAYMENT

Payment for this item shall be as shown in the Bid Proposal.

SECTION 13500
HOUSED VALVES

1.0 GENERAL

1.1 SCOPE OF WORK

Provide all materials, labor, equipment and services required to furnish and install all valves shown on the Drawings and specified herein.

1.2 RELATED WORK SPECIFICED ELSEWHERE

- A. Piping is included in 13104.
- B. Hangers and supports are included in 13100 (not applicable to this contract).
- C. Valves associated with yard piping (buried service) are included in Section 13104.

2.0 PRODUCTS

2.1 SHEAR GATES

Shear gates shall be iron body bronze mounted double wedge type with pull rod and handle. Rod length is as shown on plans. Shear gates shall be M & H Figure No. 44, Clow Model F-3002 or approved equal.

2.2 AIR AND VACUUM VALVE FOR VERTICAL TURBINE PUMPS

Air valves for Vertical Turbine Pumps shall be designed to allow large quantities of air to escape out the orifice when the pump is started and close water tight when the liquid enters the valve. The air valve shall also permit large quantities of air to re-enter thru the orifice when the pump is stopped to prevent a vacuum from forming in the pump column.

The valve shall consist of body, cover, baffle, float and seat. The baffle will be designed to protect the float from direct contact of the rushing air and water to prevent the float from closing prematurely in the valve. The seat shall be fastened into the valve cover, without distortion, and shall be easily removed, if necessary.

13500-1

The entire float and baffle assembly must be shrouded with a perforated water diffuser to prevent the water column entering the valve, from slamming the float shut and eliminate water hammer in the system.

The discharge orifice shall be fitted with an adjustable throttling device to regulate the flow of air escaping to establish a pressure loading on the rising column of water to minimize shock to the pump and check valve.

The float shall be stainless steel, designed to withstand a minimum of 1000 psi. The float shall be center guided and not free floating for positive seating.

Valve may have either threaded or flanged inlet and outlet. The outlet shall be piped to clearwell or atmosphere as shown on the Drawings.

Valve exterior to be painted with Red Oxide Phenolic Primer Paint as accepted by the FDA for use in contact with Potable Water.

All materials of construction shall be certified in writing to conform to ASTM specifications as follows:

Body, cover & baffle	Cast iron	ASTM A48 Class 30
Float	Stainless Steel	ASTM A240
Seat	Buna-N	
Water diffuser	Brass	Commercial
Throttling device	Malleable iron	Commercial

Valve to be APCO Air & Vacuum Valve for Vertical Turbine Pumps, as manufactured by Valve & Primer Corp., Schaumburg, Illinois.

An automatic air release valve shall be provided on the high service pumps to exhaust small pockets of air which may collect in the Air and Vacuum Valve. The automatic air release valve shall have a 1/2" threaded inlet and be equal to APCO Model No. 55.

2.3 COMBINATION AIR RELEASE VALVES

Combination air release valves (single body, double orifice) shall be designed to allow large volumes of air to escape out the large air vacuum orifice when filling a pipeline and to close water tight when the liquid enters the valve. During large orifice closure, the small air release orifice shall open to allow small pockets of air to escape automatically and independently of the large orifice. The large air vacuum orifice shall also allow large volumes of air to enter through the orifice during pipeline drainage to break the vacuum. The body inlet must be baffled to protect the lower float from direct contact of the rushing air and water to prevent premature valve shut off. The top float must be protected in similar manner for the same purpose. The Buna-N seat must be fastened to the valve cover without

distortion for drop tight shut off. All floats shall be heavy stainless steel, hermetically sealed; designed to withstand 1000 psi or more. The upper float shall be center guided for positive shut off. Valve exterior to be painted red lead TT86B Type IV for high resistance to corrosion. Materials certified to ASTM specifications as follows:

- Body & Cover & Baffle - Cast Iron
- Stainless Steel Float
- Buna-N Seat & Needle
- Plug & Bronze Forging
- Delrin Level Frame
- ASTM A48 Class 30
- ASTM A240
- Nitrile Rubber ASTM SB 800
- ASTM D638

Combination air release valves shall be as shown in the valve schedule manufactured by APCO or equal.

2.4 CHECK VALVES

A. Swing Check Valves. Check valves shall be shall be Mueller Swing type lever and weight check valve with flanged end series A-2600-6-01 as manufactured by Mueller, or equal. Check valve shall be iron body, bronze mounted with bronze disc facing, pressure class 175 psig horizontal, with adjustable weight to control opening and closing of clapper.

B. Double Door Check Valves. Double door check valves shall be APCO Series 9000 as manufactured by Valve and Primer Corporation, Schaumburg, Illinois, or equal. Check valve shall be lug style, pressure class 150 pounds with cast iron body, aluminum bronze doors, T316 stainless steel hinge pin and stop pin, Buna-N set and T316 stainless steel spring.

C. Air Cushion Swing Check. Air Cushion Swing Check Valve body shall be cast iron per AWWA C508 having integral flanges.

The seat shall be centrifugally cast bronze with and o-ring seal and be locked in place with stainless steel lock screws and be field replaceable, without the use of special tools.

The shaft shall be single and continuous stainless steel, extending both sides of the body with a lever and weight, using an air cushion cylinder side mounted.

The air cushion cylinder shall be constructed of corrosion - resistant material and the piston shall be totally enclosed within the cylinder and not open at one end.

The cushion cylinder assembly shall be externally attached to either or both sides of the valve body and will permit adjustability to cushion the closure of the valve. Cushioning shall be by air trapped in the cushion cylinder which shall be fitted with a one way adjustable control check valve to cushion disc contact to the seat at the shut-off point. The bottom cylinder head shall be swivel mounted and not rigid to follow the change of force angles as the lever raises or lowers to open or close the check valve.

This valve shall prevent backflow of the media on normal pump shut-off or power failure, at zero velocity and be water tight.

The disc shall be cast iron utilizing a double clevice hinge connected to a ductile iron disc arm. The disc arm assembly shall be suspended from a stainless steel shaft which passes thru a seal retainer on both sides of the valve body.

Valve exterior to be painted with Red Oxide Phenolic Primer Paint as accepted by the FDA for use in contact with Potable Water.

Materials shall be certified to the following A.S.T.M. Specifications:

Valve to be APCO Series 6000 Cushion Swing Check Valve - Air Cushion Side Mounted as manufactured by Valve & Primer Corporation, Schaumburg, Illinois, or equal.

D. Rubber Flapper Check Valve. The check valve shall be an APCO Series 100 rubber flapper serving check valve as manufactured by Valve and Primer Corporation, Schaumburg, Illinois, or approved equal. This check valve shall have a cast iron body and cover and the body shall be long pattern design with integrally cast on end flanges. The flapper shall be Buna-N having an "O"-ring seating edge and shall be internally reinforced with steel.

E. Electric Check Valves. Electric solenoid operated check valves shall be of cast iron body, globe pattern, with all bronze or non-corrosive trim construction. The valves shall be flanged, faced and drilled to conform to 250# Stds. B16.1. The electric check valves shall be rated for a normal working pressure of 200 psi. The valves shall be Figure No. 173-D, Globe Body as manufactured by GA Industries, Inc., Cla-val, Ross or approved equal as specified herein.

The valves shall be constructed with complete bronze or non-corrosive lining which shall extend down to and form the seat of the valve. The liner shall be provided with cast "V" port openings. The piston shall be bronze. The pilot shall be of the 3-way type and of all bronze construction.

The design of the valve shall be such as to provide air and water cushioning to reduce hammer and shock. Speed of valve closing/opening shall be adjustable by a hand operated regulating valve. Wear on valve moving parts shall be absorbed by renewable leather composition or rubber cups and seat. The design of valve shall be such that the area above the piston shall be approximately twice the area on the small end of the piston.

The valve shall be designed to provide full pipe line flow when open, and it shall shut off tight, when closed.

Valve shall provide for normal automatic opening and closing function, plus emergency closing on electrical outage. It shall also provide for manual-hydraulic control for opening main valve.

The Sequence of operation for the electric check valve shall be as follows:

a. Valve openings:

-Pump motor starter, three-way solenoid pilot, emergency solenoid pilot simultaneously energized by control circuit.

-Valve opens as pump reaches full speed.

-Limit switch contacts close interlocking with motor starter circuit.

b. Valve closing:

-Three-way solenoid pilot de-energized by control circuit.

-Pump motor circuit and emergency solenoid pilot remain energized.

-Valve starts to close, pump running.

-As piston nears its seat, limit switch contacts open, de-energizing pump circuit and emergency solenoid pilot.

In the event of a power failure, the motor starter circuit solenoid operated three-way pilot, and the solenoid operated two-way pilot will become de-energized simultaneously. De-energizing both pilots simultaneously will cause the main valve piston to move rapidly to its seat. The speed of emergency closing is adjustable by regulating valve. The emergency closing speed is always at a faster rate than that of the normal closing speed.

The emergency sequence of operation would also pertain in the event of motor undervoltage, motor overload, or by depressing the emergency stop button if same is used.

F. "Duckbill" Elastomeric Check Valves. Duckbill Check Valves are to be all rubber and the flow operated check type with a flanged end connection. The port area shall contour down to a duckbill which shall allow passage of flow in one direction while preventing reverse flow. The flange and flexible duckbill sleeve shall be one piece rubber construction fabricated of NSF61 approved elastomer with nylon reinforcement.

The flange drilling shall conform to ANSI B16 Class 125/ANSI B16.5, Class 150 standards. The valve shall be furnished with stainless steel back-up rings for installation.

Company name, plant location, valve size and serial number shall be bonded to the check valve. Elastomeric duckbill check valves shall be manufactured in the United States of America. A single manufacturer shall supply all duckbill check valves.

a. Function.

When line pressure inside the valve exceeds the backpressure outside the valve, the line pressure forces the bill of the valve open, allowing flow to discharge. When backpressure exceeds the line pressure, the bill of the valve is forced closed preventing backflow.

b. Manufacturer.

All valves shall be of the Series 35 as manufactured by the Red Valve Co., Inc. of Carnegie, PA 15106, or approved equal.

2.5 SURGE RELIEF VALVES

The water pressure relief valve shall function to open to atmosphere when the system pressure exceeds the intensity for which the pilot is set. It shall open rapidly, and close slowly at a predetermined rate of speed. Provision shall be made on the valve to regulate the closing speed of the valve.

The valve shall be of the angle body or globe body design with inlet pressure entering the valve under the piston. It shall be possible to install the valve in any position without impairing its function.

The valve shall be hydraulically operated, designed with a differential type piston such that the piston will expose a greater area to the closing force than to the opening force. A vent to atmosphere from the side of the valve body shall produce the differential piston area, and also serve to provide air cushion to prevent hammer and shock.

The body and lid of the valve shall be constructed of high grade cast iron. Interior parts of the valve, including the piston, liner and seat, shall be of bronze. The liner and piston shall be equipped with renewable leather cups and the piston shall additionally have a leather or rubber seat ring. All wear on the valve shall be absorbed by the cups and seat ring and there shall be no metal to metal contacts within the main valve.

The pilot valve shall be of cast bronze conforming to ASTM Specifications B-62. It shall be of the diaphragm operated, spring loaded type, single seated, balanced design. Adjustment of the opening pressure of the main valve shall be accomplished by regulation of the handwheel on the pilot and shall provide for a range of 20 psi.

The valve shall provide full pipe line opening when opened its full stroke, and it shall be drop tight when closed. It shall be possible to open the relief valve at any time by exhausting the pressure from above the piston to atmosphere. The overall body test shall be made hydraulically at a pressure of no less than 50 percent above the maximum working pressure of the valve. The purchaser reserves the right to witness all or any tests, and must be given free access to the place of manufacture at all times. The valve shall be Golden-Anderson Valve Co. Figure No. 66-D for angle body or 67-D for globe body. The valve shall be factory tested to relieve at 200 psi.

2.6 GATE VALVES*

A. Housed. Gate valves for fabricated pipe systems shall be resilient seat type, iron body, flanged, fully bronze mounted with O-ring seals, and suitable for

* - Buried service gate valves specified in Section 13104

working water pressures of not less than 250 PSIG. Housed valves shall be left uncoated to allow painting without the use of tar stop. Valves shall be of standard manufacture and of the highest quality both of materials and workmanship and shall conform to the latest revision of AWWA Specification C-500. Unless otherwise shown on the plans, all housed gate valves shall be non rising stem. Valves shall be rated for a working pressure of not less than 250 psi and shall have flanges drilled 125 lbs. pattern. Unless otherwise shown on the Drawings, housed valves and valves in basins shall be handwheel operated. Handwheels shall be ANSI B16.1 Class 125. Handwheels shall have not less than the following diameters:

<u>Size Valves</u>	<u>Diameter</u>
1"	3 1/8"
1 1/2"	4 1/4"
2"	6"
3"	8"

<u>Size Valves</u>	<u>Diameter</u>
4"	10"
6"	12"
8"	14"
10"	16"
12"	18"

<u>Size Valves</u>	<u>Diameter</u>
14"	20"
16"	22"
18"	24"

Valve stand handwheels and handwheels on extended stems, shall have the same minimum diameters as those shown for handwheels directly on valves. Extension stems for O.S&Y valves shall be non-rising, with clamp to valve handwheel and hollow shaft for rising stem of valve, with adjustable cast iron guides per each eight feet (8') of extension stem length maximum. All extension stems shall be connected with suitable coupling castings for connection to and removal from valves and stands. Nuts and bolts on all extension stem connections shall be stainless steel.

2.7 PLUG VALVES

Plug valves shall be non-lubricated eccentric type with synthetic rubber faced plugs, corrosion resistant nickel seats, replaceable stainless steel sleeve type

bearings in the upper and lower journals. Furnish with flanges faced and drilled ANSI B16.1 125-pound.

Valve shall provide drip-tight shut-off up to the full rated pressure. All plug valves shall be provided with limit stops and rotated 90 degrees from fully opened to fully closed. Plug valves shall be manually operated with worm gear operator handwheel or lever actuated. Plug valves located 6 feet or more above the floor shall be furnished with chainwheel operators.

Eccentric plug valves shall be as manufactured by DeZurik, Clow, or equal.

2.8 BUTTERFLY VALVES*

All butterfly valves shall be of tight closing, rubber or synthetic rubber seat type with seats securely fastened to valve body. No metal-to-metal seating surfaces will be permitted. Valves shall be bubble tight at the rated pressure in either direction and shall be satisfactory for applications involving throttling service and/or frequent operation and for applications involving valve operation after long periods of inactivity.

The valve discs shall rotate 90° from the full open position to the tight shut position.

The valve bodies themselves shall be of the lugged wafer or flanged type design except where specifically noted on the Drawings. Valve bodies shall be constructed of cast iron ASTM A 126, Class B, and shall be suitable for use with 125# ANSI flanges. Valves shall meet the full structural requirements of the applicable classes of AWWA C 504.

The valve discs shall be cast iron, semi-steel or bronze with a welded nickel edge free of ribbing or protrusions which may collect solids. The disc-to-shaft connections shall be via polished 316 SS pins. Sprayed or plated discs are not acceptable. All disc seating edges shall be smooth and polished.

The shafts shall be turned, ground and polished. They shall be 300 Series or 400 Series Stainless Steel with diameters per AWWA Spec. C504, Class 75B. The shafts shall be of one-piece construction.

The shaft seals shall be of Hycar or Hypalon and shall be provided to prevent leakage into the bearing chest areas.

The valve bearings shall be Teflon coated, self-lubricating, stainless steel design and construction.

* - Buried service butterfly valves specified in Section 13104

The valve seats shall be Neoprene or Hypalon and shall be simultaneously molded, vulcanized and bonded to the valve body or a rigid reinforcing ring. All surfaces of the valve shall be clean, dry and free from grease before painting. The valve surfaces except for disc, seating and finished portions shall be evenly coated at the factory with a suitable rust inhibitive primer. Hydrostatic and leakage tests shall be conducted in strict accordance with AWWA C 504, Section 12.

The valves shall be manufactured by M & H, Dresser, Dezurik or approved equal and supplied as listed in the valve schedule specified herein.

A. High Pressure Butterfly Valves. High performance butterfly valves, 2" - 12" in ANSI Class 300 design, shall be of the flanged or lugged wafer body style. Bodies shall be of carbon steel or cast 316 stainless steel construction. ANSI Class 300 valves shall provide drip tight shutoff to 740 psi.

All valves shall be furnished with upper and lower body bearings and with thrust bearings to assure disc centering in the seat. Valves are to be furnished with adjustable v-ring packing of PTFE and an adjustable gland. The one piece shaft shall be high strength Condition "B" type 316 stainless steel, and shall be centerless, ground, and polished to minimize bearing and packing wear.

Valve seats shall be of PTFE with integral titanium control ring capable of service in temperature ranges of -100°F to 300°F.

Discs shall be cast 316 stainless steel with concave face to reduce dynamic torque and decrease turbulence.

Valve actuators shall provide external disc position indication. Actuators to be weather proof, factory lubed and equipped with fully adjustable mechanical open and closed position stops.

Valves shall be as manufactured by Dezurik, M & H or approved equal.

B. Manually Operated Butterfly Valves. Manually operated valves shall be operated using a cast iron housed handwheel or chain wheel, as required, available in standard weatherproof construction. All units shall have adjustable open and close position stops and valve position indicator with provision to prevent accidental adjustment changes. The operating shaft shall be supported, axially and radially, at the input end by permanently lubricated bronze thrust and sleeve bearings.

Manually operated butterfly valves shall be furnished and installed as listed in the Butterfly Valve Schedule contained herein.

C. Hydraulically Operated Butterfly Valves. All hydraulically operated butterfly valves shall meet the requirements of Section 2.8 contained herein.

The valves supplied with hydraulic cylinder operators shall be designed and sized according to torque requirements of the valve. The method for calculating torques shall be as outlined in AWWA, Appendix A. Operator shall produce the full AWWA Standard C504 Table 1 output torque throughout entire travel. All hydraulically operated butterfly valves shall be furnished with manual override solenoid valves.

Cylinder actuators shall have working mechanisms fully enclosed and shall be sized for operation using water supply at 40 psi to 100 psi. Contractor shall coordinate cylinder pressure requirements and settings on the plant water pressure reducing valve.

Cylinder pivots shall have bearings. All Cylinder actuators shall be provided with stationary supply connections and flexible cylinder supply lines to allow rigid supply piping to the valve.

Cylinder operator shall be of the base mounted configuration. Cylinder barrel shall be of molybdenum-disulfide lined glass fiber reinforced epoxy tubing, to provide a corrosion-free, self-lubricated high strength barrel. Rod seal shall be of urethane, molybdenum-disulfide filled, to provide a self-lubricated, long life seal.

Piston rod shall be of hard chromium plated 18-8 stainless steel, and shall be top and bottom guided in a heavy cast iron mechanism housing for positive alignment. Guiding shall be accomplished by bronze bearings at end of housing straddling all side loads imposed in operation. Entire operator including piston rod shall be fully enclosed.

The open/close valves shall be supplied with 4-way pre-piped solenoid valves with manual override - NEMA 4 115 V coils, energize to operate.

Open/Closed Valves shall be supplied with speed control for both opening and closing speeds.

Solenoids for open/hold/close (backwash) valves shall be dual coil 4-way with manual override.

Hydraulically operated butterfly valves shall be furnished and installed as listed in the Butterfly Valve Schedule contained herein.

D. Electric Motor Operators. Electric motor operators shall be designed to move the valve from fully open to fully closed with operating speeds such that no undue surge or water hammer occurs when electrical power is applied, and hold the valve disc in any intermediate position between full open and fully closed

without creeping or fluttering. Valve, gear, reducer, electric motor operator and accessories shall be furnished complete, ready for installation. Accessories shall include pre-wired control stations with indicating lights, controls and integral reversing contactor furnished for remote operation, and a valve position transmitter and feedback potentiometer enclosed in a NEMA IV housing furnished for remote indication of valve disc position. The motors shall be heavy duty, operating from 120 VAC single phase input source and shall be fused locally. Control compartment shall have internal heater to prevent condensation, a thermal cut-out switch in case of motor overload and four (4) limit switches, 2 to prevent disc overtravel in each direction and 2 for signal-controlled intermediate position stop. Limit switches shall be field adjustable, independent of each other. Limit switches gearing shall be totally enclosed, permanently lubricated. Operator housing shall be heavy, cast aluminum, fully gasketed, capable of remaining watertight for 48 hours submersion in 20 feet of water with conduit access ports sealed.

One handwheel operator shall be furnished for each valve. Operator shall have manual over-ride in which the motor is disconnected when handwheel is in use and the handwheel is not engaged when the motor is in operation.

Motor operation and controls shall be Henry Pratt, AUMA Actuators, or equal.

All valves to be integrated to a flow tube to provide means of rate of flow control shall be equipped with a proportional positioning system to be internally wired to the electric operator for remote indication and control of position of the disc. This system shall be capable of converting a DC milliampere output signal from rate of flow controller to accurately the valve operator to the position required. All valves equipped with electric operators for open and close service shall have on and off position indicators and transmitters.

3.0 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with manufacturer's recommendations.

4.0 MEASUREMENT AND PAYMET

Valves are included in the fabricated piping of a structure or specific bid item and separate payment will not be made unless provided for in the Bid Schedule. Costs are to be included in the work to which they are subsidiary.

DIVISION 16: ELECTRICAL

SECTION 16020

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Provide all labor, material, tools, approvals, utility connection fees, excavation, backfill, and other services and equipment necessary to install the electrical system as shown on the Contract Drawings and as specified herein.
- B. Each Contractor bidding on the work included in these Specifications shall view the building site and carefully examine the contract Drawings and Specifications, so that he/she may fully understand what is to be done, and to document existing conditions.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Contractors bidding work under this Contract shall read and understand Division Zero and Division 1 - General Requirements. If any discrepancies are discovered between this Division and the General Requirements, the above mentioned documents shall overrule this section.
- B. Section 16900 – Control Panel

1.03 SUBMITTALS

- A. Provide shop drawings including descriptive literature and/or installation, operation and maintenance instructions. Shop drawings shall be submitted for all equipment proposed to be furnished under this Division.
- B. Electrical submittals shall be submitted after the pumping/process equipment has been approved. Otherwise the Contractor is responsible for any changes and costs incurred as a result of changes necessary to the electrical equipment.
- C. Shop Drawings shall be clearly marked and or highlighted as to which product, type, option, etc. is being submitted.
- D. Where wiring diagrams are not shown on the Contract Drawings, they are to be provided by the supplier of the equipment served.

1.04 SYMBOLS AND ABBREVIATIONS

- A. The symbols and abbreviations generally follow standard electrical practice, however, exceptions to this shall be as shown on the Contract Drawings.

1.05 COORDINATION WITH OTHER TRADES

- A. The Contractor shall coordinate the electrical work with that of other trades to ensure proper final location of all electrical equipment and/or connections.

1.06 CODES

- A. Comply with the latest revision of the following codes:

1.	Kentucky Building Code	KBC
2.	National Electrical Code	NEC
3.	National Electrical Safety Code	NESC
4.	Underwriters Laboratories, Inc.	UL
5.	National Fire Protection Association	NFPA
6.	National Electrical Manufacturers Association	NEMA
7.	Occupational Safety and Health Administration	OSHA
8.	Insulated Cable Engineers Association	ICEA
9.	Instrument Society of America	ISA
10.	American National Standards Institute, Inc.	ANSI
11.	Anti-Friction Bearing Manufacturers Association, Inc.	AFBMA
12.	Federal Communications Commission	FCC

- C. Comply with any other applicable federal, state, or local laws and ordinances.

- D. Where the Engineer's design requires a higher standard than the applicable code, the Engineer's design shall be followed.

1.07 INSPECTIONS AND PERMITS

- A. Inspection of the electrical system on all construction projects is required. If the local government has appointed a state licensed inspector, the Contractor shall be required to use that person to perform the inspections. If a locally mandated inspector does not exist, the Contractor shall select and hire a state licensed inspector, who has jurisdiction before any work is concealed.

- B. At the time of completion of the project, there shall be furnished to the Owner and Engineer a certificate of compliance, from the agency having

jurisdiction pursuant to all electrical work performed.

- C. All permits necessary for the complete electrical system shall be obtained by the Contractor from the authorities governing such work.

1.08 STORAGE

- A. All work, equipment, and materials shall be protected against dirt, water, or other injury during the period of construction. Complete replacement with new equipment is required for any damaged materials.
- B. Sensitive electrical equipment such as motor starters, controls, transmitters, etc., delivered to the jobsite, shall be protected against injury or corrosion due to atmospheric conditions or physical damage by other means. Protection is interpreted to mean that equipment shall be stored under roof, in a structure properly heated in cold weather and ventilated in hot weather. Provision shall be made to control the humidity in the storage area at 50 percent relative. The stored equipment shall be inspected periodically, and if it is found that the protection is inadequate, further protective measures shall be employed.

1.09 MATERIALS

- A. All materials used shall be new and at least meeting the minimum standards as established by the NEC and/or National Electrical Manufacturers Association. All materials shall be UL listed for the application where a listing exists. All equipment shall meet applicable FCC requirements and restrictions.
- B. The material and equipment described herein has been specified according to a particular trade name or make to set quality standards. However, each Contractor has the right to substitute other material and equipment in lieu of that specified, other than those specifically mentioned at matching or for standardization, providing such material and equipment meets all of the requirements of those specified and is accepted, in writing by the Engineer.
- C. The reuse of salvaged electrical equipment and/or wiring will not be permitted unless specified herein or indicated on the Contract Drawings.
- D. All salvaged or abandoned electrical materials shall become the property of the Contractor and shall be removed from the job site upon completion of the project, unless otherwise noted on the Contract Drawings or specified herein.

1.10 ERRORS, CORRECTIONS, AND/OR OMISSIONS

- A. Should a piece of utilization equipment be supplied of a different size or horsepower than shown on the Contract Drawings, the Contractor shall be responsible for installing the proper size wiring, conduit, starters, circuit breakers, etc., for proper operation of that unit and the complete electrical system at no extra cost to the Owner.
- B. It is the intent of these Specifications to provide for an electrical system installation complete in every respect, to operate in the manner and under conditions as shown in these Specifications and on the Contract Drawings. The Contractor shall notify the Engineer, in writing, of any omission or error at least 10 days prior to opening of bids. In the event of the Contractor's failure to give such notice, he/she may be required to correct work and/or furnish items omitted without additional cost.
- C. Necessary changes or revisions in electrical work to meet any code or power company requirement shall be made by the Contractor without additional charge.

1.11 GUARANTEES AND WARRANTIES

- A. The Contractor shall guarantee all work including equipment, materials, and workmanship. This guarantee shall be against all defects of any of the above and shall run for a period of 1 year from the date of acceptance of the work, concurrent with the one-year guarantee period designated for the general construction contract under which electrical work is performed.
- B. Repair and maintenance for the guarantee period is the responsibility of the Contractor and shall include all repairs and maintenance other than that which is considered as routine. (That is oiling, greasing, etc.) The Engineer shall be the judge of what shall be considered as routine maintenance.

1.12 TESTING

- A. After the wiring system is complete, and at such time as the Engineer may direct, the Contractor shall conduct an operating test for acceptance. The equipment shall be demonstrated to operate in accordance with the requirements of these Specifications and the Contract Drawings. The test shall be performed in the presence of the Engineer or his authorized representative. The Contractor shall furnish all instruments and personnel required for the tests, as well as the necessary electrical power.
- B. Before energizing the system, the Contractor shall check all connections

and set all relays and instruments for proper operation. He shall obtain all necessary clearances, approvals, and instructions from the serving utility company prior to placing power on the equipment.

- C. Cost of utilities for testing done prior to beneficial occupancy by the Owner shall be borne by the Contractor.

1.13 CLEANUP

- A. Cleanup shall be performed as soon as possible after the electrical installation is complete. All control panels, switches, etc., shall be free from tags, stickers, etc. All painted enclosures shall be free from scratches or splattered paint. The interior of all enclosures shall be clean from dust, wire strippings, etc. Surplus material, rubbish, and equipment shall be removed from the jobsite upon completion of the work.
- B. During construction, cover all Owner equipment subject to damage.

1.14 EXCAVATION AND BACKFILL

- A. Excavation for conduits shall be of sufficient width to allow for proper jointing and alignment of the type conduit used. Conduit shall be bedded on original ground unless indicated otherwise on the Drawings. Where conduit is in solid rock, a 6 inch earth cushion must be provided. Conduit shall be laid in straight lines between pull boxes and/or structures unless otherwise notes on the Contract Drawings. The cost of solid rock excavation shall be included in the lump sum bid.
- B. Backfill shall be hand placed, loose granular earth for a height of 6 inches above the top of the largest conduit. This material shall be free of rocks over ½ inches in diameter. Above this, rocks up to 3" diameter may be included but must be mixed with sufficient earth to fill all voids.

1.15 POWER COMPANY COORDINATION

- A. The Contractor is responsible for coordinating all activities onsite by the power company.
- B. The Contractor is required to meet all requirements and special provisions of the power company. The Contractor shall coordinate with the utility prior to bidding the project. No extras will be allowed for provisions required by the power company.

1.16 TEMPORARY ELECTRICAL POWER

- A. The Contractor shall be responsible for providing temporary electrical

power as required during the course of construction and shall remove the temporary service equipment when no longer required.

1.17 OVERCURRENT PROTECTION

- A. Circuit breakers or fused switches shall be the size and type as written herein and shown on the Contract Drawings. Any additional overcurrent protection required to maintain an equipment listing by an authority having jurisdiction shall be installed by the Contractor at no extra cost to the Owner.

1.18 TRAINING

- A. Provide onsite training on major items of equipment. The training shall be conducted by a qualified representative of the manufacturer, and shall be sufficient in content and length such that the Owner's personnel are fully qualified to operate, maintain, and troubleshoot the equipment. O&M manuals must be approved before training can commence. Only one training class is required for each item of equipment. Coordinate the time/date with the Owner.
- B. An official training report shall be submitted to the Engineer. It shall be signed by Owner's personnel.

1.19 RECORD DRAWINGS

- A. The Contractor shall maintain 1 set of the Contract Drawings on the job in good condition for examination at all times. The Contractor's qualified representative shall enter upon these Drawings, from day to day, the actual "as-built" record of construction and/or alteration progress. Entries and notes shall be made in a neat and legible manner and these Drawings delivered to the Engineer after completion of the construction, for use in preparation of Record Drawings. Underground lines must be dimensioned to permanent structures.

1.20 MAINTAINING CONTINUOUS ELECTRICAL SYSTEM AND SERVICE

- A. Existing service continuity shall be maintained at the existing water tank until the system is ready to change over. Outage time shall be minimized and coordinated in advance with the Owner. Contractor shall provide temporary power provisions necessary to maintain SCADA monitoring of the tank for any outage longer than 12 hours in duration.

1.21 GROUNDING AND BONDING

- A. All metallic conduit, cabinets, equipment, and service shall be grounded in

accordance with NEC requirements. All supporting framework in contact with electrical conduit, cable, and/or enclosures, shall be properly grounded.

1.22 SERVICE ENTRANCE

- A. Conductors and terminations for service entrances shall be furnished and installed by the Contractor. Voltage, phase, and number of wires shall be as shown on the Drawings. Clearances for overhead entrance wires shall be per power company, NEC, and NESC requirements.

1.23 CONTRACTOR LICENSING

- A. The Contractor performing the electrical work on this project shall be a licensed electrical contractor in the State of Kentucky.

1.24 ELECTRICAL COMPONENT MOUNTING HEIGHTS

- A. Mounting heights shall be as shown on the Contract Drawings. Operators and control devices shall not be mounted higher than 6'6" above finished floor or grade.

1.25 EQUIPMENT IDENTIFICATION

- A. All starters, feeder units, disconnects, instruments, etc., shall be marked to indicate the motors, circuit, they control or monitor. Marking is to be done with engraved laminated nameplates. Nameplates shall be fastened to equipment with stainless steel screws, one each side. In no way shall the installation of the mounting screws void the NEMA enclosure rating of the equipment in which they are installed. If there are more than one number, the equipment shall be numbered consecutively and labeled as such. Nameplate background color shall be white, with black engraved letters.
- B. Disconnect switches, control panels, transfer switches, panelboards etc. shall be labeled with orange OSHA-compliant vinyl self-adhesive signs that list the maximum voltage contained inside the cabinet or panel.

1.26 EQUIPMENT CONFIGURATION/PROGRAMMING

- A. Any equipment furnished by the Contractor is required to be configured or programmed by the Contractor or his subcontractor/vendor. Any necessary studies or engineering necessary to configure or program this equipment shall be provided by the Contractor as needed to place the equipment into successful operation. Engineer or Owner will not be responsible for equipment configuration or programming.

- B. If a manufacturer or manufacturer's representative is required to startup/commission the equipment in these Specifications, then it is required that the Contractor provide the services of the manufacturer to configure/program the equipment. This includes the provision of any necessary studies or engineering necessary for the configuration/programming.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Raceways
 - 1. Rigid Aluminum Conduit - "Allied," "Wheatland," "Indalex," or equal.
 - 2. PVC Conduit - "Allied," "Carlson," "Cantex," or equal.
 - 3. Liquidtight Flexible Metal Conduit - "Allied," "Anaconda," or equal.
- B. Wires and Cables
 - 1. Building Wire (Types THWN and THW) - "Collyer," "Rome," "American," "Carol," or equal.
 - 2. Instrumentation Cables - "Eaton-Dekoron," "Manhattan," "American," "Belden," "Okonite," or equal.
- C. Boxes - "Appleton," "Crouse-Hinds," "Hoffman," "Rittal," or equal.
- D. Wire Connections and Connecting Devices
 - 1. Termination and Splice Connectors - "3M Scotchlok," "Anderson," "T&B," "Burndy," or equal.
 - 2. Connectors, Lugs, etc. - "T&B," "Anderson," "Burndy," or equal.
- E. Grounding Equipment - "Cadweld," "ITT Blackburn," "Copperweld Bimetallics Group," "Cathodic Engineering Equipment Co.," or equal.
- F. Motor Control Equipment - "Square D," "Allen Bradley," "Eaton Cutler-Hammer," "G.E.," or equal.

2.02 MATERIALS

- A. Conduit and Fittings

1. Aluminum Conduit
 - a. Aluminum conduit shall be extruded from alloy 6063 and shall be the rigid type, non-toxic, corrosion resistant, and non-staining. It shall be manufactured per UL standards as well as listed/labeled by same.
 - b. Fittings, boxes, and accessories used in conjunction with aluminum conduit shall be die cast, copper free type. They shall be resistant to both chemical and galvanic corrosion. All covers shall have neoprene gaskets. Aluminum fittings containing more than 0.4 percent copper are prohibited.
 - c. Aluminum conduit proposed for concrete slab or underground applications shall be UL listed for the purpose and factory pre-coated. Corrosion-resistant taping is allowed for stubouts out of the ground.
2. Polyvinylchloride (PVC) Conduit - PVC conduit and fittings shall be Schedule 80 heavy wall and UL listed. Expansion joints shall be used as recommended by the manufacturer in published literature. PVC systems shall be 90 degrees Celsius minimum UL rated, have a tensile strength of 7,000 psi @ 73.4 degrees Fahrenheit, flexural strength of 11,000 psi and compressive strength of 8,000 psi.
3. Liquidtight Flexible Conduit - Flexible conduit shall be the metallic liquidtight type constructed from flexibly or spirally wound electro-galvanized steel. Connections shall be by means of galvanized malleable iron squeeze type fittings. The conduit shall be light gray in color and have sealtight fittings, type UA.
4. Locknuts shall be bonding type with sharp edges for digging into the metal wall of an enclosure. Myer-style aluminum hubs shall be used rather than locknuts for all NEMA 4X and exterior penetrations.
5. Bushings shall be metallic insulating type, consisting of an insulating insert molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.
6. Corrosion-Protection Tape: The corrosion protection tape shall be Scotchrap 51 or equal with 20mil thickness PVC tape and high-tack adhesive. Degreasing and priming of the conduit is required prior to applying the corrosion-protection tape.

B. Conductors (600 Volts and Below)

1. All conductors shall be insulated so that they are rated at 600 volts.
2. Insulated conductors shall be minimum #12 AWG for power or #14 AWG for control and shall be stranded.
3. All conductors brought to the job site shall be new and unused and where no special factory cut lengths are involved, shall be delivered to the job site in standard coils. Contractor shall provide verification to the Engineer of wire condition before wire is installed.
4. All conductors shall be soft drawn, 98% conductivity copper conforming to the latest ASTM Specifications and the requirements of the National Electrical Code.
5. Conductors shall be insulated with type THWN insulation and all conduits shown on the Drawings are sized accordingly.

C. Instrumentation Cable - Instrumentation cable shall have individually shielded and twisted pairs or triads. Conductors shall be tinned copper, and the cable shall include a separate drain conductor. Voltage rating shall be 600 Volt. Conductor colors shall be black and white. Shielding shall be a combination braid/foil with 100% coverage. Insulation shall be PVC or XLPE. Conductors shall be #18AWG minimum, but no smaller than the size indicated on the Drawings. Insulation shall be polyethylene, rated for underground wet location use, and resistance at 68 degrees Fahrenheit between conductors and between conductors and ground should be at least 500 megohms per 1,000 feet.

D. Boxes and Enclosures

1. Junction boxes for outdoors surface mounting shall be stainless NEMA 4X, with at least 5 ½ full threads for each conduit opening, and shall be suitable for surface mounting as required with drilled external, cast mounting extensions. Box covers shall be hinged or cap screw retained as required, of the same material as the box and provided with stainless steel hardware.

E. Wire Connections and Connecting Devices

1. Terminals and splice connectors from #22 to #4 AWG shall be compression type with barrels to provide maximum conductor contact and tensile strength. Performance, construction, and materials shall be in conformance with UL standards for wire

connectors and rated for 600 Volts and 105 degrees Celsius.

2. Lugs and splice connectors from #6 AWG to 1000 kcmil shall be compression types with barrels to provide maximum conductor contact and tensile strength. They shall be manufactured from high conductivity copper and entirely tin plated. They shall be crimped with standard industry tooling. The lugs and connectors must have a current carrying capacity equal to the conductors for which they are rated and must also meet all UL requirements. All lugs above #4/0 shall be 2 hole lugs with NEMA spacing. The lugs shall be rated for operation through 35 KV. The lugs shall be of closed end construction to exclude moisture migration into the cable conductor.

F. Wiring Devices

1. General – All receptacles shall be heavy duty specification grade duplex receptacle, Nema 5-20R, 20A, 125V, 3-wire. Provide weatherproof cover where indicated on the Drawings.
2. Duplex outlet (interior) - “Hubbell” catalog series 5362, or equal.
3. Ground fault interrupting receptacles shall be required where shown on the Contract Drawings, and shall be indicated by the abbreviation “GFI” beside the circuit symbol on the Contract Drawings. They shall be rated 20 amps (125 volts) and shall be of the duplex, feed through type, capable of protecting all downstream receptacles on the same circuit. They shall be UL listed and shall comply with UL 943 and interrupt the current between 4-6 milliamps of ground fault leakage. Appropriate plates shall be furnished and installed. The 20 ampere rating shall apply not only to device internals but to the faceplate as well. Receptacle shall be Hubbell GFI 5352, or equal.
4. Weatherproof covers shall be Hubbell WP series, Thomas and Betts 2CKG, or equal. They shall be weatherproof-in-use with cast aluminum construction. Mounting screws shall be stainless. Protection shall be Nema 3R.
5. General – Switches shall be industrial grades, 120/227VAC, 20A
 - a. Single pole (exterior) - “Hubbell” cat. no. 1222-gray, or equal.

G. Panelboards

1. Shall be UL listed with copper bussing.

2. Enclosure shall be NEMA 1 where located inside, NEMA 3R where located outside.
3. Circuit breakers shall be bolt-in.
4. Panelboards rated for 120/208V service shall have an interrupting capacity of not less than 10,000A, RMS symmetrical.
5. Panelboards rated for 480V service shall have an interrupting capacity of not less than 14,000A, RMS symmetrical.
6. Panelboards scheduled for use as service equipment shall be service-entrance listed and shall have an integral TVSS surge suppressor.

H. Motors

1. Ratings and Electrical Characteristics:
 - a. Time: All motors shall be rated for continuous duty.
 - b. Temperature: Maximum ambient temperature of 40 degrees C. and an altitude of 3,300 feet or less, according to service factor and insulation class employed.
 - c. Voltage: All single phase motors shall be rated 115/208/230 volts and all polyphase motor 230/460 volts. All motors shall be capable of normal operation at balanced voltages in the range of + 10 percent from rated winding voltage.
 - d. Frequency: All AC motors shall be rated for 60 hz. operation. All motors shall be capable of normal operation at frequencies 5 percent above or below the normal rating of 60 hz.
 - e. Locked Rotor Current: Locked rotor current shall be in accordance with NEMA standards.
 - f. Efficiency: NEMA premium efficiency is required.
 - g. Speed: Slip shall not exceed 4 percent at full load.
 - h. Service Factor: The service factor shall be 1.15 unless requirements of the driven load necessitate a higher service factor.
 - i. Insulation Class: Insulation shall be NEMA Class F or Class

H. All motors shall be inverter-duty and suitable for operation on variable frequency drives.

- j. Design Level: Motors shall be NEMA design B, except as otherwise noted.
- k. Enclosure: Motors for process equipment 2 HP and smaller shall be totally enclosed. All motors for process equipment larger than 2 HP shall be TEFC (totally enclosed fan cooled), suitable for use indoors or outdoors, except as otherwise noted. Totally enclosed non-ventilated (or air-over) motors may be used for ventilators and other auxiliary equipment that by virtue of the load are provided with more than adequate ventilation. ODP (open dripproof) motors may be used for ventilators where the motor is outside the air stream yet still protected from the weather. Submersible motors shall be air or oil filled and of watertight construction. Motors used in classified atmospheres shall be properly rated for that hazard.
- l. Winding Overtemperature Sensors: All pump motors shall be provided with motor winding thermostats. The devices shall be hermetically sealed, snap-acting thermal switches, actuated by a thermally responsive bi-metallic disk. A minimum of 1 per phase is required, with switches wired into the control circuit of the starter to provide de-energization should overheating threaten.

2. Tests, Nameplates and Shop Drawings:

- a. Test: Tests shall be required on integral horsepower motors only. A factory certified test report of "electrically duplicate motors previously tested" shall be supplied on all motors under 200 horsepower. The test shall be certified by the factory and shall contain a statement to the effect that complete tests affirm the guaranteed characteristics published in the manufacturer's catalogs or descriptive literature. Tests shall be in accordance with IEEE test procedures.
- b. Nameplates: Each motor shall have a permanently affixed nameplate of brass, stainless steel, or other metal of durability and corrosion resistance. The data contained on the nameplate shall be in accordance with NEMA standards. Provide a spare nameplate with each motor and mount the nameplate in the starter cabinet. A Brady label with

equivalent nameplate information will be accepted in lieu of an actual spare nameplate.

3. Efficiency Requirements

- a. The following motor full load efficiency requirements shall be met as a minimum for totally enclosed 3 phase integral horsepower motors (per NEMA test Methods):

Horsepower	Nominal 3600 RPM (Minimum %)	Nominal 1800 RPM (Minimum %)	Nominal 1200 RPM (Minimum %)
1	75.5	82.5	80.0
1.5	82.5	84.0	85.5
2	84	84.0	86.5
3	85.5	87.5	87.5
5	87.5	87.5	87.5
7.5	88.5	89.5	89.5
10	89.5	89.5	89.5
15	90.2	91.0	90.2
20	90.2	91.0	90.2
25	91.0	92.4	91.7
30	91.0	92.4	91.7
40	91.7	93.0	93.0
50	92.4	93.0	93.0
60	93.0	93.6	93.6
75	93.0	94.1	93.6
100	93.6	94.5	94.1
125	94.5	94.5	94.1
150	94.5	95.0	95.0
200	95.0	95.0	95.0

- b. Motors shall be energy efficient and shall be documented in the shop drawings submittal in sufficient detail to allow the Engineer complete review of what is offered. Motors shall meet NEMA premium efficiency standards.

I. Surge Protection Devices

1. Distribution Equipment TVSS:

- A. The TVSS shall be suitable for application in category C3 environments as described in ANSI/IEEE C62.41. The TVSS shall be of parallel design and provide protection, line to ground, neutral to ground, and line to neutral for wye or delta distribution systems. The TVSS shall be compatible with the indicated electrical system, voltage, current and distribution configuration.
- B. TVSS shall comply with ANSI/IEEE C62.1, C62.41, and C62.45. The TVSS shall be capable of surviving 1,000 sequential category C3 surges without failure following IEEE test procedures established in C62.45.
- C. The TVSS shall have LED indicators that provide indication of suppression failure. It shall also have a surge counter. It shall also have a relay contact that provides remote indication of surge protection failure.
- D. The TVSS maximum continuous operating voltage (MCOV) shall be capable of sustaining 110 percent of the nominal RMS voltage continuously without degradation.
- E. TVSS shall have surge current capacity of 80,000 amps minimum per mode with a response time no greater than 5 nanoseconds, for any of the individual protection modes, under laboratory conditions with optimum lead lengths.
- F. The TVSS UL 1449 surge suppression rating for any suppression mode shall not exceed:

Electrical System Voltage	Phases	UL 1449 Surge Suppression Ratings
120/240	1	330V
120/240	3	330V
120/208	3	330V
208	3	700V
277/480	3	700V
480	3	1500V

J. Safety Switches

- 1. All safety switches shall be heavy-duty load break type with a

quick-make, quick-break, switch mechanism. The switches shall be fused or unfused as indicated on the Drawings. The handle position shall give visual indication of open and closed switch position. Padlocking capability shall be provided for locking the switch in the "OFF" (open) position.

2. The switch jaws shall be multi-spring type for positive grip of the switch blades and shall be provided with arc suppressors. The fuse clips shall be spring reinforced, positive pressure type of electrolytic copper. Fuse clips shall be rejection type.
3. The switch shall be provided with 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. Note: where indicated, safety switches shall have integral electrical interlocks. Contacts shall be open when the switch is in the off position.
4. Enclosures shall be NEMA 1 where used inside the building and NEMA 3R stainless steel where used outside unless otherwise shown on the Drawings.
5. Each safety switch shall be provided with ground lugs as required to accept grounding conductors as shown on the Drawings. The grounding lugs shall be factory installed and shall have direct metal-to-metal contact with the switch enclosure.
6. Double throw fused safety switches shall be furnished where indicated. They shall be lockable in any position and shall be service-entrance rated. They shall be heavy-duty NEMA 3R unless noted otherwise.

K. Portable Generator Receptacle

1. Generator receptacle shall be Crouse-Hinds Arktite series, Killark, or equal. Shall be UL1682 and 514 compliant.
2. Provide a heavy-duty, surface mounted generator receptacle with back box and all accessories. Provide the rating indicated on the Drawings. Sizes through 200A shall be load-break type.
3. The generator receptacle shall be the "Style 2" metallic type with factory installed jumper to bond the metallic housing to the grounded conductor.

4. The generator receptacle shall have reversed contacts such that personnel will not be exposed to live voltage even if the generator is running.
 5. The receptacle shall be a 4-wire, 4-pole model where used for 3-phase duty.
 6. The receptacle shall be NEMA 4 weatherproof with a cap for protection while not in use.
- L. Motor Control – See Section 16900 for requirements.
- M. Overcurrent Protection
1. Main 3-Phase Breakers – Shall be thermal-magnetic, molded-case, Type FA or KA as needed, Square D or equal. Provide service-entrance rated where indicated on the Drawings as being used in a service entrance application.
 2. Power Fuses – Utilize Class J fuses and fuse blocks. Fuse blocks must have protective cover. Fuses may only be used where indicated on the Drawings. Otherwise, use circuit breakers.
- N. Lighting
1. All fixtures shall be delivered complete with suspension and mounting accessories, ballasts, diffusers, reflectors, etc., all wired and assembled. All accessory wiring shall be furnished and installed as shown on the Contract Drawings.
 2. All supports required for luminaires shall be furnished and installed by the Contractor.
- O. Supporting Devices – All strut, channel, conduit clamps/straps, and other supporting devices shall be either stainless steel or aluminum. All hardware such as nuts, bolts, anchors, washers, etc. shall be stainless steel.
- P. General Purpose Dry-Type Transformers
1. Single phase transformers shall be 480 or 600 volt primary and 120/240 volt secondary. Transformers 25 KVA and larger shall have a minimum of 4 (2 above, 2 below) 2 ½ percent full capacity primary taps.
 2. Transformers shall be 150 degrees Celsius temperature rise above

a 40 degrees Celsius ambient. All insulating materials are to be in accordance with the latest NEMA Standards for a 220 degrees Celsius UL recognized insulation system.

3. Transformer coils shall be of the continuous wire wound construction and shall be impregnated with non-hygroscopic, thermo-setting varnish. The coils shall also have a final wrap of electrical insulating material to prevent mechanical injury to the wire as well as increasing the electrical breakdown strength.
4. All cores shall be constructed of high grade, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point. The core laminations shall be clamped together with steel angles. The completed core and coil shall then be bolted to the base of the enclosure but isolated from the base by means of rubber, vibration absorbing mounts. There shall be no metal-to-metal contact between the core and coil to the enclosure. On transformers 500 KVA and smaller, the vibration isolation system shall be designed to provide a permanent fastening of the core and coil to the enclosure. To further facilitate vibration and noise isolation, the final section of conduit to the transformer shall be flexible.
5. Transformers 25 KVA and larger shall be in heavy gauge, sheet steel, ventilated enclosures. The ventilating openings shall be designed to prevent accidental access to live parts in accordance with UL, NEMA, and National Electrical Code Standards for ventilated enclosures.
6. The entire transformer enclosure shall be degreased, cleaned, phosphatized, primed, and finished in ANSI gray.
7. The maximum temperature of the top of the enclosure shall not exceed 50 degrees Celsius rise above a 40 degrees Celsius ambient.
8. The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with NEMA and NEC Standards.
9. The transformer shall be marked "DANGER HIGH VOLTAGE" with labels specified in the section on marking, this Division.
10. The transformers shall be manufactured to requirements of applicable standards, especially as they apply to noise level and surface temperatures.

Q. Pressure Switches

1. Pressure switches shall be industrial type NEMA 4X epoxy-coated aluminum body with UL listing.
 2. The pressure switch shall have a single pole double throw relay output. The setpoint shall have an adjustable range suitable for operation in the conditions shown on the Drawings and in the equipment specifications.
 3. The switch shall be rated for operation in -25°F to 130°F ambient. Setpoint shall drift no more than 1.5% for a 50°F ambient temperature change.
 4. Setpoint repeatability shall be within 1.5% of adjustable range, maximum.
 5. Electrical connection shall be either a 1/2" or 3/4" threaded connection.
 6. Pressure connection shall be NPT.
 7. Provide isolation valve and bleed valve suitable for removing the pressure switch from its connection under pressure.
 8. The pressure switch shall be Omega, or equal.
- R. Pressure Transmitters – Owner will furnish pressure transmitters for Contractor installation. Contractor shall provide all instrumentation tubing in Type L hard-drawn copper and Contractor shall provide all fittings and bronze 1/4-turn ball valves. Install per detail on the Drawings.

PART 3 - EXECUTION

3.01 INSTALLATION/APPLICATION/ERECTION

A. Conduit

1. PVC conduit shall be utilized below grade, and aluminum conduit shall be used above grade. The transition from PVC to aluminum shall occur below grade prior to the elbow. The aluminum conduit shall be taped with corrosion-prevention tape from the transition point to 6" above finished grade.
2. The Contractor shall be responsible for setting of all sleeves for his work. Passage of conduit through masonry and concrete walls shall be provided with steel pipe sleeves. Sleeves shall be flush with each face of the wall. Seal space between sleeve and conduit with oakum and waterproof mastic.
3. All conduit 1-1/4 inches and larger shall be sleeved.
4. Concrete encasements of underground conduit shall be installed where shown on the Drawings or specified herein. Concrete shall be 2500 psi in

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strength, dyed red throughout and shall be sized as detailed on the drawings.

5. 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.
6. Rigid conduits, where they entered panelboards, cabinets, pull boxes or outlet boxes shall be secured in place by galvanized, double locknuts (one inside and one outside) and bushings. Conduit bushings 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. Myers hubs shall be utilized rather than locknuts for all exterior and NEMA 4X penetrations.
7. 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.
8. 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.
9. In general, flexible conduit is prohibited. Where absolutely necessary, it shall be liquidtight, with maximum lengths of 3 feet.
10. All conduit joints shall be made up tight and no running threads shall be permitted on threaded connections. No kinked, clogged or deformed conduits shall be permitted on the job.
11. During construction, all installed conduits shall be temporarily capped or corked.
12. All moisture proofing or other material for thread protection shall be removed from conduit threads prior to installation. No material of insulating quality shall be used on the conduit threads or other places which will reduce the overall conductivity of the conduit system.
13. Raceways shall be securely and rigidly fastened in place with conduit clamps or approved conduit hangers. Bolts, screws, etc. used in securing the work shall be stainless steel and of ample size for the service. Assembly bolts, nuts, washers, etc., shall be stainless steel. Raceways shall NOT be welded to steel structures.

14. Horizontal and vertical conduit runs shall be supported by one hole straps with clamp backs, special brackets, or other approved devices with suitable bolts, expansion shields where required. All mounting hardware shall be stainless steel.
15. The use of perforated iron straps or wire for supporting conduits will not be permitted.
16. Where conduit is run in a concrete slab, the conduit shall be installed as close to the middle of the concrete slabs as practicable without disturbing the reinforcement. The outside diameter shall not exceed one-third of the slab thickness and conduits shall be placed not closer than three diameters on centers, except at cabinet locations where the slab thickness shall be increased upon consultation with and approval by the Engineer.
17. Depth of bury for all conduit shall be as indicated but not less than 30 inches below finished grade.
18. All conduit shall have an insulated ground wire pulled to all equipment.
19. All conduits penetrating enclosures shall have duct seal applied to seal the conduit and prevent moisture from entering the enclosure.

B. Wire and Cable (600 Volts and Below):

1. All wiring shall be installed in conduit. Wire shall not be installed until all work of any nature that may cause injury to the wire is completed.
2. Mechanical means shall not be used in pulling in wires No. 8 or smaller.
3. Approved wire pulling lubricant shall be used as required to prevent insulation damage and over stressing 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.
4. All wiring in control equipment, cabinets, etc., shall be neatly wrapped, taped, or laced into groups to provide a neat and orderly appearance in the equipment.
5. 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.
6. For the wiring of circuits consisting of AWG No. 10 or smaller wire,

self-insulated pressure connectors (wirenuts) shall be utilized for all splices or joints.

7. Where indicated on the Drawings, cables entering enclosures shall be sealed using strain relief connectors suitable for Class I, Division 1, Group D hazardous locations. The purpose of the connector is to provide a seal between the hazardous and non-hazardous location without the use of sealing fittings.
8. Each wire shall be labeled at both termination points. Individual conductor or circuit identification shall be carried throughout, with circuit numbers or other identification clearly stamped on terminal strips and shown in wiring diagrams.
9. In all junction boxes, cabinets, control compartments and terminal boxes where no terminal board is provided, each wire, including all power wires, shall be properly identified by plastic coated, self-adhesive, wire marker.
10. In cases similar to the above where the terminal boards are provided for the control, indicating, and metering wires, all wires including motor leads and other power wires shall be identified by wire markers as specified above.
11. Equipment ground wire insulation shall be colored green or green with two or more yellow stripes. Isolated grounding conductors shall be green with striping that identifies the conductor as "isolated ground" and different from the equipment (bonded) ground.
12. In general and unless otherwise shown on the drawings, no two wires of the same color shall be run in the same conduit except such as control wiring, switch legs, neutral, and ground. Where a conduit run is shown on the drawings to have two or more wires connected to the same phase and, therefore, are the same color, pressure sensitive, plastic marked wire marker identification tape shall be used wherever the wire is accessible (junction boxes, panels, device boxes, etc). The numbers shall in each case, correspond to the circuit number and panelboard from which the circuit emanates. Control wiring inside any compartment which may be energized from a source outside the compartment shall have insulation. Where yellow insulated wires are used inside any cabinet, compartment, etc., a machine engraved, laminated plastic identification marker shall be installed on the outside of the compartment.
13. 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.

14. All wiring on this project, except control wiring, shall reflect the phase relationship as follows:

480 volt system: brown, orange and yellow for ungrounded conductors, gray with brown tracer for neutral conductors.

208Y/120 volt system: black, red and blue for ungrounded conductors, white for neutral conductors.

120/240 volt, 3-phase

4-wire, delta system: black, red for ungrounded conductors, orange for ungrounded conductor connected to "high leg", white for neutral.

C. Grounding

1. Ground rods shall be driven vertically into the earth to at least one foot below finished grade. Where a counterpoise or grounding grid is indicated and where rock is encountered at a depth of less than four (4) feet, rods shall be buried in a trench at not less than two feet below finished grade, and at equal angles from any two adjacent sides on the outside of the counterpoise or grid. In these cases, at the Contractor's option, equal lengths of bare conductor of the same size as the counterpoise or grid may be used in place of ground rods.
2. Conductors connecting the main ground bars in switchgear to the earth shall be continuous without joints or splices. Connections to the grounding system at the switchgear shall be made with pressure connectors such as defined in Article 100, "Connector, Pressure (Solderless)", of the National Electrical Code.
3. 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 (3) square inches.
4. All connections made below finished grade shall be exothermic.
5. Installation of grounding conductors shall be such that they are not exposed to physical damage. All connections shall be firm and tight. Conductors and connectors shall be so arranged and provided so that there is no strain upon the connection. Buried equipment grounding conductors shall be buried at least 24 inches below finished grade and shall not be buried below concrete pads, paving, etc. except where running a tap to the grid or where shown on the contract drawings. Where buried below concrete or paving, grounding conductors shall be in rigid conduit unless shown on the drawings as a part of a grid.

6. Resistance measurements shall be made between the main grounding bar in the switchgear and a good earth ground. If this resistance is not equal to or less than 5 Ohms, an additional grounding electrode system in the form of ground rods installed and connected together in a 10 feet by 10 feet grid shall be added. The rods shall be connected together and this grid connected to the system with AWG #3/0 bare tinned copper. The number of rods shall be as required to register the resistance value mentioned above. Measurements shall be made in normally dry conditions and, in no case, less than 48 hours after rainfall. Submit a ground test report to the Engineer using the "Fall of Potential" method and appropriate ground testing instrumentation.
7. Where a bare conductor is the only conductor installed in conduit or other raceway, and this conductor is serving as a grounding conductor, it shall be bonded to the raceway that contains it at each end of the raceway. The bond shall be made using a grounding type bushing and bonding jumper. The size of the jumper shall be the maximum size that the grounding bushing lug will accept and it shall be connected to the bushing with the lug and to the grounding conductor with a split bolt connector.
8. All metal electrical equipment cabinets (wireways, panels, switchgear, device boxes, junction and pull boxes, motor control panels, etc.) 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. Switchgear, panelboards and motor control equipment shall be provided with an equipment ground bus (including lugs or screw terminals) securely bonded to the enclosure. 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 switchgear 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.
9. No raceway (including rigid steel conduit, EMT, etc.) shall serve as a grounding conductor.
10. All main feeder circuits and all branch circuits shall contain a grounding conductor sized according to Table 250-95, Article 250 of the National Electrical Code or as shown on the drawings. This grounding conductor shall be connected to the main grounding conductor in the switchgear from which the circuit emanates. Individual components of the system served by the main feeder circuit shall have their enclosures connected to the main feeder grounding conductor with pressure connectors.
11. The grounding conductor serving motor circuitry shall be connected inside

the entrance compartment to the motor frame with a bolted solderless pressure connector. Bolts, nuts, washers and other assorted hardware shall be bronze, cadmium plated steel, or other corrosion resistant material. The motor ground connection shall be to the motor frame and independent of the mounting bolts or sliding base.

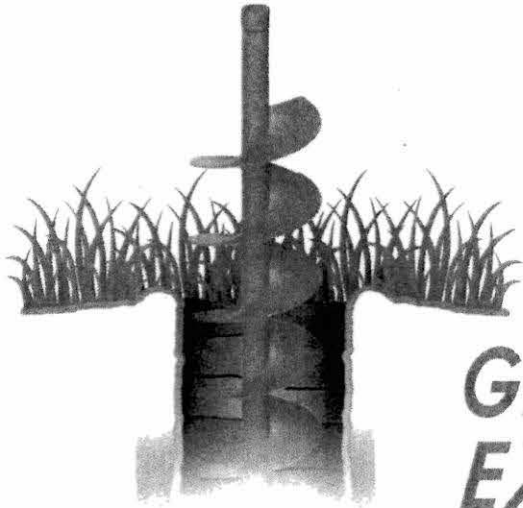
12. Where lightning arresters are furnished and installed either separately or with equipment and the grounding connections are not inherently provided, a suitable, separate, grounding conductor shall connect the lightning arrester with a separate ground rod. This rod shall be interconnected with any adjacent grounding system.
13. Grounded and Grounding Conductor: Connections to the grounding conductor and/or the neutral (grounded) conductor shall be made in such a manner that removal of any device or equipment will not interrupt the continuity of these conductors to any device downstream from the device removed.

D. Lighting

1. The Contractor shall furnish all light fixtures, lighting equipment, components, hangers, etc., as shown on the Contract Drawings and shall install them at the locations shown on the Contract Drawings.
2. Mounting heights specified as indicated shall be to bottom of fixture. Coordinate exact mounting of lighting fixture with type, style and pattern of ceiling being installed.
3. Clean interior lighting fixtures of dirt and debris upon completion of installation. Protect installed fixtures from damage during remainder of construction period.
4. At date of substantial completion, replace lamps in lighting fixture.
5. No light fixtures shall be hung or installed until after painting is completed, however, the Contractor shall provide temporary lighting. Fixtures in suspended ceilings shall be fastened to the main tees of the ceiling grid.

END OF SECTION

APPENDIX A



Report of
**GEOTECHNICAL
EXPLORATION**

AMERICAN ENGINEERS, INC.

MORRILL

ELEVATED TANK

ROCKCASTLE COUNTY, KY

APRIL 2015

DESIGNING YOUR FUTURE, TODAY.





April 8, 2016

Mr. Howard Williams, President
Jackson County Water Association
P.O. Box 232
Tyner, KY 40486

Re: Report of Geotechnical Exploration
Morrill Elevated Tank
Rockcastle County, Kentucky
AEI Project No. 216-032

Dear Mr. Williams:

American Engineers, Inc. is pleased to submit this geotechnical report that details the results of our geotechnical exploration performed at the above referenced site.

The attached report describes the site and subsurface conditions and also details our recommendations for the proposed project. The Appendices to the report contains a drawing with a boring layout, typed boring logs and the results of all laboratory testing.

We appreciate the opportunity to be of service to you on this project and hope to provide further support on this and other projects in the future. Please contact us if you have any questions regarding this report.

Respectfully,
AMERICAN ENGINEERS, INC.

A handwritten signature in black ink that reads "Brad High".

Brad High, PG
Project Geologist

A handwritten signature in black ink that reads "Dusty Barrett".

Dusty Barrett, PE
Geotechnical Project Manager

**REPORT OF GEOTECHNICAL EXPLORATION
MORRILL ELEVATED TANK
ROCKCASTLE COUNTY, KENTUCKY**
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Appendices

Appendix A – Boring Layout

Appendix B – Boring Logs

REPORT OF GEOTECHNICAL EXPLORATION MORRILL ELEVATED TANK ROCKCASTLE COUNTY, KENTUCKY

1 GENERAL SITE DESCRIPTION

The site is located near KY 1912 on N Cruse Ridge Road in Rockcastle County, Kentucky. The proposed project includes a 100,000 gallon elevated water storage tank supported on four legs with a center riser and will be on the order of about 108 feet tall. The tank will have an approximate diameter of 30 feet.

The topography of the site is best described as level to gently rolling near the tank footprint with about three feet of relief in the immediate vicinity of the tank. Structural loads are anticipated to be on the order of 332 kips for the outside columns with the center column (riser) on the order of 80 kips. Preliminary structural loads were provided by Caldwell Tanks.

2 GENERAL SITE GEOLOGY

Available geologic mapping (*Geologic Map of the Bighill Quadrangle, East-Central Kentucky, KGS 1971* and the Kentucky Geologic Map Information Service online) shows the site to be underlain by lower Pennsylvanian-aged deposits of the Lee Formation or more recently differentiated Grundy Formation. Geologic mapping indicates the uppermost bedrock beneath the site to be comprised of shale, siltstone, sandstone and coal. The shale and siltstone are commonly interbedded with sandstone and comprise about 90 percent of the unit. The shale and sandstone are also described by mapping as commonly medium gray to black, carbonaceous and micaceous in part and laminated. Sandstone of the formation is typically brown to yellowish gray, mostly fine-grained and in part silty and micaceous.

No geologic hazards or coal mines were apparent during the site investigation or upon review of geologic mapping, however since coal is known to exist in the area and has been mined within the quadrangle it is possible that coal could have been mined for local consumption in the area. It should be noted that it is impossible to investigate a site to such an extent to fully identify the possibility of future geologically related problems during the course of a typical geotechnical investigation.

3 SCOPE OF WORK PERFORMED

The geotechnical exploration consisted of drilling two soil test borings to auger refusal and two rockline soundings. Rock coring was performed in each of the soil test borings about ten to 15 feet beneath the auger refusal depth. The borings were staked by others prior to arrival of AEI personnel on site. Boring elevations were estimated from provided topographic mapping. A boring layout is included in Appendix A of this report.

The borings were drilled by an AEI drill crew using a track-mounted drill rig equipped with continuous flight hollow-stem augers and an NQ2-size diamond coring bit. Standard

penetration tests (SPT's) were performed in each of the soil test borings at 2 ½ foot intervals to the refusal depth. A Graduate Geologist was on site throughout the fieldwork to log the soil and rock encountered during the drilling operation, with particular attention given to soil type, color, relative moisture content, primary constituents, and soil strength consistencies. The recovered soil samples and rock core were further classified in the lab by experienced laboratory personnel and verified by a Geotechnical Engineer.

The natural moisture content of the soil samples was determined in the laboratory. The natural moisture content is denoted as (W%) and shown as a percentage of the dry weight of the soil on the boring logs. The results of the natural moisture content tests are indicated on the boring logs in Appendix B.

The soils were classified in the laboratory in general accordance with the Unified Soil Classification System (USCS). The Unified symbol for each stratum is shown on the legend for the typed boring logs. The testing was performed in accordance with the generally accepted standards for such tests.

4 RESULTS OF THE EXPLORATION

4.1 GENERAL

Information provided in the Appendices for this report includes boring locations, logs of the borings, and other relevant geotechnical information. A description of the subsurface soil, bedrock and groundwater conditions follows.

4.2 SUBSURFACE SOIL CONDITIONS

The generalized subsurface conditions encountered at the boring locations, including descriptions of the various strata and their depths and thicknesses are presented on the Boring Logs in Appendix B.

Topsoil was encountered at the existing ground surface in each of the borings with a thickness of about two inches. Beneath the topsoil, lean clays were typically encountered to the top of bedrock. The lean clay can generally be described as containing variable amounts of gravel, brown to reddish brown or gray in color, moist to wet and very stiff to hard in soil strength consistency.

SPT-N values in the residual clays ranged from 18 to 41 blows per foot (bpf), excluding 50+ blow counts. Corresponding estimated unconfined compressive strength (Q_p) values were generally greater than 4.5 tons per square foot (tsf). Together, the SPT-N and Q_p values are indicative of very stiff to hard soil strength consistencies.

Visual classification of recovered soil samples indicate that the near-surface clay soils typically classify as CL (Clay of Low plasticity), lean clay, in accordance with the USCS. Moisture contents of the residual clays ranged from about 11 to 31 percent. The results of visual classification and natural moisture content testing indicate that the clay soils at the site are generally at a moisture content near the anticipated optimum moisture for compaction.

4.3 BEDROCK CONDITIONS

Refusal, as indicated by the driller on the field boring logs, indicates a depth where either essentially no downward progress can be made by the auger or where the N-value indicates essentially no penetration of the split-spoon sampler. It is normally indicative of a very hard or very dense material such as large boulders or the upper bedrock surface. At this site, auger refusal was encountered in each boring at a depth ranging from about ten feet beneath the existing ground surface. Weathered shale was encountered in each of the borings prior to auger refusal at depths ranging from about seven feet beneath the existing ground surface. The recovered rock core was described as shale with interbedded sandstone, arenaceous, dark gray to black, very thin to thin bedded and soft to moderately hard. Core recovery percentages ranged from 29 to 100 percent with most runs measured at 84 percent recovery or greater. Measured Rock Quality Designation (RQD) values for the rock core samples were all zero percent indicating very poor rock quality on average.

4.4 GROUNDWATER CONDITIONS

Groundwater was not encountered in any of the borings during drilling. In cohesive soils such as those encountered at the site, a long time is required for the hydrostatic groundwater level to come to equilibrium in the borehole. The short-term groundwater levels reported by the drill crew are not generally indicative of the long-term groundwater level. To accurately determine the long-term groundwater level, as well as the seasonal and precipitation induced fluctuations of the groundwater level, it is necessary to install piezometers in the borings, and monitor them for an extended length of time. Frequently, groundwater conditions affecting construction in this region are caused by trapped or perched groundwater, which occurs within the soil materials or at the soil/rock interface in irregular, discontinuous locations. If these water bodies are encountered during excavation, they can produce seepage durations and rates that will vary depending on the recent rainfall activity and the hydraulic conductivity of the material.

4.5 SEISMIC CONDITIONS

According to the Kentucky Building Code, 2012 Edition and the subsurface conditions encountered in the borings, Site Class B should be utilized for design.

Soil liquefaction analysis was outside the scope of this investigation. Prior studies in this region on similar soil types indicate that the potential for liquefaction is low and is primarily dependent on the variability of site soils and earthquake severity.

Consideration for seismic loading and liquefaction potential beyond this level of investigation is left to the discretion of the structural framing and foundation design engineer.

5 ANALYSES AND RECOMMENDATIONS

The recommendations that follow are based on our conceptual understanding of the project. As the site design is advanced, please notify us of any significant design changes so that our recommendations can be reviewed and modified as necessary.

5.1 GENERAL SITE WORK

5.1.1 On-Site Soils

The on-site soils are suitable for use as fill material, provided close control is maintained over the moisture content at placement. The surficial site soils are low plasticity clays with USCS classifications of CL (Clay of Low plasticity).

5.1.2 Excavations

Foundation excavations should be properly sloped back in accordance with the Kentucky Occupational Safety and Health Standards for the Construction Industry 29 CFR Part 1926, Subpart P – Excavations. The soil overburden at the site should be classified as Type A soil in accordance with the above standard for excavations less than 20 feet. Soil at the site should be laid back on a slope of 1 Horizontal: 1 Vertical (1 H: 1V) or flatter. Excavations which extend below the bedrock surface can be excavated vertical.

5.2 STRUCTURE FOUNDATIONS

5.2.1 Recommended Foundation Type and Bearing Capacity

Due to the anticipated heavy foundation loads for the tank and relatively shallow depth to rock, spread footings can be designed to bear on weathered shale bedrock. At an approximate depth of seven feet, the net allowable bearing pressure for weathered shale bedrock is 4,000 pounds per square foot (psf). If a larger bearing capacity is desired the net allowable bearing pressure may be increased to 8,000 psf at depths varying from 10.5 to 15 feet based on the data from Borings B-1 and B-2.

Non-durable shale may be encountered in foundation excavations. Shale at the site exposed in the foundation excavations will degrade rapidly when exposed to moisture. Foundations should be poured the same day that excavations are completed. In no case should excavations be allowed to remain open overnight. Concrete foundations below grade should be backfilled as soon as practical to minimize infiltration of water.

This recommendation is provided in consideration of the field-testing, laboratory testing, local codes, and our experience with materials of similar description.

5.2.2 Potential Foundation Movement

A detailed settlement analysis was not performed. However, based on a crude empirical settlement analysis using the foundation loads previously estimated it is anticipated that less than ½ inch of total settlement will occur with a rock bearing foundation system.

These estimates assume that the foundations are designed and constructed according to the recommendations in this report and in conjunction with sound foundation construction practice.

5.2.3 Acceptance of Foundation Bearing Surfaces

Prior to placement of reinforcing steel in spread footings, an AEI Engineer or Engineering Technician should review the bearing surface to verify that the design bearing capacity provided can be achieved. The spread footings should also be reviewed to verify that the bottom is level and free of mud, loose soil or other questionable material that might affect foundation support.

5.2.4 Footing Excavations

Foundation construction should follow these recommendations:

- **All foundation excavations should be reviewed by an AEI Geotechnical Engineer or Engineering Technician to verify that the design bearing capacity can be achieved.**
- **Foundation concrete should be placed in the excavations the same day the trenches are cut.**
- **Exposed bearing surfaces should be protected from severe drying, freezing, and water accumulation.**
- Any loose soil, debris, or excess water should be removed from the bearing surface by hand cleaning prior to concrete placement.
- The foundation-bearing surface should be level.
- **Foundation materials that have deteriorated as a result of the elements should be removed prior to concrete placement.**
- Foundation trenches should be "clean-cut" where possible and constructed without the use of forms.
- Reinforcing steel should be placed in all footings to provide strength to distribute loads on the foundation that may be overlying weak or more compressible foundation materials to stronger adjacent materials.

5.3 GENERAL CONSIDERATIONS

5.3.1 Construction Monitoring/Testing

All construction operations involving foundation construction should be performed in the presence of an experienced representative of AEI. The representative would operate under the direct supervision of an AEI Geotechnical Engineer. Field observations should be performed prior to and during concrete placement operations.

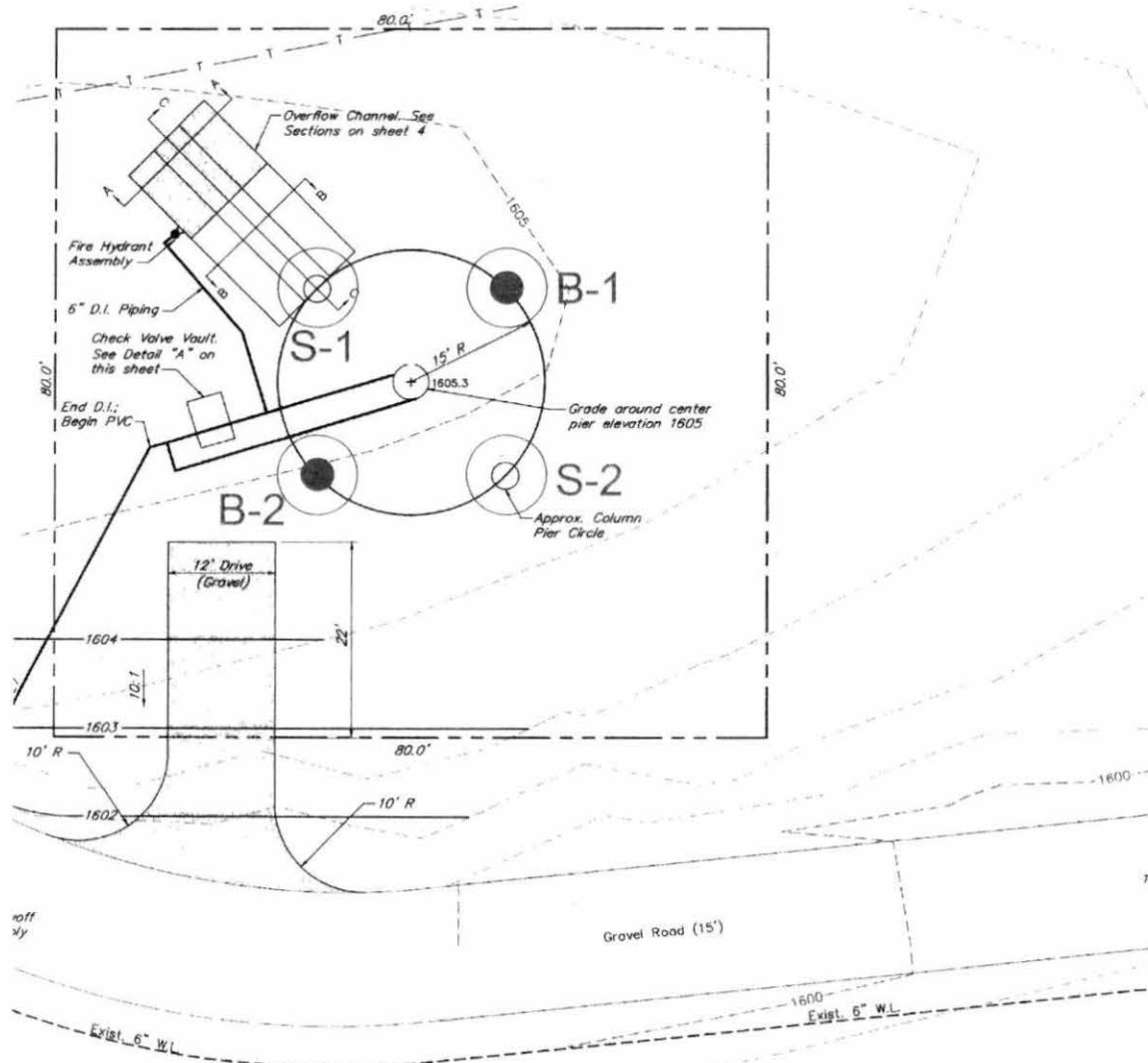
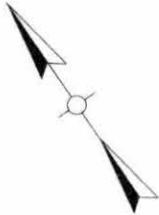
5.3.2 Limitations

The conclusions and recommendations presented herein are based on information gathered from the borings advanced during this exploration using that degree of care and skill ordinarily exercised under similar circumstances by competent members of the engineering profession. No warranties can be made regarding the continuity of conditions between the borings.


We will retain samples acquired for this project for a period of 30 days subsequent to the submittal date printed on the cover of this report. After this period, the samples will be discarded unless otherwise requested.

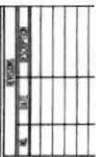
APPENDIX A

Boring Layout



LEGEND

-  SOIL TEST BORING WITH STANDARD PENETRATION TESTS AND ROCK CORE
-  ROCKLINE SOUNDING

	BORING LAYOUT
CLIENT:	Jackson County Water Association
PROJECT:	Morrill Elevated Tank Rockcastle County, KY
SCALE: NTS	
DATE: 7-16-15	
DRAWN BY: J. CHILDRESS	
CHECKED BY: D. BARRETT	
FILE:	
SHEET	B1

APPENDIX B

Boring Logs



FIELD TESTING PROCEDURES

The general field procedures employed by the Field Services Center are summarized in the following outline. The procedures utilized by the AEI Field Service Center are recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Soil Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the surface conditions. Borings are advanced into the ground using continuous flight augers. At prescribed intervals throughout the boring depths, soil samples are obtained with a split-spoon or thin-walled sampler and sealed in airtight glass jars and labeled. The sampler is first seated 6 inches to penetrate loose cuttings and then driven an additional foot, where possible, with blows from a 140 pound hammer falling 30 inches. The number of blows required to drive the sampler each six-inch increment is recorded. The penetration resistance, or "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during the exploration are in general accordance with ASTM D 1586. Split spoon samples are considered to provide *disturbed* samples, yet are appropriate for most engineering applications. Thin-walled (Shelby tube) samples are considered to provide *undisturbed* samples and obtained when warranted in general accordance with ASTM D 1587.

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

Core Drilling Procedures for use on refusal materials. Prior to coring, casing is set in the boring through the overburden soils. Refusal materials are then cored according to ASTM D-2113 using a diamond bit attached to the end of a hollow double tube core barrel. This device is rotated at high speeds and the cuttings are brought to the surface by circulating water. Samples of the material penetrated are protected and retained in the inner tube, which is retrieved at the end of each drill run. Upon retrieval of the inner tube the core is recovered, measured and placed in boxes for storage.

The subsurface conditions encountered during drilling are reported on a field test boring record by the driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soil in general accordance with the procedures outlined in ASTM D 2487 and D 2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

Representative portions of soil samples are placed in sealed containers and transported to the laboratory. In the laboratory, the samples are examined to verify the driller's field classifications. Test Boring Records are attached which show the soil descriptions and penetration resistances.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designate the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

Water table readings are normally taken in conjunction with borings and are recorded on the "Boring Logs". These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious soils are encountered (clayey soils) the amount of water seepage into the boring is small, and it is generally not possible to establish the location of hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring water level reported on the boring records is determined by field crews as the drilling tools are advanced. The boring water level is detected by changes in the drilling rate, soil samples obtained, etc. Additional water table readings are generally obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using an electrical probe to detect the water level surface.

Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

Sampling Terminology

Undisturbed Sampling: Thin-walled or Shelby tube samples used for visual examination, classification tests and quantitative laboratory testing. This procedure is described by ASTM D 1587. Each tube, together with the encased soil, is carefully removed from the ground, made airtight and transported to the laboratory. Locations and depths of undisturbed samples are shown on the "Boring Logs."

Bag Sampling: Bulk samples of soil are obtained at selected locations. These samples consist of soil brought to the surface by the drilling augers, or obtained from test pits or the ground surface using hand tools. Samples are placed in bags, with sealed jar samples of the material, and taken to our laboratory for testing where more mass material is required (i.e. Proctors and CBR's). The locations of these samples are indicated on the appropriate logs, or on the Boring Location Plan.

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIVE SOILS (Clay, Silt, and Mixtures)

<u>CONSISTENCY</u>	<u>SPT N-VALUE</u>	<u>Qu/Qp (tsf)</u>	<u>PLASTICITY</u>	
Very Soft	2 blows/ft or less	0 – 0.25	Degree of Plasticity	Plasticity Index (PI)
Soft	2 to 4 blows/ft	0.25 – 0.49	Low	0 – 7
Medium Stiff	4 to 8 blows/ft	0.50 – 0.99	Medium	8 – 22
Stiff	8 to 15 blows/ft	1.00 – 2.00	High	over 22
Very Stiff	15 to 30 blows/ft	2.00 – 4.00		
Hard	30 blows/ft or more	> 4.00		

NON-COHESIVE SOILS (Silt, Sand, Gravel, and Mixtures)

<u>DENSITY</u>	<u>SPT N-VALUE</u>	<u>PARTICLE SIZE IDENTIFICATION</u>	
Very Loose	4 blows/ft or less	Boulders	12 inch diameter or more
Loose	4 to 10 blows/ft	Cobbles	3 to 12 inch diameter
Medium Dense	10 to 30 blows/ft	Gravel	Coarse – 1 to 3 inch
Dense	30 to 50 blows/ft		Medium – ½ to 1 inch
Very Dense	50 blows/ft or more		Fine – ¼ to ½ inch
		Sand	Coarse – 0.6mm to ¼ inch
			Medium – 0.2mm to 0.6mm
			Fine – 0.05mm to 0.2mm
		Silt	0.05mm to 0.005mm
		Clay	0.005mm

RELATIVE PROPORTIONS

<u>Descriptive Term</u>	<u>Percent</u>
Trace	1 – 10
Trace to Some	11 – 20
Some	21 – 35
And	36 – 50

NOTES

Classification – The Unified Soil Classification System is used to identify soil unless otherwise noted.

Standard “N” Penetration Test (SPT) (ASTM D1586) – Driving a 2-inch O.D., 1 3/8-inch I.D. sampler a distance of 1 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6-inches to seat the sampler into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the field drill long (e.g., 10/8/7). On the report log, the Standard Penetration Test result (i.e., the N value) is normally presented and consists of the sum of the 2nd and 3rd penetration counts (i.e., N = 8 + 7 = 15 blows/ft.)

Soil Property Symbols

Qu:	Unconfined Compressive Strength	N:	Standard Penetration Value (see above)
Qp:	Unconfined Comp. Strength (pocket pent.)	omc:	Optimum Moisture content
LL:	Liquid Limit, % (Atterberg Limit)	PL:	Plastic Limit, % (Atterberg Limit)
PI:	Plasticity Index	mdd:	Maximum Dry Density



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PROFESSIONAL ENGINEERING

85 Aberdeen Drive
Glasgow, KY 42141
(270) 551-7220

CLIENT Jackson County Water Association
 PROJECT NUMBER 216-032
 DATE STARTED 3/4/16 COMPLETED 3/4/16
 DRILLER Adam Thompson
 DRILLING METHOD HSA/ Diamond impregnated coring bit
 LOGGED BY Aaron Holland CHECKED BY Brad High
 NOTES _____

PROJECT NAME Morrill Elevated Tank
 PROJECT LOCATION Rockcastle County, Kentucky
 GROUND ELEVATION 1605 ft
 GROUND WATER LEVELS:
 AT TIME OF DRILLING ---
 AT END OF DRILLING ---
 AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0		TOPSOIL (2 INCHES) (CL) silty lean CLAY, trace to some gravel, brown to reddish brown, wet, very stiff to hard	SPT 1	100	3-6-12 (18)	1.0	31			
5			SPT 2	100	5-12-19 (31)	4.5+	19			
		weathered SHALE, dark gray	SPT 3	100	12-20-35 (55)	4.5+	13			
10		SHALE, arenaceous, dark gray to black, very thin to thin bedded, soft to moderately hard	SPT 4	100	12-50	4.5+	11			
			RC 5	84 (0)						
15			RC 6	100 (0)						
20										

Refusal at 10.0 feet.
Bottom of borehole at 20.0 feet.

GEO TECH BH COLUMNS - GINT STD US LAB.GDT - 4/21/16 08:18 - T:16 PROJECTS\216-032 JACKSON COUNTY WATER TANK\MORRILL SITE\REPORTS\JACKSON COUNTY MORRILL SITE.GPJ

wea clay to



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85 Aberdeen Drive
Glasgow, KY 42141
(502) 651-7227

B-2

PAGE 1 OF 1

CLIENT Jackson County Water Association

PROJECT NAME Morrill Elevated Tank

PROJECT NUMBER 216-032

PROJECT LOCATION Rockcastle County, Kentucky

DATE STARTED 3/4/16 COMPLETED 3/4/16

GROUND ELEVATION 1605 ft

DRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---

LOGGED BY Aaron Holland CHECKED BY Brad High

AT END OF DRILLING ---

NOTES _____

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		TOPSOIL (2 INCHES) (CL) lean CLAY, some chert gravel, light reddish brown to gray, moist, very stiff to hard	SPT 1	100	9-12-11 (23)	4.5+	16				
5			SPT 2	100	9-15-26 (41)	4.5+	12				
		weathered SHALE, dark gray	SPT 3	100	10-20-40 (60)	4.5+	11				
10		SHALE, arenaceous, dark gray to black, very thin to thin bedded, soft to moderately hard	SPT 4	100	50	4.5+	7				
			RC 4	29 (0)							
			RC 5	84 (0)							
			RC 6	(0)							
			RC 7	100 (0)							
			RC 8	100 (0)							

Refusal at 9.8 feet.
Bottom of borehole at 24.7 feet.

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55 Aberdeen Drive
Glasgow, KY 42141
(270) 531-7225

CLIENT Jackson County Water Association

PROJECT NAME Morrill Elevated Tank

PROJECT NUMBER 216-032

PROJECT LOCATION Rockcastle County, Kentucky

DATE STARTED 3/4/16 COMPLETED 3/4/16

GROUND ELEVATION 1605 ft

DRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---

LOGGED BY Aaron Holland CHECKED BY Brad High

AT END OF DRILLING ---

NOTES

AFTER DRILLING ---

GEO/TECH BH COLUMNS - GINT STD US LAB GDT - 4/21/16 08:18 - T116 PROJECTS\216-032 JACKSON COUNTY WATER TANK\MORRILL SITE\REPORTS\JACKSON COUNTY MORRILL SITE.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		OVERBURDEN									
5											
10											

Refusal at 10.2 feet.
Bottom of borehole at 10.2 feet.



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KEY TO SYMBOLS

CLIENT Jackson County Water Association

PROJECT NAME Morrill Elevated Tank

PROJECT NUMBER 216-032

PROJECT LOCATION Rockcastle County, Kentucky

LITHOLOGIC SYMBOLS (Unified Soil Classification System)



CL: USCS Low Plasticity Clay



SHALE: Shale



TOPSOIL: Topsoil

SAMPLER SYMBOLS



Rock Core



Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

- LL - LIQUID LIMIT (%)
- PI - PLASTIC INDEX (%)
- W - MOISTURE CONTENT (%)
- DD - DRY DENSITY (PCF)
- NP - NON PLASTIC
- 200 - PERCENT PASSING NO. 200 SIEVE
- PP - POCKET PENETROMETER (TSF)

- TV - TORVANE
- PID - PHOTOIONIZATION DETECTOR
- UC - UNCONFINED COMPRESSION
- ppm - PARTS PER MILLION
- Water Level at Time Drilling, or as Shown
- Water Level at End of Drilling, or as Shown
- Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - GINT STD US LAB.GDT - 4/21/16 08:30 - T:\16 PROJECTS\216-032 JACKSON COUNTY WATER TANKS\MORRILL SITE\REPORTS\JACKSON COUNTY MORRILL SITE.GPJ

Your Geotechnical Engineering Report

To help manage your risks, this information is being provided because subsurface issues are a major cause of construction delays, cost overruns, disputes, and claims.

Geotechnical Services are Performed for Specific Projects, Purposes, and People

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering exploration conducted for an engineer may not fulfill the needs of a contractor or even another engineer. Each geotechnical engineering exploration and report is unique and is prepared solely for the client. No one except the client should rely on the geotechnical engineering report without first consulting with the geotechnical engineer who prepared it. The report should not be applied for any project or purpose except the one originally intended.

Read the Entire Report

To avoid serious problems, the full geotechnical engineering report should be read in its entirety. Do not only read selected sections or the executive summary.

A Unique Set of Project-Specific Factors is the Basis for a Geotechnical Engineering Report

Geotechnical engineers consider a numerous unique, project-specific factors when determining the scope of a study. Typical factors include: the client's goals, objectives, project costs, risk management preferences, proposed structures, structures on site, topography, and other proposed or existing site improvements, such as access roads, parking lots, and utilities. Unless indicated otherwise by the geotechnical engineer who conducted the original exploration, a geotechnical engineering report should not be relied upon if it was:

- not prepared for you or your project,
- not prepared for the specific site explored, or
- completed before important changes to the project were implemented.

Typical changes that can lessen the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a multi-story hotel to a parking lot
- finished floor elevation, location, orientation, or weight of the proposed structure, anticipated loads or
- project ownership

Geotechnical engineers cannot be held liable or

responsible for issues that occur because their report did not take into account development items of which they were not informed. The geotechnical engineer should always be notified of any project changes. Upon notification, it should be requested of the geotechnical engineer to give an assessment of the impact of the project changes.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that exist at the time of the exploration. A geotechnical engineering report should not be relied upon if its reliability could be in question due to factors such as man-made events as construction on or adjacent to the site, natural events such as floods, earthquakes, or groundwater fluctuation, or time. To determine if a geotechnical report is still reliable, contact the geotechnical engineer. Major problems could be avoided by performing a minimal amount of additional analysis and/or testing.

Most Geotechnical Findings are Professional Opinions

Geotechnical site explorations identify subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field logs and laboratory data and apply their professional judgment to make conclusions about the subsurface conditions throughout the site. Actual subsurface conditions may differ from those indicated in the report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risk associated with unanticipated conditions.

The Recommendations within a Report Are Not Final

Do not put too much faith on the construction recommendations included in the report. The recommendations are not final due to geotechnical engineers developing them principally from judgment and opinion. Only by observing actual subsurface conditions revealed during construction can geotechnical engineers finalize their recommendations. Responsibility and liability cannot be assumed for the recommendations

within the report by the geotechnical engineer who developed the report if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject To Misinterpretation

Misinterpretation of geotechnical engineering reports has resulted in costly problems. The risk of misinterpretation can be lowered after the submittal of the final report by having the geotechnical engineer consult with appropriate members of the design team. The geotechnical engineer could also be retained to review crucial parts of the plans and specifications put together by the design team. The geotechnical engineering report can also be misinterpreted by contractors which can result in many problems. By participating in pre-bid and preconstruction meetings and providing construction observations by the geotechnical engineer, many risks can be reduced.

Final Boring Logs Should not be Re-drawn

Geotechnical engineers prepare final boring logs and testing results based on field logs and laboratory data. The logs included in a final geotechnical engineering report should never be redrawn to be included in architectural or design drawings due to errors that could be made. Electronic reproduction is acceptable, along with photographic reproduction, but it should be understood that separating logs from the report can elevate risk.

Contractors Need a Complete Report and Guidance

By limiting what is provided for bid preparation, contractors are not liable for unforeseen subsurface conditions although some owners and design professionals believe the opposite to be true. The complete geotechnical engineering report, accompanied with a cover letter or transmittal, should be provided to contractors to help prevent costly problems. The letter states that the report was not prepared for purposes of bid

development and the report's accuracy is limited. Although a fee may be required, encourage the contractors to consult with the geotechnical engineer who prepared the report and/or to conduct additional studies to obtain the specific types of information they need or prefer. A prebid conference involving the owner, geotechnical engineer, and contractors can prove to be very valuable. If needed, allow contractors sufficient time to perform additional studies. Upon doing this you might be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Closely Read Responsibility Provisions

Geotechnical engineering is not as exact as other engineering disciplines. This lack of understanding by clients, design professionals, and contractors has created unrealistic expectations that have led to disappointments, claims, and disputes. To minimize such risks, a variety of explanatory provisions may be included in the report by the geotechnical engineer. To help others recognize their own responsibilities and risks, many of these provisions indicate where the geotechnical engineer's responsibilities begin and end. These provisions should be read carefully, questions asked if needed, and the geotechnical engineer should provide satisfactory responses.

Environmental Issues/Concerns are not Covered

Unforeseen environmental issues can lead to project delays or even failures. Geotechnical engineering reports do not usually include environmental findings, conclusions, or recommendations. As with a geotechnical engineering report, do not rely on an environmental report that was prepared for someone else.



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APPENDIX B



Report of
**GEOTECHNICAL
EXPLORATION**

AMERICAN ENGINEERS, INC.

McCAMMON RIDGE ROAD

ELEVATED TANK

JACKSON COUNTY, KY

APRIL 2015

DESIGNING YOUR FUTURE, TODAY.





AMERICAN
ENGINEERS, INC.

April 8, 2016

Mr. Howard Williams, President
Jackson County Water Association
P.O. Box 232
Tyner, KY 40486

Re: Report of Geotechnical Exploration
McCammon Ridge Road
Elevated Tank
Jackson County, Kentucky
AEI Project No. 216-032

Dear Mr. Williams:

American Engineers, Inc. is pleased to submit this geotechnical report that details the results of our geotechnical exploration performed at the above referenced site.

The attached report describes the site and subsurface conditions and also details our recommendations for the proposed project. The Appendices to the report contains a drawing with a boring layout, typed boring logs and the results of all laboratory testing.

We appreciate the opportunity to be of service to you on this project and hope to provide further support on this and other projects in the future. Please contact us if you have any questions regarding this report.

Respectfully,
AMERICAN ENGINEERS, INC.

A handwritten signature in cursive script, appearing to read "Brad High".

Brad High, PG
Project Geologist

A handwritten signature in cursive script, appearing to read "Dusty Barrett".

Dusty Barrett, PE
Geotechnical Project Manager

**REPORT OF GEOTECHNICAL EXPLORATION
MCCAMMON RIDGE ROAD ELEVATED TANK
JACKSON COUNTY, KENTUCKY**
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Appendix A – Boring Layout

Appendix B – Boring Logs

Appendix C – Laboratory Testing

**REPORT OF GEOTECHNICAL EXPLORATION
MCCAMMON RIDGE ROAD ELEVATED TANK
JACKSON COUNTY, KENTUCKY**

1 GENERAL SITE DESCRIPTION

The site is located on McCammon Ridge Road in Jackson County, Kentucky. The proposed project includes a 500,000 gallon elevated water storage tank supported on six legs with a center riser and will be on the order of about 108 feet tall. The tank will have an approximate diameter of 56 feet.

The topography of the site is best described as gently rolling to rolling with about seven feet of relief in the immediate vicinity of the tank. Structural loads are anticipated to be on the order of 765 kips for the outside columns with the center column (riser) on the order of about 1,315 kips. Preliminary structural loads were provided by Caldwell Tanks.

2 GENERAL SITE GEOLOGY

Available geologic mapping (*Geologic Map of the McKee Quadrangle, Jackson and Owsley Counties, Kentucky, KGS 1973* and the Kentucky Geologic Map Information Service) shows the site to be underlain by lower and middle Pennsylvanian-aged deposits of the Breathitt and Lee Formations or more recently differentiated Grundy Formation. Geologic mapping indicates the bedrock beneath the site to be comprised of shale (40 to 60 percent), siltstone (30 to 40 percent), sandstone (10 to 20 percent), coal and underclay. Locally, the lithology varies and thickness of the stratum varies. The shale is commonly clayey to silty, slight to very carbonaceous and medium gray to dark gray in color. Siltstone of the formation is commonly medium brownish gray to medium gray, clayey or sandy and intergrades with shale and sandstone of the formation. Sandstone of the formation is typically light gray to light brown, fine to very fine grained, quartzose and often found interstratified with siltstone and shale.

No geologic hazards or coal mines were apparent during the site investigation or upon review of geologic mapping, however since coal is known to exist in the area and has been mined within the quadrangle it is possible that coal could have been mined for local consumption. It should be noted that it is impossible to investigate a site to such an extent to fully identify the possibility of future geologically related problems during the course of a typical geotechnical investigation.

3 SCOPE OF WORK PERFORMED

The geotechnical exploration consisted of drilling three soil test borings to auger refusal and three rockline soundings. Rock coring was performed in each of the soil test borings about ten to 15 feet beneath the auger refusal depth. The borings were staked by others prior to arrival of AEI personnel on site. A boring layout is included in Appendix A of this report.

The borings were drilled by an AEI drill crew using a track-mounted drill rig equipped with continuous flight hollow-stem augers and an NQ2-size diamond coring bit. Standard penetration tests (SPT's) were performed in each of the soil test borings at 2 ½ foot intervals to the refusal depth. Undisturbed samples were also obtained at selected depth intervals. A Geologist was on site throughout the fieldwork to log the soil and rock encountered during the drilling operation, with particular attention given to soil type, color, relative moisture content, primary constituents, and soil strength consistencies. The recovered soil samples and rock core were further classified in the lab by experienced laboratory personnel and verified by a Geotechnical Engineer.

The natural moisture content of the soil samples was determined in the laboratory. The natural moisture content is denoted as (W%) and shown as a percentage of the dry weight of the soil on the boring logs. In addition, Atterberg Limits, grain-size analysis and unconfined compressive strength tests were performed on samples representative of the predominant soil horizons. The results of the laboratory tests are summarized in Appendix C.

The soils were classified in the laboratory in general accordance with the Unified Soil Classification System (USCS). The Unified symbol for each stratum is shown on the legend for the typed boring logs. The testing was performed in accordance with the generally accepted standards for such tests.

4 RESULTS OF THE EXPLORATION

4.1 GENERAL

Information provided in the Appendices for this report includes boring locations, logs of the borings, and other relevant geotechnical information. A description of the subsurface soil, bedrock and groundwater conditions follows.

4.2 SUBSURFACE SOIL CONDITIONS

The generalized subsurface conditions encountered at the boring locations, including descriptions of the various strata and their depths and thicknesses are presented on the Boring Logs in Appendix B.

Topsoil was encountered in Boring B-2 at the existing ground surface in each of the borings with a thickness of about one inch. Beneath the topsoil, sandy lean clays were typically encountered to the top of bedrock. The lean clay can generally be described as containing variable amounts of fine-grained sand, brown to yellow or red in color, moist to wet and stiff to very stiff in soil strength consistency.

SPT-N values in the residual clays ranged from eight to 27 blows per foot (bpf), excluding 50+ blow counts. Corresponding estimated unconfined compressive strength (Q_p) values ranged from about 0.75 to greater than 4.5 tons per square foot (tsf). Together, the SPT-N and Q_p values are indicative of stiff to very stiff soil strength consistencies. Unconfined compressive strength testing was performed on undisturbed samples representative of the predominant soil horizons. Unconfined compressive strength test results ranged from 4,739 to 5,646 pounds per

square foot (psf) with corresponding dry unit weights ranging from about 107 to 111 pounds per cubic foot (pcf).

Atterberg limits testing and visual classification of recovered soil samples indicate that the near-surface clay soils typically classify as CL (Clay of Low plasticity), lean clay, in accordance with the USCS. The liquid limit test results ranged from 30 and 46 percent with corresponding plasticity indices ranging from ten to 21 percent. Moisture contents of the residual clays ranged from about 16 to 22 percent. The results of Atterberg limits and natural moisture content testing indicate that the clay soils at the site are at a moisture content are near that of the plastic limit.

4.3 BEDROCK CONDITIONS

Refusal, as indicated by the driller on the field boring logs, indicates a depth where either essentially no downward progress can be made by the auger or where the N-value indicates essentially no penetration of the split-spoon sampler. It is normally indicative of a very hard or very dense material such as large boulders or the upper bedrock surface. At this site, auger refusal was encountered in each boring drilled in the tank footprint at depths ranging from about 14 ½ to 19 feet beneath the existing ground surface. Weathered shale was encountered in each of the borings prior to auger refusal at depths ranging from about 13 to 14 feet beneath the existing ground surface. In Boring B-1 shale was encountered upon performing rock coring and was described as dark gray in color, soft and thin bedded. In Borings B-2 and B-3 the recovered rock core was obtained beneath the shale and was described as sandstone with interbedded shale, fine grained, light to dark gray, soft to moderately hard and thin to thick bedded. Sandstone recovered from Boring B-3 was also described as being relatively friable. Core recovery percentages ranged from 96 to 100 percent. Measured Rock Quality Designation (RQD) values for the rock core sample range from zero to 93 percent indicating poor rock quality on average.

4.4 GROUNDWATER CONDITIONS

Groundwater was not encountered in any of the borings during drilling. In cohesive soils such as those encountered at the site, a long time is required for the hydrostatic groundwater level to come to equilibrium in the borehole. The short-term groundwater levels reported by the drill crew are not generally indicative of the long-term groundwater level. To accurately determine the long-term groundwater level, as well as the seasonal and precipitation induced fluctuations of the groundwater level, it is necessary to install piezometers in the borings, and monitor them for an extended length of time. Frequently, groundwater conditions affecting construction in this region are caused by trapped or perched groundwater, which occurs within the soil materials or at the soil/rock interface in irregular, discontinuous locations. If these water bodies are encountered during excavation, they can produce seepage durations and rates that will vary depending on the recent rainfall activity and the hydraulic conductivity of the material.

4.5 SEISMIC CONDITIONS

According to the Kentucky Building Code, 2012 Edition and the subsurface conditions encountered in the borings, Site Class B should be utilized for design provided a rock bearing foundation system is utilized to support the structure.

Soil liquefaction analysis was outside the scope of this investigation. Prior studies in this region on similar soil types indicate that the potential for liquefaction is low and is primarily dependent on the variability of site soils and earthquake severity.

Consideration for seismic loading and liquefaction potential beyond this level of investigation is left to the discretion of the structural framing and foundation design engineer.

5 ANALYSES AND RECOMMENDATIONS

The recommendations that follow are based on our conceptual understanding of the project. As the site design is advanced, please notify us of any significant design changes so that our recommendations can be reviewed and modified as necessary.

5.1 GENERAL SITE WORK

5.1.1 On-Site Soils

The on-site soils are suitable for use as fill material, provided close control is maintained over the moisture content at placement. The surficial site soils are low plasticity clays with USCS classifications of CL (Clay of Low plasticity).

5.1.2 Excavations

Foundation excavations should be properly sloped back in accordance with the Kentucky Occupational Safety and Health Standards for the Construction Industry 29 CFR Part 1926, Subpart P – Excavations. The soil overburden at the site should be classified as Type B soil in accordance with the above standard for excavations less than 20 feet. Soil at the site should be laid back on a slope of 1 Horizontal: 1 Vertical (1 H: 1V) or flatter. Excavations which extend below the bedrock surface can be excavated vertical. If these vertical rock cuts are exposed to excessive moisture, the walls may become unstable. Prolonged exposure should be prevented.

5.2 STRUCTURE FOUNDATIONS

5.2.1 Recommended Foundation Type and Bearing Capacity

Due to the anticipated heavy foundation loads for the tank and relatively shallow depth to rock, spread footings can be designed to bear on weathered shale bedrock. At an approximate depth of 14 feet, the net allowable bearing pressure for weathered shale bedrock is 4,000 pounds per square foot (psf). It should be noted that some footings may need to bear at a depth greater than 14 feet to meet the 4,000 psf bearing capacity. If a larger bearing capacity is desired, the net allowable bearing pressure may be increased to 8,000 psf at a minimum foundation depth of 20 feet.

Non-durable shale may be encountered in foundation excavations. Shale at the site exposed in the foundation excavations will degrade rapidly when exposed to moisture. Foundations should be poured the same day that excavations are completed. In no case should

excavations be allowed to remain open overnight. Concrete foundations below grade should be backfilled as soon as practical.

As an alternate to spread footings on bedrock, recommendations for drilled shafts bearing in weathered bedrock can be provided.

This recommendation is provided in consideration of the field-testing, laboratory testing, local codes, and our experience with materials of similar description.

5.2.2 Potential Foundation Movement

A detailed settlement analysis was not performed. However, based on a crude empirical settlement analysis using the foundation loads previously estimated it is anticipated that less than ½ inch of total settlement will occur with a rock bearing foundation system.

These estimates assume that the foundations are designed and constructed according to the recommendations in this report and in conjunction with sound foundation construction practice.

5.2.3 Acceptance of Foundation Bearing Surfaces

Prior to placement of reinforcing steel in spread footings, an AEI Engineer or Engineering Technician should review the bearing surface to verify that the design bearing capacity provided can be achieved. The spread footings should also be reviewed to verify that the bottom is level and free of mud, loose soil or other questionable material that might affect foundation support.

5.2.4 Footing Excavations

Foundation construction should follow these recommendations:

- **All foundation excavations should be reviewed by an AEI Geotechnical Engineer or Engineering Technician to verify that the design bearing capacity can be achieved.**
- **Foundation concrete should be placed in the excavations the same day the trenches are cut.**
- **Exposed bearing surfaces should be protected from severe drying, freezing, and water accumulation.**
- Any loose soil, debris, or excess water should be removed from the bearing surface by hand cleaning prior to concrete placement.
- The foundation-bearing surface should be level.
- **Foundation materials that have deteriorated as a result of the elements should be removed prior to concrete placement.**

- Foundation trenches should be “clean-cut” where possible and constructed without the use of forms.
- Reinforcing steel should be placed in all footings to provide strength to distribute loads on the foundation that may be overlying weak or more compressible foundation materials to stronger adjacent materials.

5.3 GENERAL CONSIDERATIONS

5.3.1 Construction Monitoring/Testing

All construction operations involving foundation construction should be performed in the presence of an experienced representative of AEI. The representative would operate under the direct supervision of an AEI Geotechnical Engineer. Field observations should be performed prior to and during concrete placement operations.

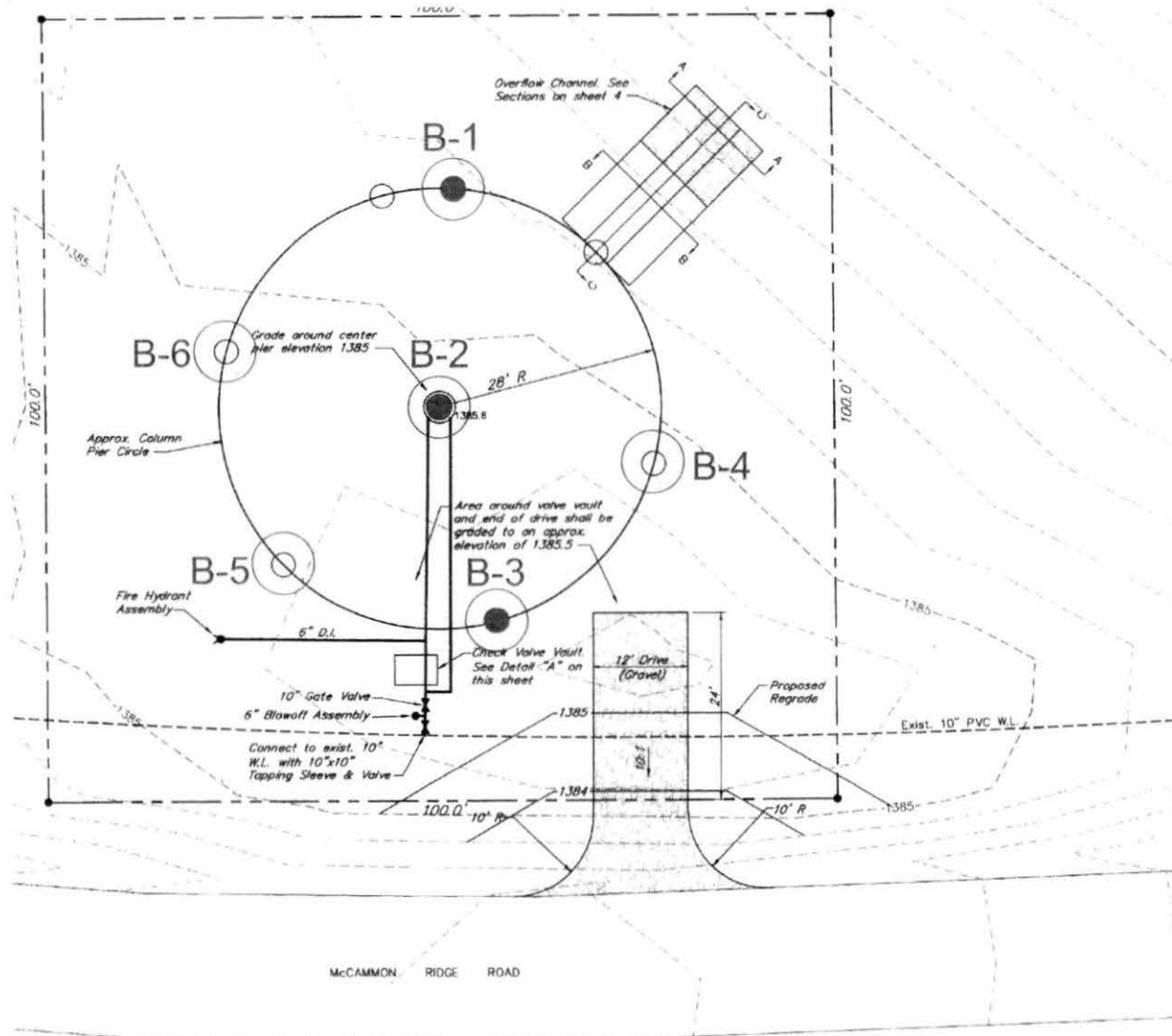
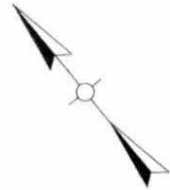
5.3.2 Limitations

The conclusions and recommendations presented herein are based on information gathered from the borings advanced during this exploration using that degree of care and skill ordinarily exercised under similar circumstances by competent members of the engineering profession. No warranties can be made regarding the continuity of conditions between the borings.



We will retain samples acquired for this project for a period of 30 days subsequent to the submittal date printed on the cover of this report. After this period, the samples will be discarded unless otherwise requested.

APPENDIX A

Boring Layout



LEGEND

-  SOIL TEST BORING WITH STANDARD PENETRATION TESTS AND ROCK CORE
-  ROCKLINE SOUNDING

DATE 4-11-16	PROJECT: McCammon Ridge Elevated Tank Jackson County, KY	CLIENT: Jackson County Water Association	DRAWING NO. 16-001
SCALE NTS			
DATE 4-11-16	CHECKED BY: D. BARRETT	SHEET B1	

APPENDIX B

Boring Logs



FIELD TESTING PROCEDURES

The general field procedures employed by the Field Services Center are summarized in the following outline. The procedures utilized by the AEI Field Service Center are recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Soil Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the surface conditions. Borings are advanced into the ground using continuous flight augers. At prescribed intervals throughout the boring depths, soil samples are obtained with a split-spoon or thin-walled sampler and sealed in airtight glass jars and labeled. The sampler is first seated 6 inches to penetrate loose cuttings and then driven an additional foot, where possible, with blows from a 140 pound hammer falling 30 inches. The number of blows required to drive the sampler each six-inch increment is recorded. The penetration resistance, or "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during the exploration are in general accordance with ASTM D 1586. Split spoon samples are considered to provide *disturbed* samples, yet are appropriate for most engineering applications. Thin-walled (Shelby tube) samples are considered to provide *undisturbed* samples and obtained when warranted in general accordance with ASTM D 1587.

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

Core Drilling Procedures for use on refusal materials. Prior to coring, casing is set in the boring through the overburden soils. Refusal materials are then cored according to ASTM D-2113 using a diamond bit attached to the end of a hollow double tube core barrel. This device is rotated at high speeds and the cuttings are brought to the surface by circulating water. Samples of the material penetrated are protected and retained in the inner tube, which is retrieved at the end of each drill run. Upon retrieval of the inner tube the core is recovered, measured and placed in boxes for storage.

The subsurface conditions encountered during drilling are reported on a field test boring record by the driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soil in general accordance with the procedures outlined in ASTM D 2487 and D 2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

Representative portions of soil samples are placed in sealed containers and transported to the laboratory. In the laboratory, the samples are examined to verify the driller's field classifications. Test Boring Records are attached which show the soil descriptions and penetration resistances.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designate the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

Water table readings are normally taken in conjunction with borings and are recorded on the "Boring Logs". These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious soils are encountered (clayey soils) the amount of water seepage into the boring is small, and it is generally not possible to establish the location of hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring water level reported on the boring records is determined by field crews as the drilling tools are advanced. The boring water level is detected by changes in the drilling rate, soil samples obtained, etc. Additional water table readings are generally obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using as electrical probe to detect the water level surface.

Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

Sampling Terminology

Undisturbed Sampling: Thin-walled or Shelby tube samples used for visual examination, classification tests and quantitative laboratory testing. This procedure is described by ASTM D 1587. Each tube, together with the encased soil, is carefully removed from the ground, made airtight and transported to the laboratory. Locations and depths of undisturbed samples are shown on the "Boring Logs."

Bag Sampling: Bulk samples of soil are obtained at selected locations. These samples consist of soil brought to the surface by the drilling augers, or obtained from test pits or the ground surface using hand tools. Samples are placed in bags, with sealed jar samples of the material, and taken to our laboratory for testing where more mass material is required (i.e. Proctors and CBR's). The locations of these samples are indicated on the appropriate logs, or on the Boring Location Plan.

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIVE SOILS

(Clay, Silt, and Mixtures)

<u>CONSISTENCY</u>	<u>SPT N-VALUE</u>	<u>Qu/Qp (tsf)</u>	<u>PLASTICITY</u>	
Very Soft	2 blows/ft or less	0 – 0.25	Degree of Plasticity	Plasticity Index (PI)
Soft	2 to 4 blows/ft	0.25 – 0.49	Low	0 – 7
Medium Stiff	4 to 8 blows/ft	0.50 – 0.99	Medium	8 – 22
Stiff	8 to 15 blows/ft	1.00 – 2.00	High	over 22
Very Stiff	15 to 30 blows/ft	2.00 – 4.00		
Hard	30 blows/ft or more	> 4.00		

NON-COHESIVE SOILS

(Silt, Sand, Gravel, and Mixtures)

<u>DENSITY</u>	<u>SPT N-VALUE</u>	<u>PARTICLE SIZE IDENTIFICATION</u>	
Very Loose	4 blows/ft or less	Boulders	12 inch diameter or more
Loose	4 to 10 blows/ft	Cobbles	3 to 12 inch diameter
Medium Dense	10 to 30 blows/ft	Gravel	Coarse – 1 to 3 inch
Dense	30 to 50 blows/ft		Medium – ½ to 1 inch
Very Dense	50 blows/ft or more		Fine – ¼ to ½ inch
		Sand	Coarse – 0.6mm to ¼ inch
			Medium – 0.2mm to 0.6mm
			Fine – 0.05mm to 0.2mm
		Silt	0.05mm to 0.005mm
		Clay	0.005mm

RELATIVE PROPORTIONS

<u>Descriptive Term</u>	<u>Percent</u>
Trace	1 – 10
Trace to Some	11 – 20
Some	21 – 35
And	36 – 50

NOTES

Classification – The Unified Soil Classification System is used to identify soil unless otherwise noted.

Standard “N” Penetration Test (SPT) (ASTM D1586) – Driving a 2-inch O.D., 1 3/8-inch I.D. sampler a distance of 1 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6-inches to seat the sampler into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the field drill log (e.g., 10/8/7). On the report log, the Standard Penetration Test result (i.e., the N value) is normally presented and consists of the 2nd and 3rd penetration counts (i.e., $N = 8 + 7 = 15$ blows/ft.)

Soil Property Symbols

Qu:	Unconfined Compressive Strength	N:	Standard Penetration Value (see above)
Qp:	Unconfined Comp. Strength (pocket pent.)	omc:	Optimum Moisture content
LL:	Liquid Limit, % (Atterberg Limit)	PL:	Plastic Limit, % (Atterberg Limit)
PI:	Plasticity Index	mdd:	Maximum Dry Density



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PAGE 1 OF 1

CLIENT Jackson County Water Association
 PROJECT NUMBER 216-032
 DATE STARTED 3/2/16 COMPLETED 3/2/16
 DRILLER Adam Thompson
 DRILLING METHOD HSA/ Diamond impregnated coring bit
 LOGGED BY Aaron Holland CHECKED BY Brad High
 NOTES _____

PROJECT NAME McCammon Ridge Road Elevated Tank
 PROJECT LOCATION Jackson County, Kentucky
 GROUND ELEVATION 1385.6 ft
 GROUND WATER LEVELS:
 AT TIME OF DRILLING ---
 AT END OF DRILLING ---
 AFTER DRILLING ---

GEO TECH BH COLUMNS - GINT STD US LAB.GDT - 4/19/16 15:44 - T:116 PROJECTS\216-032 JACKSON COUNTY WATER TANK\MCCAMMON RIDGE RD\JACKSON COUNTY MCCAMMON RIDGE.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		TOPSOIL (1 INCH) (CL) sandy lean CLAY, yellowish brown to red, moist to wet, very stiff									
1			ST 1	100		2.75	19	30	18	12	
4			SPT 2	100	4-7-9 (16)	1.75	21				
8			SPT 3	100	3-9-10 (19)	1.5	20				
10			SPT 4	100	6-10-13 (23)	2.25	18				
15		weathered SHALE, dark gray	SPT 5	100	7-33-50 (83)	4.5+	16				
20		SHALE, gray, soft SANDSTONE with interbedded shale, fine grained, light to dark gray, soft to moderately hard, thin to thick bedded	RC 6	100 (0)							
			RC 7	100 (20)							
25			RC 8	100 (64)							
30			RC 9	100 (93)							

Refusal at 19.0 feet.
 Bottom of borehole at 34.7 feet



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CLIENT Jackson County Water Association
 PROJECT NUMBER 216-032
 DATE STARTED 3/3/16 COMPLETED 3/3/16
 DRILLER Adam Thompson
 DRILLING METHOD HSA/ Diamond impregnated coring bit
 LOGGED BY Aaron Holland CHECKED BY Brad High
 NOTES _____

PROJECT NAME McCammon Ridge Road Elevated Tank
 PROJECT LOCATION Jackson County, Kentucky
 GROUND ELEVATION 1386.5 ft
 GROUND WATER LEVELS:
 AT TIME OF DRILLING ---
 AT END OF DRILLING ---
 AFTER DRILLING ---

GEO TECH BH COLUMNS - GINT STD US LAB.GDT - 4/19/16 15:44 - 116 PROJECTS\216-032 JACKSON COUNTY WATER TANK\MCCAMMON RIDGE RD\JACKSON COUNTY MCCAMMON RIDGE.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		(CL) lean CLAY with sand, brown to red, moist to wet, stiff to very stiff									
5			SPT 1	100	3-5-8 (13)	2.0	22				
			ST 2	75		4.5+	18	32	22	10	
10			SPT 3	100	5-9-14 (23)	4.5+	20				
			ST 4	85		4.5+	22	46	25	21	
15		weathered SHALE, gray	SPT 5	100	9-20-50 (70)	4.5+	17				
		SHALE, argillaceous, dark gray to black, laminated to thin bedded, soft	RC 6	96 (0)							
20		friable SANDSTONE with interbedded shale, fine grained, light to medium gray, thin to thick bedded, soft	RC 7	100 (24)							

Refusal at 15.5 feet.
 Bottom of borehole at 25.5 feet.



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PAGE 1 OF 1

CLIENT Jackson County Water Association PROJECT NAME McCammon Ridge Road Elevated Tank
 PROJECT NUMBER 216-032 PROJECT LOCATION Jackson County, Kentucky
 DATE STARTED 3/3/16 COMPLETED 3/3/16 GROUND ELEVATION 1385.5 ft
 DRILLER Adam Thompson GROUND WATER LEVELS:
 DRILLING METHOD HSA/ Diamond impregnated coring bit AT TIME OF DRILLING ---
 LOGGED BY Aaron Holland CHECKED BY Brad High AT END OF DRILLING ---
 NOTES _____ AFTER DRILLING ---

GEO TECH BH COLUMNS - GINT STD US LAB.GDT - 4/19/16 15:44 - T:\16 PROJECTS\216-032 JACKSON COUNTY WATER TANKS\MCCAMMON RIDGE RD\JACKSON COUNTY MCCAMMON RIDGE.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		OVERBURDEN									
5											
10											
15											Weathered grey shale, augered through

Refusal at 19.0 feet.
 Bottom of borehole at 19.0 feet.



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CLIENT Jackson County Water Association

PROJECT NAME McCammon Ridge Road Elevated Tank

PROJECT NUMBER 216-032

PROJECT LOCATION Jackson County, Kentucky

DATE STARTED 3/3/16 COMPLETED 3/3/16

GROUND ELEVATION 1386 ft

DRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING ---

LOGGED BY Aaron Holland CHECKED BY Brad High

AT END OF DRILLING ---

NOTES _____

AFTER DRILLING ---

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 4/19/16 15:44 - T:16 PROJECTS\216-032 JACKSON COUNTY WATER TANKS\MCCAMMON RIDGE RD\JACKSON COUNTY MCCAMMON RIDGE.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		OVERBURDEN									
5											
10											
15											

Refusal at 16.0 feet.
Bottom of borehole at 16.0 feet.



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CLIENT Jackson County Water Association

PROJECT NAME McCammon Ridge Road Elevated Tank

PROJECT NUMBER 216-032

PROJECT LOCATION Jackson County, Kentucky

DATE STARTED 3/3/16 COMPLETED 3/3/16

GROUND ELEVATION 1385 ft

DRILLER Adam Thompson

GROUND WATER LEVELS:

DRILLING METHOD HSA/ Diamond impregnated coring bit

AT TIME OF DRILLING --

LOGGED BY Aaron Holland CHECKED BY Brad High

AT END OF DRILLING --

NOTES _____

AFTER DRILLING --

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 4/19/16 15:44 - T:\16 PROJECTS\216-032 JACKSON COUNTY WATER TANKS\MCCAMMON RIDGE RD\JACKSON COUNTY MCCAMMON RIDGE.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N-VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			REMARKS
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		OVERBURDEN									
5											
10											

Refusal at 14.5 feet.
Bottom of borehole at 14.5 feet.



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KEY TO SYMBOL





CLIENT Jackson County Water Association

PROJECT NAME McCammon Ridge Road Elevated Tank

PROJECT NUMBER 216-032

PROJECT LOCATION Jackson County, Kentucky

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

-  CL: USCS Low Plasticity Clay
-  SANDSTONE: Sandstone
-  SHALE: Shale
-  TOPSOIL: Topsoil




SAMPLER SYMBOLS

-  Rock Core
-  Standard Penetration Test
-  Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

- LL - LIQUID LIMIT (%)
- PI - PLASTIC INDEX (%)
- W - MOISTURE CONTENT (%)
- DD - DRY DENSITY (PCF)
- NP - NON PLASTIC
- 200 - PERCENT PASSING NO. 200 SIEVE
- PP - POCKET PENETROMETER (TSF)

- TV - TORVANE
- PID - PHOTOIONIZATION DETECTOR
- UC - UNCONFINED COMPRESSION
- ppm - PARTS PER MILLION
-  Water Level at Time Drilling, or as Shown
-  Water Level at End of Drilling, or as Shown
-  Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - GINT STD US LAB.GDT - 4/19/16 15:45 - T:\16 PROJECTS\216-032 JACKSON COUNTY WATER TANKS\MCCAMMON RIDGE RD\JACKSON COUNTY MCCAMMON RIDGE.GPJ

APPENDIX C

Laboratory Testing Results



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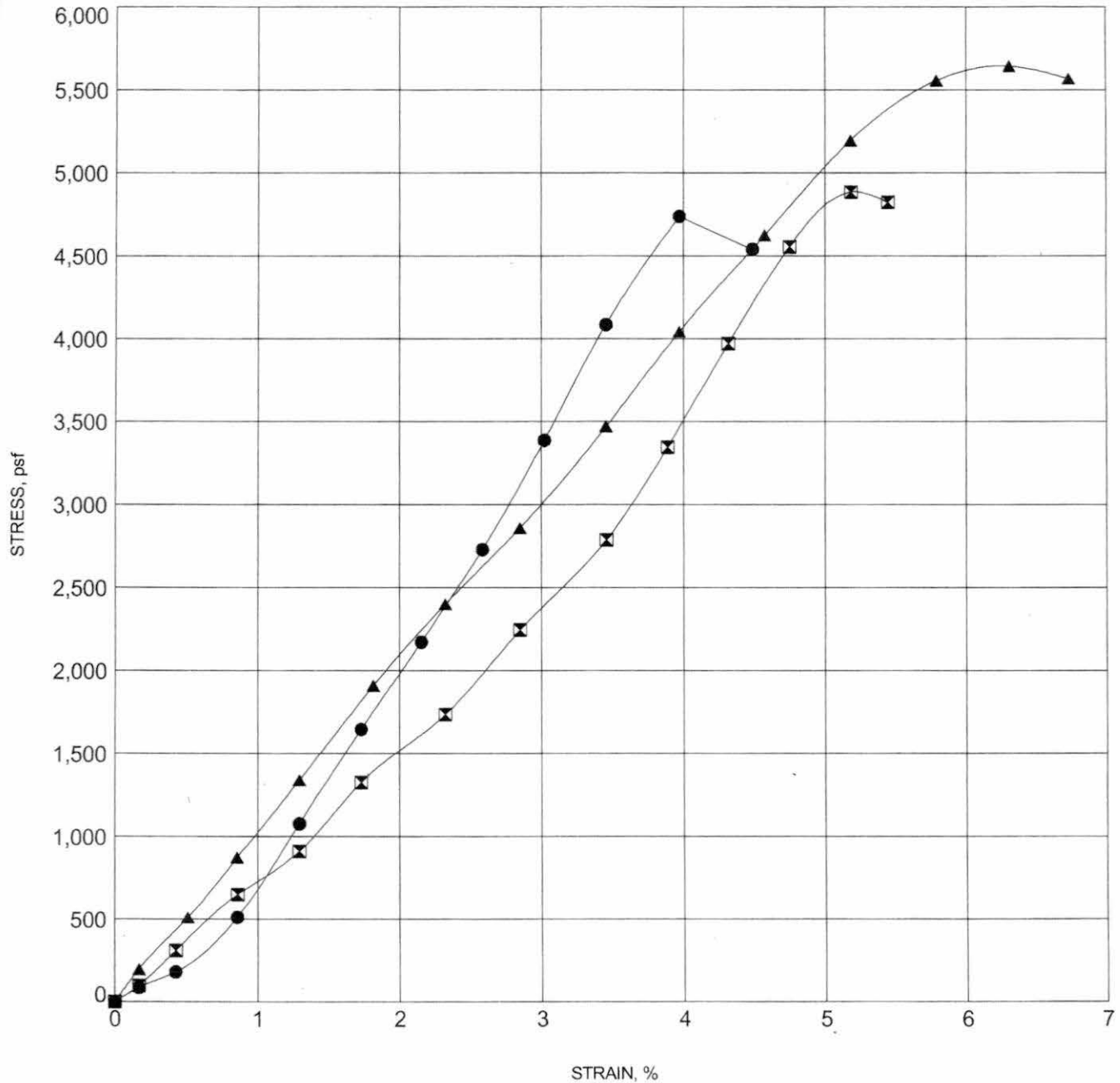
UNCONFINED COMPRESSION TEST

CLIENT Jackson County Water Association

PROJECT NAME McCammon Ridge Road Elevated Tank

PROJECT NUMBER 216-032

PROJECT LOCATION Jackson County, Kentucky



BOREHOLE	DEPTH	Classification	γ_d	Qu
● B-2	2.0	red lean CLAY	110	4739
☒ B-3	4.0	red lean CLAY	111	4886
▲ B-3	9.0	red lean CLAY	107	5646

Your Geotechnical Engineering Report

To help manage your risks, this information is being provided because subsurface issues are a major cause of construction delays, cost overruns, disputes, and claims.

Geotechnical Services are Performed for Specific Projects, Purposes, and People

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering exploration conducted for an engineer may not fulfill the needs of a contractor or even another engineer. Each geotechnical engineering exploration and report is unique and is prepared solely for the client. No one except the client should rely on the geotechnical engineering report without first consulting with the geotechnical engineer who prepared it. The report should not be applied for any project or purpose except the one originally intended.

Read the Entire Report

To avoid serious problems, the full geotechnical engineering report should be read in its entirety. Do not only read selected sections or the executive summary.

A Unique Set of Project-Specific Factors is the Basis for a Geotechnical Engineering Report

Geotechnical engineers consider a numerous unique, project-specific factors when determining the scope of a study. Typical factors include: the client's goals, objectives, project costs, risk management preferences, proposed structures, structures on site, topography, and other proposed or existing site improvements, such as access roads, parking lots, and utilities. Unless indicated otherwise by the geotechnical engineer who conducted the original exploration, a geotechnical engineering report should not be relied upon if it was:

- not prepared for you or your project,
- not prepared for the specific site explored, or
- completed before important changes to the project were implemented.

Typical changes that can lessen the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a multi-story hotel to a parking lot
- finished floor elevation, location, orientation, or weight of the proposed structure, anticipated loads or
- project ownership

Geotechnical engineers cannot be held liable or

responsible for issues that occur because their report did not take into account development items of which they were not informed. The geotechnical engineer should always be notified of any project changes. Upon notification, it should be requested of the geotechnical engineer to give an assessment of the impact of the project changes.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that exist at the time of the exploration. A geotechnical engineering report should not be relied upon if its reliability could be in question due to factors such as man-made events as construction on or adjacent to the site, natural events such as floods, earthquakes, or groundwater fluctuation, or time. To determine if a geotechnical report is still reliable, contact the geotechnical engineer. Major problems could be avoided by performing a minimal amount of additional analysis and/or testing.

Most Geotechnical Findings are Professional Opinions

Geotechnical site explorations identify subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field logs and laboratory data and apply their professional judgment to make conclusions about the subsurface conditions throughout the site. Actual subsurface conditions may differ from those indicated in the report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risk associated with unanticipated conditions.

The Recommendations within a Report Are Not Final

Do not put too much faith on the construction recommendations included in the report. The recommendations are not final due to geotechnical engineers developing them principally from judgment and opinion. Only by observing actual subsurface conditions revealed during construction can geotechnical engineers finalize their recommendations. Responsibility and liability cannot be assumed for the recommendations

within the report by the geotechnical engineer who developed the report if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject To Misinterpretation

Misinterpretation of geotechnical engineering reports has resulted in costly problems. The risk of misinterpretation can be lowered after the submittal of the final report by having the geotechnical engineer consult with appropriate members of the design team. The geotechnical engineer could also be retained to review crucial parts of the plans and specifications put together by the design team. The geotechnical engineering report can also be misinterpreted by contractors which can result in many problems. By participating in pre-bid and preconstruction meetings and providing construction observations by the geotechnical engineer, many risks can be reduced.

Final Boring Logs Should not be Re-drawn

Geotechnical engineers prepare final boring logs and testing results based on field logs and laboratory data. The logs included in a final geotechnical engineering report should never be redrawn to be included in architectural or design drawings due to errors that could be made. Electronic reproduction is acceptable, along with photographic reproduction, but it should be understood that separating logs from the report can elevate risk.

Contractors Need a Complete Report and Guidance

By limiting what is provided for bid preparation, contractors are not liable for unforeseen subsurface conditions although some owners and design professionals believe the opposite to be true. The complete geotechnical engineering report, accompanied with a cover letter or transmittal, should be provided to contractors to help prevent costly problems. The letter states that the report was not prepared for purposes of bid

development and the report's accuracy is limited. Although a fee may be required, encourage the contractors to consult with the geotechnical engineer who prepared the report and/or to conduct additional studies to obtain the specific types of information they need or prefer. A prebid conference involving the owner, geotechnical engineer, and contractors can prove to be very valuable. If needed, allow contractors sufficient time to perform additional studies. Upon doing this you might be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Closely Read Responsibility Provisions

Geotechnical engineering is not as exact as other engineering disciplines. This lack of understanding by clients, design professionals, and contractors has created unrealistic expectations that have led to disappointments, claims, and disputes. To minimize such risks, a variety of explanatory provisions may be included in the report by the geotechnical engineer. To help others recognize their own responsibilities and risks, many of these provisions indicate where the geotechnical engineer's responsibilities begin and end. These provisions should be read carefully, questions asked if needed, and the geotechnical engineer should provide satisfactory responses.

Environmental Issues/Concerns are not Covered

Unforeseen environmental issues can lead to project delays or even failures. Geotechnical engineering reports do not usually include environmental findings, conclusions, or recommendations. As with a geotechnical engineering report, do not rely on an environmental report that was prepared for someone else.



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