WATER TOWERS
NO. 4 & 9 – VALVE VAULT IMPROVEMENTS

PREPARED FOR:
The City of Fargo
FAR MORE

City Project No. WA1854
AE2S Project No. P00803-2017-010

May 2018

PROJECT MANUAL
PROCUREMENT AND CONTRACTING REQUIREMENTS
PLANS AND SPECIFICATIONS

FOR

WATER TOWERS NO. 4 & 9 – VALVE VAULT IMPROVEMENTS

CITY OF FARGO, NORTH DAKOTA

CITY OF FARGO WATER PROJECT NO. WA1854

CIVIL / PROCESS ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of North Dakota.

Responsible for Division 00, Division 01, Division 02, Division 03, Division 08, Division 09, Division 31, Division 32, Division 33, and Sections 40 23 19, 40 27 20, 40 27 87, 40 27 89, and 40 42 80.

ELECTRICAL ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of North Dakota.

Responsible for Division 26 and Section 40 91 00

Water Towers No. 4 & 9 – Valve Vault Improvements

City of Fargo, North Dakota
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SECTION 00 11 13 – ADVERTISEMENT FOR BIDS

Water Towers No. 4 & 9 – Valve Vault Improvements
CITY OF FARGO PROJECT NO. WA1854

NOTICE IS HEREBY GIVEN that the City of Fargo, North Dakota will receive sealed Bids at Fargo City Auditor’s Office until Wednesday, June 27, 2018 at the hour of 11:30 a.m. local time for the purpose of furnishing all materials, labor, equipment, and skill required for the construction of the Water Towers No. 4 & 9 – Valve Vault Improvements, and incidental items, for said City, as is more fully described and set forth in the Plans and Specifications which are now on file in the office of the City Engineering Department. Bids will be opened in the Centennial Hall Lobby at the Fargo City Hall, 207 4th Street North shortly after the bid deadline and read aloud.

Bids shall be mailed or delivered to City Auditor, City of Fargo, 200 3rd Street North, Fargo, ND 58102.

The Work is comprised of two (2) Contracts: Contract No. 1 – General Construction and Contract No. 2 – Electrical Construction. Individual Bids will be received for each Contract as well as Contract No. 3 – Combined General and Electrical Construction which is a combined Bid for Contracts No. 1 and No. 2. The Owner will not accept a combined Bid unless that Bid is lower than the combined total of the lowest and best Bids for the separate Contracts. The Work for each Contract is described as follows:

**Contract No. 1 – General Construction:** Work generally includes removal and replacement of valves, piping, and fittings within and outside the valve vault of Water Towers No. 4 & 9. This work includes 16-inch gate valves, 16-inch check valves, 12-inch gate valves, 12-inch check valves, electric actuated 12-inch plug valves, 16-inch and 12-inch underground site piping and fittings, miscellaneous appurtenances, site restoration, and other associated Work.

**Contract No. 2 – Electrical Construction:** Work generally includes removal of existing equipment and installation of electrical fittings, boxes, panels, cable and conduit, and appurtenances within two valve vaults and two water towers. This work includes installing new panels, controls and power circuitry, heaters, conduit, and associated appurtenances at two water tower and valve vault sites.

**Contract No. 3 – Combined Construction:** Construction consisting of the Work described under Contract No. 1 – General Construction and Contract No. 2 – Electrical Construction.

All bids shall be contained in a sealed envelope plainly marked showing that such envelope contains a Bid for the Project. Refer to Section 00 21 13, for preparation of bid information.

Attached to the outside of the bid envelope must be a separate envelope containing a list of all addenda to the plans and specifications and an acknowledgement by the bidder of receipt of such addenda. The separate envelope shall also contain a bidder’s bond in the amount of 5 percent of the full amount of the bid executed by the bidder as principal and by a surety, conditioned that if the principal’s bid is accepted and the contract awarded to the principal, the principal, within 10 days after notice of award shall execute a contract in accordance with the Plan.

Water Towers No. 4 & 9 – Valve Vault Improvements
City of Fargo, North Dakota

00 11 13 - 1
with the terms of the bid and a contractor’s bond as required by law and the regulations and
determinations of the governing body. Countersignature of a bid bond is not required under
this section.

All bidders, except a bidder on a municipal, rural, and industrial water supply project
authorized for funding under Public Law No. 99-294 [100 Stat. 426; 43 U.S.C. 390a], must
be licensed for the full amount of the bid, as required by Section 43-07-05. A copy of the
Contractor’s License or Certificate of Renewal thereof, issued by the Secretary of State,
**must** be enclosed in the bid bond envelope as required under Section 43-07-12.

Bidders on this Work will be required to comply with the President’s Executive Order No.
11246, as amended. The requirements for Bidders and Contractors under this order are
explained in the Specifications.

Contracts shall be awarded on the basis of the low Bid submitted by a qualified, responsible,
and responsive Bidder deemed most favorable to the City’s interest.

The City of Fargo reserves the right to reject any and all Bids, to waive any informality in
any Bid, to hold all Bids for a period not to exceed sixty (60) days from the date of opening
Bids.

The Work on the project shall be Substantially Complete no later than December 14, 2018,
and ready for Final Payment no later than June 14, 2019.

All Work shall be done in accordance with the Bidding Documents on file in the Office of the
City Engineering Department, 200 3rd Street North, Fargo, North Dakota 58102. Complete
You may download the digital plan documents for Twenty Dollars ($20.00) by inputting
Quest project #5776089 on the website’s Project Search page. Please contact
QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance with free
membership registration, downloading, and working with this digital project information.
Copies of the Plans and Specifications and other Bidding and Contract Documents may be
obtained from Advanced Engineering and Environmental Services, Inc. (AE2S), 3101 South
Frontage Road, Moorhead, MN 56560 for a **NON-REFUNDABLE** charge of One Hundred
Fifty Dollars ($150.00) for each paper set of documents requested or Fifty ($50.00) for each
electronic copy (CD) of documents requested.

Copies of the Bidding Documents may be seen and examined at the offices of the Engineer,
Advanced Engineering and Environmental Services, Inc. (AE2S), and at Builders
Exchanges in Bismarck, Minot, Grand Forks, Fargo, Sioux Falls, and Minneapolis. All
bidding document interpretations and clarifications should be directed to the office of
Advanced Engineering and Environmental Services, Inc. (AE2S) at (218) 299-5610.

All Bidders are invited to be present at the public opening of the Bids.

Dated this 21st day of May, 2018

By: /s/ Steve Sprague, City Auditor

Fargo, North Dakota

INSTRUCTIONS FOR PROCUREMENT
SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

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 which are applicable to both the singular and plural thereof:

A.  Bidder - The individual or entity who submits a Bid directly to Owner.

B.  Successful Bidder - The lowest responsible Bidder submitting a responsive Bid to whom Owner (on the basis of Owner's evaluation as provided herein) makes an award.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Engineer. The cost, as stated in the Advertisement for Bids, is NON-REFUNDABLE.

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 requested.

A.  The Owner reserves the right to reject any Bid, if the experience qualifications 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 agreement and to complete the work contemplated therein.

3.02 A contractor's license or renewal form must be submitted with the Bid.
ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:
   1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.
   2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.02 of the General Conditions has been identified and established in paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

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 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, test, 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.

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 for which a Bid is to be submitted. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other Work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, including any Addenda and the other related data identified in the Bidding Documents;

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 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 carefully study all reports and drawings of a Hazardous Environmental Condition, if any, 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 assume responsibility for 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 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 bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

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

ARTICLE 5 – PRE-BID CONFERENCE

5.01 A Pre-Bid Conference will not be held for this project.

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified 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 the Contractor. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents.
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 ten (10) 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 five (5) percent of Bidder's maximum Bid price and in the form of a Bid Bond on the form attached, and 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 fifteen (15) days after Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of the three (3) lowest Bidders shall be retained by Owner until the earlier of seven (7) days after the Effective Date of Agreement or sixty (60) days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of Bidders other than the three (3) lowest Bidders shall be returned within fifteen (15) days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be Substantially Completed and also completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages are set forth in the Agreement and Bid Form.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute, “or-equal”, or “approved equivalent” items. Whenever it is specified or described in the Bidding Documents that a substitute, “or-equal”, or “approved equivalent” item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, Bidder may make application to Engineer for approval of the substitute, “or-equal”, or “approved
equivalent” material or equipment. Engineer will consider request for approval ONLY if submitted at least fifteen (15) days prior to the date for receipt of Bids. Each such request shall include the name of the material or equipment for which it is to be considered as a substitute, “or-equal”, or “approved equivalent” and a complete description of the proposed item including drawings, cuts, performance, and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or Work that incorporation of the proposed item would require shall be included. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

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 specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five (5) 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 lists 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, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in the cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the contract award.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

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

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents.

13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed. A Bid price shall be indicated for each Contract, Bid, and Alternate item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered. Where Increase/Deduct is shown for Alternate Lump Sum Pricing on the Bid form, either Increase
or Deduct shall be circled to indicate if the Alternate is an increase or deduct, respectively, to the Base Bid price.

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

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

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

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

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

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

13.09 The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid form. Failure to do so may be cause for classifying the Bid as non-responsive and the Bid not being opened.

13.10 The address and telephone number for communications regarding the Bid shall be shown. If the Bidder has an e-mail address, that e-mail address shall be included for communication purposes.

13.11 A copy of Contractor's License or Certificate of Renewal as issued by the Secretary of State to do business in the State of North Dakota must be enclosed in the bid bond envelope as required under Section 43-07-12. All bids and proposals for the construction of any public contract project subject to the provisions of this chapter shall contain a statement showing that the bidder or contractor is duly and regularly licensed hereunder. The number and class of such license then held by such public contractor shall appear upon such bid or proposal. No contract shall be awarded to any contractor unless he is the holder of a license in the class within which the value of the project shall fall as hereinbefore provided. A contractor must be the holder of a license at least ten days prior to the date set for receiving bids to be a qualified bidder. The bid shall be submitted in a sealed envelope upon which there is disclosed the following information:
- The class of license held by the bidder;
- The number of the bidder's license;
- The name of the person, firm or corporation submitting the bid;
- Date on which license was issued or renewed.

A bid submitted without this information shall not be considered and shall be returned to the bidder.
ARTICLE 14 – BASIS OF BID; EVALUATION OF BIDS

14.01 General
A. Bidders shall submit a Bid on individual Contracts or any combination of Contracts as set forth in the Bid Form.
   1. Bidders may submit a Bid for any of the separate Contracts or any combination of Contracts as provided in the Bid Form. Submission of a Bid on any Contract signifies Bidder’s willingness to enter into a Contract for that section alone at the price offered.
   2. Bidders offering a Bid on one or more contracts must be capable of completing the Work within the time period stated in the Agreement.

14.02 Unit Price
A. Bidders shall submit a Bid on a unit price basis for contracts established as unit price contracts as set forth in the Bid Form.
B. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. 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.

14.03 Lump Sum
A. Bidders shall submit a Bid, on a lump sum basis, on individual Contracts, any combination of Contracts, or the Combined Contract as set forth in the Bid Form.
   1. Submission of a Bid on any Contract signifies Bidder’s willingness to enter into a Contract for the Contract(s) indicated by the Bidder on the Bid Form at the price(s) offered.
   2. Bidders offering a Bid on one or more Contracts must be capable of completing the Work with the time period stated in the Agreement.
B. Discrepancies between words and figures will be resolved in favor of the words.
C. Bidders shall submit a Bid on a lump sum basis for the Base Bid and include a separate price for each Alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each Alternate will be the amount added to or deleted from the Base Bid if Owner selects the Alternate.

14.04 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in paragraph 11.02 of the General Conditions.

ARTICLE 15 – SUBMITTAL OF BID

15.01 Each prospective Bidder is furnished one (1) copy of the Bidding Documents with one (1) separate unbound copy each of the Bid form, the Bid Bond form, Non-Collusion Affidavit
form, and Contractor’s license. The unbound copy of the Bid form is to be completed and submitted with the Bid security and other required documents as described in this article.

15.02 Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids. If the Bid is sent through the mail or other delivery system, the sealed envelope and attached Bid security envelope shall be enclosed in a separate sealed envelope, labeled with the notation “Bid Enclosed” on its face and sent to the address below.

15.03 Bidder shall prepare his Bid as follows:

A. Enclose in an opaque sealed envelope:
   1. Completed Bid Form.

B. Mark on outside of opaque sealed envelope:
   1. “BID ENCLOSED"
   2. City of Fargo
      200 3rd Street North
      Fargo, ND  58102
      Attn:  City Auditor
   3. BID FOR: Water Towers No. 4 & 9 – Valve Vault Improvements
      City Project No. WA1854
      City of Fargo, North Dakota
   4. BID FROM: (Name and address of the Bidder)

      Acknowledgement of Receipt of Addenda      through _____.
      (Fill in appropriate Addendum numbers.)

      NOTE: Any Bidder who fails to acknowledge receipt of Addenda on
      the outside of the Bid envelope shall be considered non-responsive
      and that Bid will not be opened.

C. Attach to outside of sealed opaque envelope containing bid a separate sealed envelope containing the following:
   1. Bid Bond.
   2. Non-Collusion Affidavit Form. (Document 00 45 19)
   3. Contractor’s License or Certificate of Renewal.

      Note: Any Bidder who fails to include all the forms indicated above within
      the Bid Bond envelope shall be considered non-responsive and that Bid will
      not be opened.
D. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid and the associated attached Bid Security envelope shall be enclosed in a separate envelope, plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid or a Bid submitted via other delivery system shall be addressed to:

City of Fargo
Attn: City Auditor
200 3rd Street North
Fargo, ND  58102

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.

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 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 the period of time stated in the Bid form, but Owner may, in its sole discretion, release any Bid and return Bid security prior to the end of this period.

ARTICLE 19 – AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, non-responsive, 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 may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities and to negotiate contract terms with the Successful Bidder. 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.

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 a 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 Bidder whose Bid is in the best interest of the Project.

19.07 Owner will award the Contract to the lowest, responsible Bidder(s) for the Base Bid or the Base Bid plus any combination of Alternates.

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 and insurance.

ARTICLE 21 – EXECUTION 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 ten (10) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten (10) days thereafter, Owner shall deliver one (1) fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

21.02 A performance bond and payment bond, each in the amount of 100 percent of the contract price, with a corporate surety approved by the Owner, will be required as security for the faithful performance and payment of obligation under the Agreement. Attorneys-in-fact who sign the performance and payment bonds must file with each bond a certified and effective dated copy of their power of attorney.

21.03 In the event of the Bidder failing to execute the Agreement, the Owner may at their option consider the Bidder in default, in which case the certified check, bank check, or Bid Bond accompanying the Bid shall become property of the Owner.

21.04 Within ten (10) days after receipt of acceptable performance and payment bonds and the Agreement signed by the Successful Bidder, Owner shall sign the Agreement and return to the Successful Bidder an executed duplicate of the Agreement.

21.05 The Notice to Proceed shall be issued within ten (10) days of the execution of the Agreement by the Owner. A preconstruction conference will be held prior to the issuance
of the Notice to Proceed. Should there be any reason why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within ten (10) days of the execution of the Agreement or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

ARTICLE 22 – SALES AND USE TAXES

22.01 Owner is not exempt from State of North Dakota state sales and use taxes on materials and equipment to be incorporated in the Work. Said taxes shall be included in the Bid.

ARTICLE 23 - RETAINAGE

23.01 Retention of Contractor's securities in lieu of retainage is not acceptable, provisions concerning retainage are set forth in the Agreement.

ARTICLE 24 – EXECUTIVE ORDER

24.01 The Successful Bidder shall comply with all requirements of Executive Order No. 11246 regarding non-discrimination in employment, and shall incorporate the same in all subcontracts over $10,000.

ARTICLE 25 – EQUAL OPPORTUNITY REQUIREMENTS

25.01 The Bidder will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Bidder will take affirmative action to ensure that applicants are employed and that employees are treated during employment, without regard to race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Bidder agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

25.02 The Bidder will, in all solicitation or advertisements for employees placed by or on behalf of the Bidder, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

25.03 The Bidder will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the Bidder's commitments under section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

25.04 The Bidder will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
25.05 The Bidder will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

25.06 In the event of the Bidder's non-compliance with the nondiscrimination clauses of this contract or with any of such rules, regulations or orders, this contract may be cancelled, terminated or suspended in whole or in part and the Bidder may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965 or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

25.07 The Bidder will include the provisions of paragraphs as above stated in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Bidder will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, That in the event the Bidder becomes involved in or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Bidder may request the United States to enter into such litigation to protect the interests of the United States.

ARTICLE 26 – WORK HOURS

26.01 Normal work hour activity shall be limited to the hours between 7:00 am and 7:00 pm, Monday through Friday, unless specifically approved in writing by Owner.
PROCUREMENT FORMS AND SUPPLEMENTS
SECTION 00 41 00 – BID FORM

PROJECT IDENTIFICATION:

Water Towers No. 4 & 9 – Valve Vault Improvements
City Project No. WA1854
City of Fargo, North Dakota

THIS BID IS SUBMITTED TO:

City of Fargo
200 North Third Street
Fargo, ND  58102

CONTRACT IDENTIFICATION NUMBER:

Contract No. 1 – General Construction
Contract No. 2 – Electrical Construction
Contract No. 3 – Combined Construction

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

2.01 Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for sixty (60) days after the day of Bid opening. Bidder will sign and deliver the required number of counterparts of the Agreement with the Bonds and other documents required by the Bidding Requirements within ten (10) days after the date of Owner's Notice of Award.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, 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 all which is hereby acknowledged:

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Addendum Date</th>
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</table>

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 the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition, if any, which has been identified in the Supplementary conditions as provided in paragraph 4.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

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 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.

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

5.01 Bidder will complete the Work, whether specifically listed on the BID FORM, shown on the Drawings, described in the Specifications, or described in Addendum in accordance with the Contract Documents for the following price(s):

FARGO WATER TOWERS NO. 4 & 9 – VALVE VAULT IMPROVEMENTS

<table>
<thead>
<tr>
<th>CONTRACT NO. 1 – GENERAL CONSTRUCTION</th>
</tr>
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<tbody>
<tr>
<td>Lump Sum Bid Price for CONTRACT NO. 1 – GENERAL CONSTRUCTION.</td>
</tr>
<tr>
<td>$ _____________________________</td>
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<tr>
<td>(Use Figures)</td>
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<td>_____________________________</td>
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<td>(Use Words)</td>
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</table>

<table>
<thead>
<tr>
<th>CONTRACT NO. 2 – ELECTRICAL CONSTRUCTION</th>
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<table>
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<tr>
<th>CONTRACT NO. 3 – COMBINED CONSTRUCTION</th>
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<tr>
<td>Lump Sum Bid Price for CONTRACT NO. 3 – COMBINED CONSTRUCTION.</td>
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<td>(Use Figures)</td>
</tr>
<tr>
<td>_____________________________</td>
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<td>(Use Words)</td>
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6.01 Bidder agrees to complete the Work to Substantial Completion by the calendar dates indicated below, and have all Work completed and ready for Final Payment, in accordance with paragraph 14.07.B of the General Conditions, by the below-indicated calendar dates.

Contract No. 1 – General Construction:
   a) Substantial Completion – December 14, 2018
   b) Final Completion – June 14, 2019

Contract No. 2 – Electrical Construction:
   a) Substantial Completion – December 14, 2018
   b) Final Completion – June 14, 2019

Contract No. 3 – Combined Construction:
   a) Substantial Completion – December 14, 2018
   b) Final Completion – June 14, 2019

6.02 Bidder accepts the provisions of the Agreement regarding Liquidated Damages in the event of failure to complete the Work within the times specified above, and to pay Owner specified Liquidated Damages as indicated below:

A. Liquidated Damages Schedule for Substantial and Final Completion Dates

<table>
<thead>
<tr>
<th>Original Contract Amount</th>
<th>Substantial Completion Fee Per Calendar Day</th>
<th>Final Completion Fee Per Calendar Day</th>
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<tr>
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<td>$12,000,000</td>
<td>Up</td>
<td>$5,000</td>
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</tbody>
</table>

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid Security in the form of a bond.
B. Non-Collusion Affidavit Form.
C. North Dakota Contractor's License or Certificate of Renewal.
8.01 Communications concerning this Bid shall be addressed to the following:

Name
Address
Telephone No.

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

The undersigned bidder hereby expressly acknowledges his understanding of and his agreement to comply during the performance of any work under any contract resulting from this bid with all equal opportunity obligations as set forth in 40 CFR Part 8 and 41 CFR Parts 60-1 and 60-4.

SUBMITTED on _________________________, 2018.
If Bidder is:

An Individual

Name (typed or printed): ________________________________________________________________

By: ______________________________________________________________________________

(Individual's Signature)

Doing business as: ________________________________________________________________

Business address: __________________________________________________________________

__________________________________________________________________________________

Phone No.: ___________________ Fax No.: ___________________
A Partnership

Partnership Name: ________________________________________________

By: ____________________________________________________________

(Signature of general partner)

Name (typed or printed): __________________________________________

Business address: _______________________________________________

________________________________________________________________

Phone No.: _____________________    Fax No.: _____________________
A Corporation

Corporation Name: ____________________________________________

State of Incorporation: ____________________________________________

Type (General Business, Professional, Service, Limited Liability): ______________

By: ____________________________________________

(Signature)

Name (typed or printed): ____________________________________________

Title: ____________________________________________

Attest: ____________________________________________

(Signature)

Business address: ____________________________________________

_______________________________________________________________

Phone No.: __________________________ Fax No.: __________________________
A Joint Venture

Joint Venture Name: ________________________________

By: ________________________________

(Signature of joint venture partner)

Name (typed or printed): ________________________________

Title: ________________________________

Business address: ________________________________

____________________________________________________

Phone No.: ____________________________ Fax No.: ____________________________

Joint Venturer Name: ________________________________

By: ________________________________

(Signature of joint venture partner)

Name (typed or printed): ________________________________

Title: ________________________________

Business address: ________________________________

____________________________________________________

Phone No.: ____________________________ Fax No.: ____________________________

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)
SECTION 00 43 13 - 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):

BID

Bid Due Date:
Description (Project Name — Include Location):

BOND

Bond Number:
Date:
Penal sum $ (Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER

Surety’s Name and Corporate Seal

Bidder’s Name and Corporate Seal

By: ________________________________ By: ________________________________

Signature (Attach Power of Attorney)

Print Name

Title

Attest: ________________________________ Attest: ________________________________

Signature

Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.
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 Bidder’s and Surety’s liability. Recovery of such penal sum under the terms of this Bond shall be Owner’s sole and exclusive remedy upon default of Bidder.

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 of 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 the 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 the 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 00 45 19 – NON-COLLUSION AFFIDAVIT

STATE OF ________________________________

COUNTY OF _______________________________

I hereby swear (affirm) under penalty of perjury:

1. That I am the Bidder (if Bidder is an individual), a partner in the Bidder (if Bidder is a partnership), or an officer or employee of the Bidder (if Bidder is a corporation) having authority to sign on its behalf;

2. That the attached Bid or Bids have been arrived at by the Bidder individually and have been submitted without collusion with, and without any agreement, understanding or planned common course or action with any vendor of materials, suppliers, equipment, or services described in the invitation to bid designed to limit individual bidding or competition;

3. That the contents of this Bid or Bids have not been communicated by Bidder or its employees or agents to any person not an employee or agent of the Bidder or its surety on any bond furnished with the Bid or Bids, and will not be communicated to any such person, prior to any official opening of the Bid or Bids; and

4. That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

____________________________________
Signature of Bidder

Subscribed and sworn before me this

______ day of ____________20___

____________________________________
Position

______________________________
Notary

____________________________________
Company Name

(seal)

____________________________________
Date

END OF SECTION
CONTRACTING FORMS AND SUPPLEMENTS
SECTION 00 51 00 – NOTICE OF AWARD

DATE: _____________________________

TO: _____________________________

_____________________________
_____________________________

PROJECT: Water Towers No. 4 & 9 – Valve Vault Improvements
City Project No. WA1854
City of Fargo, North Dakota

CONTRACT FOR: ______________________________________________________________

You are notified that your Bid dated _________________________ for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a contract for all work under the above referenced project.

The Contract Price of your contract is _____________________ dollars and ___________ cents ($_______________).

Four (4) copies of the proposed Agreement accompany this Notice of Award.

You must comply with the following conditions precedent within fifteen (15) days of the date of this Notice of Award, that is by _____________________.

1. You must, immediately, deliver to the Engineer four (4) signed copies of this Notice acknowledging its receipt.

2. You must deliver to the Engineer four (4) fully executed counterparts of the Agreement including all the Contract Documents.

3. You must deliver with each executed Agreement, Performance and Payment Bonds as specified in the Instructions to Bidders (Paragraph 20), and General Conditions (Paragraph 5.1).

4. You must deliver with each executed Agreement, Certificates of Insurance as specified in the General Conditions (Paragraph 5.04) and Supplementary Conditions (Paragraph SC-5.04).

Please note the requirements of Article 5 of the General Conditions. The Certificate of Insurance MUST include provision for 30 days prior written notice prior to cancellation. "Will Endeavor to Mail" is not acceptable. Crossing out or X-ing over the words "endeavor to" will not be acceptable. Failure to comply with the required cancellation provision will cause the contracts to be rejected and will delay Notice to Proceed.
5. You must deliver with each executed Agreement, Current Workmen's Compensation Certificate of Premium Paid.

6. You must deliver with each executed Agreement, Contractor's Certificate of North Dakota Income and Sales Tax Clearance.

After execution of the Agreement, please send all copies of the Contract, along with the above items to the Engineer, Advanced Engineering and Environmental Services, Inc. (AE2S), 4170 28th Avenue S, Fargo ND, 58104.

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

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.
SECTION 00 52 00 – AGREEMENT

THIS AGREEMENT is by and between the City of Fargo, 200 North 3rd Street, Fargo, ND  58102 (hereinafter called Owner) and ______________________________ (hereinafter called 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:

To be filled in per intended Contract (Individual or Combined) accepted and awarded by Owner.

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:

Water Towers No. 4 & 9 – Valve Vault Improvements
City Project No. WA1854
City of Fargo
Fargo, North Dakota

ARTICLE 3 - THE ENGINEER

3.01 The Project has been designed by Advanced Engineering and Environmental Services, Inc., who is hereinafter called Engineer and 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 the essence of the Contract.
4.02 **Dates for Substantial Completion and Final Payment**

A. Substantial and Final Completion for all Contracts: Work shall be substantially completed by December 14, 2018, and be completed and ready for final payment by June 14, 2019. Failure to comply with or meet deadlines set forth herein will result in liquidated damages in accordance with Document 00 52 00.

4.03 **Liquidated Damages**

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner [to be filled in for each Contract per Liquidated Damages Schedule in Specification Section 00 41 00] for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner [to be filled in for each Contract per Liquidated Damages Schedule in Specification Section 00 41 00] for each day that expires after the time specified in paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

**ARTICLE 5 - CONTRACT PRICE**

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

A. *To be filled in per intended Contract (Individual or Combined) accepted and awarded by Owner.*

**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 a monthly basis 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 in
paragraph 2.07.A of the General Conditions 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, in accordance with paragraph 14.02 of the General Conditions:

   a. 90 percent of Work completed (with the balance being retainage).
      If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no retainage on account of Work subsequently completed, in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100 percent of the Work completed less the aggregate of payments previously made; and

   b. 100 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 97.5 percent of the Work completed, less such amounts as Engineer shall determine in accordance with paragraph 14.02.B.5 of the General Conditions and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

   A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said paragraph 14.07.

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 rate of five (5) percent per annum.

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 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 the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for having done 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 Contractor, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by Contractor, and safety precautions and programs incident thereto.

F. 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.

G. 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.

H. 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.

I. 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.

J. 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 7, inclusive);
   2. Performance Bond;
   3. Payment Bond;
   4. General Conditions (pages 1 to 40, inclusive);
   5. Supplementary Conditions (pages 1 to 9, inclusive);
   6. Specifications as listed in the table of contents of the Project Manual;
   7. Drawings consisting of a cover sheet and sheets numbered G1 through G4, C1 through C6, P1 through P7, and E1 through E8, inclusive, with each sheet bearing the following general title: WATER TOWERS NO. 4 & NO. 9 VALVE VAULT IMPROVEMENTS;
   8. Addenda (numbers _____ to _____, inclusive);
   9. Notice of Award;
   10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
       a. Notice to Proceed
       b. Written Amendment(s);
       c. Work Change Directive(s);
       d. Change Order(s);
       e. Insurance Certification(s);
       f. Current Workmen’s Compensation Certificate of Premium Paid;
       g. Contractor’s Certificate of North Dakota Income and Sales Tax Clearance.

B. The documents listed in paragraphs 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 3.05 of the General Conditions.

ARTICLE 11 - MISCELLANEOUS

11.01 Terms

A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

11.02 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.

11.03 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.

11.04 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 duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on ________________________________ (which is the Effective Date of the Agreement).

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Water Towers No. 4 & 9 – Valve Vault Improvements
City of Fargo, North Dakota

00 52 00 - 7
SECTION 00 55 00 - NOTICE TO PROCEED

DATE: ________________________________

TO: ________________________________ (Contractor)

ADDRESS: ________________________________

PROJECT: Water Towers No. 4 & 9 – Valve Vault Improvements
City Project No. WA1854
City of Fargo, North Dakota

CONTRACT FOR: ________________________________

You are hereby notified to commence WORK in accordance with the Agreement dated _____________________. You are to have all WORK completed and ready for final payment on or before _____________________.

City of Fargo
(Owner)

By: ________________________________

(Authorized Signature)

______________________________

>Title)

ACCEPTANCE OF NOTICE:
Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

______________________________

(Contractor)

______________________________

(Authorized Signature)

______________________________

>Title)

Date: ____________________, 20__

Copy to Engineer
FRM (Use Certified Mail, Return Receipt Requested)

Water Towers No. 4 & 9 – Valve Vault Improvements
City of Fargo, North Dakota

00 55 00 - 1
PROJECT FORMS
PERFORMANCE BOND

CONTRACTOR (name and address): 

SURETY (name and address of principal place of business):

OWNER (name and address):

CONSTRUCTION CONTRACT
  Effective Date of the Agreement:
  Amount:
  Description (name and location):

BOND
  Bond Number:
  Date (not earlier than the Effective Date of the Agreement of the Construction Contract):
  Amount:
  Modifications to this Bond Form: [ ] None [ ] See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Contractor’s Name and Corporate Seal (seal)

By: ________________________________
    Signature

Print Name

Title

Attest: ________________________________
    Signature

Title

SURETY

Surety’s Name and Corporate Seal (seal)

By: ________________________________
    Signature (attach power of attorney)

Print Name

Title

Attest: ________________________________
    Signature

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.
1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety’s obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor’s performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner’s notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety’s receipt of the Owner’s notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner’s right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety’s obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety’s expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety does not proceed as provided in Paragraph 5, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor’s Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety’s liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction 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 the Owner or its heirs, executors, administrators, successors, and assigns.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. 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 a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the 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 periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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

CONTRACTOR (name and address):

SURETY (name and address of principal place of business):

OWNER (name and address):

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description (name and location):

BOND

Bond Number:
Date (not earlier than the Effective Date of the Agreement of the Construction Contract):
Amount:
Modifications to this Bond Form: [ ] None [ ] See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Contractor’s Name and Corporate Seal (seal)

By: ____________________________

Signature

Print Name

Title

Attest: ____________________________

Signature

Title

SURETY

Surety’s Name and Corporate Seal (seal)

By: ____________________________

Signature (attach power of attorney)

Print Name

Title

Attest: ____________________________

Signature

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.
1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety’s obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner’s property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety’s expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety’s obligations to a Claimant under this Bond shall arise after the following:

5.1 Claimants who do not have a direct contract with the Contractor,

5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant’s obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety’s expense take the following actions:

7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

7.2 Pay or arrange for payment of any undisputed amounts.

7.3 The Surety’s failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney’s fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety’s total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney’s fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

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

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

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, 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.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

16.1 Claim: A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic’s lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of “labor, materials, or equipment” that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the 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.

16.3 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.
Contractor's Application For Payment No. ________

Application Period: Application Date:  

To (Owner): City of Fargo  From (Contractor):  Via (Engineer)  

Project: Fargo Water Tower No. 6 Valve Vault Improvements  Contract:  

Owner's Contract No.: Contractor's Project No.:  Engineer's Project No.:  

APPLICATION FOR PAYMENT

Change Order Summary

<table>
<thead>
<tr>
<th>Approved Change Orders</th>
<th>Number</th>
<th>Additions</th>
<th>Deductions</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

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

TOTALS

NET CHANGE BY CHANGE ORDERS

CONTRACTOR'S CERTIFICATION

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

Payment of: $_________________________  
   (Line 8 or other - attach explanation of other amount)  
is recommended by: __________________________________________  
   (Engineer)  (Date)  

Payment of: $_________________________  
   (Line 8 or other - attach explanation of other amount)  
is approved by: __________________________________________  
   (Owner)  (Date)  

Approved by:  
   __________________________________________  
   Funding Agency (if applicable)  (Date)  

By:  Date:  

Funding Agency (if applicable) (Date)
Progress Estimate

Contractor’s Application

<table>
<thead>
<tr>
<th>Item</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
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<td>Specification Section No.</td>
<td>Description</td>
<td>Scheduled Value</td>
<td>Work Completed</td>
<td>Total Completed and Stored to Date (C + D + E)</td>
<td>Materials Presently Stored (not in C or D)</td>
<td>% (F)</td>
<td>Balance to Finish (B - F)</td>
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<tr>
<td><strong>Totals</strong></td>
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For (contract): Application Number:
Application Period: Application Date:
## Progress Estimate

### Contractor's Application

For (contract):  
Application Period:  
Application Number:  
Application Date:  

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<th>Bid Item No.</th>
<th>Description</th>
<th>Bid Quantity</th>
<th>Unit Price</th>
<th>Bid Value</th>
<th>Estimated Quantity Installed</th>
<th>Value</th>
<th>Materials Presently Stored (not in C)</th>
<th>Total Completed and Stored to Date (D + E)</th>
<th>% (F)</th>
<th>Balance to Finish (B - F)</th>
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</tbody>
</table>

**Totals**

---

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
## Stored Material Summary

### Contractor's Application

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invoice No.</td>
<td>Shop Drawing Transmittal No.</td>
<td>Materials Description</td>
<td>Stored Previously</td>
<td>Stored this Month</td>
<td>Incorporated in Work</td>
<td>Materials Remaining in Storage ($) (D + E - F)</td>
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<td>Date (Month/Year)</td>
<td>Amount ($)</td>
<td>Amount ($)</td>
<td>Subtotal</td>
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</tbody>
</table>

**Totals**

---

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
REQUEST FOR INFORMATION

Submitted to: Advanced Engineering and Environmental Services, Inc.
4170 28th Avenue South
Fargo, ND 58104

Date: ____________________________________________
From: ____________________________________________
Attention To: ______________________________________
Tel/Fax: __________________________________________
CC: ______________________________________________
RFI #: ____________________________________________
RFI Subject: ________________________________________
Spec. Referenced: __________________________________
Project: Water Towers No. 4 & 9 - Valve Vault Improvements
AE2S Project #: P00803-2017-010

Information Requested:

Response:
# Work Change Directive

<table>
<thead>
<tr>
<th>Date of Issuance:</th>
<th>Effective Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

**Owner:** City of Fargo  
**Contractor:**  
**Engineer:**  
**Project:** Water Towers No. 4 & 9 – Valve Vault Improvements  
**Owner’s Contract No.:** WA1854  
**Contractor’s Project No.:**  
**Engineer's Project No.:** P00803-2017-010  
**Contract Name:**

Contractor is directed to proceed promptly with the following change(s):

**Description:**

**Attachments:** [List documents supporting change]

---

**Purpose for Work Change Directive:**
Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: **[check one or both of the following]**

- [ ] Non-agreement on pricing of proposed change.
- [ ] Necessity to proceed for schedule or other Project reasons.

**Estimated Change in Contract Price and Contract Times (non-binding, preliminary):**

- **Contract Price:** $ ___________[increase] [decrease].
- **Contract Time:** ___________ [increase] [decrease] days.

**Basis of estimated change in Contract Price:**

- [ ] Lump Sum  
- [ ] Cost of the Work  
- [ ] Unit Price  
- [ ] Other

**RECOMMENDED:**

**AUTHORIZED BY:**

**RECEIVED:**

**By:** Engineer (Authorized Signature)  
**Date:**

**By:** Owner (Authorized Signature)  
**Date:**

**By:** Contractor (Authorized Signature)  
**Date:**

---

Approved by Funding Agency (if applicable)

**By:**  
**Date:**

**Title:**
The Contract is modified as follows upon execution of this Change Order:

**Description:**

Attaches: [List documents supporting change]

<table>
<thead>
<tr>
<th>CHANGE IN CONTRACT PRICE</th>
<th>CHANGE IN CONTRACT TIMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Contract Price:</td>
<td>Original Contract Times:</td>
</tr>
<tr>
<td>$________________________</td>
<td>Substantial Completion:</td>
</tr>
<tr>
<td></td>
<td>Ready for Final Payment:</td>
</tr>
<tr>
<td></td>
<td>_______________ days or dates</td>
</tr>
</tbody>
</table>

[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___:

$________________________

Contract Price prior to this Change Order:

$________________________

Contract Price incorporating this Change Order:

$________________________

Contract Price prior to this Change Order:

$________________________

Contract Times prior to this Change Order:

<table>
<thead>
<tr>
<th>Increase</th>
<th>Decrease</th>
<th>from previously approved Change Orders No. ___ to No. ___:</th>
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</thead>
<tbody>
<tr>
<td>Substantial Completion:</td>
<td>Ready for Final Payment:</td>
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<tr>
<td>_______________ days or dates</td>
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[Increase] [Decrease] of this Change Order:

$________________________

[Increase] [Decrease] of this Change Order:

$________________________

Contract Times with all approved Change Orders:

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<thead>
<tr>
<th>Increase</th>
<th>Decrease</th>
<th>of this Change Order:</th>
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<tbody>
<tr>
<td>Substantial Completion:</td>
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<td>_______________ days or dates</td>
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Approved by Funding Agency (if applicable)

<table>
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<tr>
<th>By:</th>
<th>ACCEPTED:</th>
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<tbody>
<tr>
<td>Engineer (if required)</td>
<td>Contractor (Authorized Signature)</td>
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<tr>
<td>__________________________</td>
<td>__________________________</td>
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Title: __________________________

Date: __________________________

Accepted:

<table>
<thead>
<tr>
<th>By:</th>
<th>ACCEPTED:</th>
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</thead>
<tbody>
<tr>
<td>Owner (Authorized Signature)</td>
<td>Contractor (Authorized Signature)</td>
</tr>
<tr>
<td>__________________________</td>
<td>__________________________</td>
</tr>
</tbody>
</table>

Title: __________________________

Date: __________________________
CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE ____________________________

OWNER __________________________________________
CONTRACTOR _______________________________________
Contract: ___________________________________________
Project: ___________________________________________

OWNER's Contract No. ___________________  ENGINEER's Project No. __________________________

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To _____________________________________________
OWNER
And To ___________________________________________
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _______ days of the above date of Substantial Completion.

Water Towers No. 4 & 9 – Valve Vault Improvements
City of Fargo, North Dakota

00 65 16 - 1
The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees shall be as follows:

OWNER:__________________________________________________

CONTRACTOR:____________________________________________

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

[For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by Contract Documents.]

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 on _______________________________

______________________________________

ENGINEER

By: __________________________________________

(Authorized Signature)

CONTRACTOR accepts this Certificate of Substantial Completion on _______________________________

______________________________________

CONTRACTOR

By: __________________________________________

(Authorized Signature)

OWNER accepts this Certificate of Substantial Completion on _______________________________

______________________________________

OWNER

By: __________________________________________

(Authorized Signature)
CONDITIONS OF THE CONTRACT
STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

a practice division of the

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

Construction Specifications Institute

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.
00700 - 0
These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). 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. Agreement--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. 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.

4. 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.

5. Bid--The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. Bidder--The individual or entity who submits a Bid directly to Owner.

7. Bidding Documents--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. 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.

9. Change Order--A document recommended by Engineer which is signed by Contractor and Owner 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.

10. 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.

11. 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.

12. 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.

13. 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).

14. 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.

15. Contractor--The individual or entity with whom Owner has entered into the Agreement.


17. 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.

18. 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.

19. Engineer--The individual or entity named as such in the Agreement.
20. 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.

21. General Requirements--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. 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.

23. 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.

24. 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.

25. Liens--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. 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.

27. 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.

28. 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.

29. Owner--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. PCBs--Polychlorinated biphenyls.

31. 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.

32. 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.

33. Project--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. 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.

35. 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.

36. Related Entity--An officer, director, partner, employee, agent, consultant, or subcontractor.

37. Resident Project Representative--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. 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.

39. 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.

40. 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.

41. 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.

42. 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.

43. 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.

44. **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.

45. **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.

46. **Successful Bidder**--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. **Supplementary Conditions**--That part of the Contract Documents which amends or supplements these General Conditions.

48. **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.

49. **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.

50. **Unit Price Work**--Work to be paid for on the basis of unit prices.

51. **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.

52. **Work Change Directive**--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by 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. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

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; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

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, 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
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 or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, 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.
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

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 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 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 insured (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, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). 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 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;

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, false work, 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. Owner 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.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

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 Owner 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 Owner and made payable to Owner 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. Owner 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, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner 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 Owner’s exercise of this power. If such objection be made, Owner 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, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner 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 shallsubmit 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 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) 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 Draw-
ings 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: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

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 Drawing’s 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
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.
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.
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, 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 appropri-
ate 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
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, expresses, 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, expediters, 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 quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

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

12.01 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor’s fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. Contractor’s Fee: The Contractor’s fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

   a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor’s fee shall be 15 percent;

   b. for costs incurred under Paragraph 11.01.A.3, the Contractor’s fee shall be five percent;

   c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

   d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

   e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor’s fee by an amount equal to five percent of such net decrease; and

   f. when both additions and credits are involved in any one change, the adjustment in Contractor’s fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted
by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 Delays

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor’s ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor’s sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

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.

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. there are other items entitling Owner to a set-off against the amount recommended; or
d. 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, Contractor, and Engineer shall make an 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 thereof. 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 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.

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


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. Either Owner or Contractor may 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 and the other party to the Contract. 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.
SECTION 00 73 00 – SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. C-700, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions which 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 indicated below, which are applicable to both the singular and plural thereof.

SC-2.01.B Delete paragraph G.C. 2.01.B in its entirety and insert the following in its place:

B. Evidence of Insurance: Contractor shall include with each copy of the Contract, certificates of insurance (and other evidence of insurance which may be requested by Owner) which Contractor is required to purchase and maintain in accordance with Article 5, with copies delivered to each additional insured identified in the Supplementary Conditions. Before any Work at the site is started, Owner shall deliver to the Contractor certificates of insurance which Owner is required to purchase and maintain.

SC-2.02 Delete paragraph G.C. 2.02 in its entirety and insert the following in its place:

A. Owner shall furnish to Contractor up to three (3) copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

SC-3.01 Add the following new language immediately after paragraph G.C. 3.01.C:

D. The provisions of the Instructions to Bidders and Supplementary Conditions shall take precedence over the General Conditions. In the case of conflict, ambiguity, or discrepancy between Drawings and Specifications, or otherwise within the Contract Documents, the better quality or greater quantity of Work resulting in the greater cost shall be estimated and included in the Bid and Contract Price and the matter shall be drawn to the Engineer’s attention for resolution.

SC-4.02 Add the following new paragraphs immediately after paragraph G.C. 4.02.B:

C. It shall be the responsibility of the Contractor to determine to Contractor’s own satisfaction the location and nature of surface and subsurface obstacles and the soil and water conditions, which will be encountered during the work. Additional test borings and other exploratory options may be made by the Contractor at Contractor’s own expense. Contractor shall make arrangements for soil investigation with Owner. Reports and existing drawings are intended for reference only. Contractor shall verify existing conditions prior to Bidding.

D. In the preparation of Drawings and Specifications, Engineer relied upon the following reports of exploration and tests of subsurface conditions at or contiguous to the Site:

1. None

E. Copies of reports and drawings itemized in SC 4.02.C and SC 4.02.D that are not included with the Bidding Documents may be examined at Advanced Engineering and Environmental Services, Inc. (AE2S) 3101 South Frontage Road South, Moorhead, MN 56560

Water Towers No. 4 & 9 – Valve Vault Improvements
City of Fargo, North Dakota

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during regular business hours. These reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer and Engineer's Consultants in the preparation of Drawings and Specifications.

SC-4.03  Add the following new paragraphs immediately after paragraph G.C. 4.03.B:

C. In the preparation of Drawings and Specifications, Engineer relied upon the following reports of exploration and tests of hazardous environmental conditions at or contiguous to the Site:
1. None

SC-4.05  Add the following new paragraph immediately after paragraph 4.05.A:

B. Reference points shall be provided by the Engineer one (1) time, subsequent reestablishment of reference points shall be the responsibility of the Contractor. Contractor shall notify the Engineer a minimum of three (3) days in advance of the need for construction reference points for the Project. All other layout and staking shall be the responsibility of the Contractor.

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

C. The limits of liability for insurance required by paragraph 5.04 of the General Conditions shall provide the following 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. Longshoreman's): Statutory
   c. Employer's Liability: $100,000

2. Contractor's Liability Insurance under paragraphs 5.04.A.3 through A.6 of the General Conditions which shall also include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of Contractor:
   a. General Aggregate (Except Products-Completed Operations): $1,000,000
b. Products-Completed
   Operations Aggregate: $1,000,000

c. Personal and Advertising
   Injury (Per Person/
   Organization): $500,000

d. Each Occurrence
   (Bodily Injury and
   Property Damage): $1,000,000

e. Limit per Person Medical
   Expense: $5,000

f. Personal Injury Liability Coverage will include claims arising out of
   Employment.

g. Property Damage liability insurance will provide Explosion, Collapse,
   and Underground coverages.

h. Excess Liability Umbrella Form
   1) General Aggregate $1,000,000
   2) Each Occurrence $1,000,000

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

a. Bodily Injury:
   1) Each Person: $1,000,000
   2) Each Accident: $1,000,000

b. Property Damage:
   1) Each Accident: $1,000,000

or

c. Combined Single Limit (Bodily Injury and Property Damage)
   1) Each Accident: $1,000,000

4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General
   Conditions shall provide coverage for not less than the following amounts:

a. General Aggregate: $1,000,000

b. Each Occurrence
   (Bodily Injury and
   Property Damage): $1,000,000
5. Additional Insureds:
   a. City of Fargo, North Dakota
   b. Advanced Engineering and Environmental Services, Inc. (AE2S)

6. Please note the requirements of Article 5 of the General Conditions. The Certificate of Insurance **MUST** include provision for 30 days prior written notice prior to cancellation. “Will Endeavor to Mail” is not acceptable. Crossing out or X-ing over the words “endeavor to” will not be acceptable. Failure to comply with the required cancellation provision will cause the contracts to be rejected and will delay the Notice to Proceed.

**SC-5.06.A** **Delete paragraph G.C. 5.06.A in its entirety and insert the following in its place:**

   A. General Contractor shall purchase and maintain property insurance, completed value form, upon the Work at the site in the amount of the full replacement cost thereof. This insurance shall:

   1. include the interests of Owner, Contractors (including General, Mechanical, and Electrical), Subcontractor, Engineer, Engineer’s Consultants and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents and other 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 and 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, and such other perils 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; and

   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.

   8. Contractor shall be responsible for any deductible or self-insured retention.
9. The policies of insurance required to be purchased and maintained by Contractor in accordance with this paragraph SC-5.06 shall comply with the requirements of paragraph 5.06.C of the General Conditions.

SC-5.06.B  Delete paragraph G.C. 5.06.B in its entirety and insert the following in its place:

   B. The Owner will not be purchasing project insurance under paragraph 5.06.B

SC-6.05.A  Delete paragraph G.C. 6.05.A in its entirety and insert the following in its place:

   A. Unless otherwise indicated in the individual Technical Specifications, substitute and “or-equal” items of materials or equipment will only be considered during the bidding period as outlined in the Instructions to Bidders and Section 01 61 00 of the General Requirements. If an individual Technical Specification indicates “Or-Equal Materials”, Contractor substitutions for materials or equipment provided under the individual Technical Specification will be reviewed after Notice to Proceed as part of the Submittal process. 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.

SC-6.06.B  Add the following new language immediately after paragraph G.C. 6.06.B:

   1. The apparent successful Bidder shall, within five (5) days, after Bid opening, submit to Owner a list of all such Subcontractors and Suppliers proposed for the Work of this Project. An experience statement shall accompany such lists with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor and Supplier requested by Owner. If Owner or Engineer after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in the cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the contract award.

SC-6.06.E  Add the following new language immediately after paragraph G.C. 6.06.E:

   1. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to Contractor in accordance with Contractor's Application for Payment on account of the particular Subcontractor's, Supplier's, other person's, or other organization's Work.

SC-6.09  Add the following new paragraph immediately after paragraph G.C. 6.09.C:

   D. This project is being funded by the City of Fargo. The Contractor shall comply with all requirements set forth by the City of Fargo and the State of North Dakota.
SC-6.19 Add the following paragraph after G.C.6.19.B.2:

3. the failure of equipment that has been pre-purchased directly by Owner and is provided to Contractor for installation and start-up, but in which the defect or failure of the equipment is not the result of any fault to the Contractor.

SC-7.04 Add the following new language immediately after paragraph G.C. 7.03:

7.04 Claims Between Contractors

A. Should Contractor cause damage to the Work or property of any separate Contractor at the Site, or should any claim arising out of Contractor’s performance of Work at the Site be made by any separate Contractor against another Contractor the, Owner, Engineer, or Engineer’s Consultants, Contractor shall promptly attempt to settle with such other Contractor by agreement, or to otherwise resolve the dispute by arbitration, or at law.

B. Contractor shall, to the fullest extent permitted by Law, indemnify and hold harmless Owner, Engineer, Engineer’s Consultant and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any separate Contractor against Owner, Engineer, or Engineer’s Consultant to the extent that said claim is based on, or arises out of, Contractor’s performance of the Work. Should a separate contractor cause damage to the Work or property of Contractor, or, should the performance of the Work by any separate Contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or Engineer’s Consultant or permit any action against any of them to be maintained and continued in its name or for its benefit in any court, or before any arbiter, which seeks to impose liability on, or to recover damages from, Owner, Engineer, or Engineer’s Consultant on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of a separate Contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor’s exclusive remedy with respect to Owner, Engineer, and Engineer’s Consultant for any delay, disruption, interference or hindrance caused by any separate Contractor.

SC-10.01 Add the following paragraph immediately after G.C. 10.01.B:

"C. Except as specifically authorized in writing by the Engineer at the time additional work is done beyond the original scope of the Contract Documents, the Contractor shall make no claims for additional compensation. The Contractor’s plea of ignorance of foreseeable conditions which will create difficulties or hindrances in the execution of the work will not be acceptable to the Owner as an excuse for any failure of the Contractor to fulfill the requirements of the Contract Documents, and shall not be a basis for the Contractor’s claim for additional compensation. Any discrepancies in, or conflicts between, the items described in these Contract Documents must be submitted in writing to the Engineer for adjustment prior to proceeding with the work, as any claims for additional compensation to achieve compliance with the requirements of those items will not be allowed or considered."

Water Towers No. 4 & 9 – Valve Vault Improvements
City of Fargo, North Dakota

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SC-10.05.B  Amend the first sentence of paragraph G.C. 10.05.B to read as follows:

“Notice: Written notice stating the general nature of each such claim or dispute or other matter, will be delivered by the claimant to the Engineer and the other parties involved promptly (but in no event later than ten (10) days after the occurrence of the event giving rise thereto.”

SC-11.02  Add the following to the end of paragraph G.C. 11.02.B.1.b:

Owner shall pay Contractor the actual invoice amounts for allowances. The difference between invoice amounts and allowance amounts shall not be paid to the Contractor.

SC-13.03.B Delete the first sentence in paragraph G.C. 13.03.B and replace with the following:

Contractor shall pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents. And as so amended paragraph 13.03.B remains in effect.

SC-13.03.D  Add the following to the end of paragraph G.C. 13.03.D:

All inspections and testing laboratories must have prior approval of the Engineer.

SC-13.07.A  Amend the first sentence of paragraph G.C. 13.07.A by striking out the following words:

“Substantial Completion” and replace with the words “Final Acceptance By Owner”

SC-14.02.B.5 Add the following new language at the end of the paragraph G.C. 14.02.B.5.d:

e. Failure to make payment to Subcontractors, Supplier, or labor.

f. Claims made by Engineer for additional compensation because of Contractor delays or rejection of **defective** Work.

g. Liability for liquidated damages has been incurred by Contractor.

SC-14.02.C.1 Amend the first sentence of paragraph G.C. 14.02.C.1 to read as follows:

Replace the words "Ten days" with "Thirty days". And so amended paragraph 14.02.C.1 remains in effect.

SC-14.04.B.  Add the following language at the end of the second sentence of paragraph G.C. 14.04B:

“If the work is found to not be substantially complete, all costs associated with any subsequent inspections, will be documented by the Engineer, and Owner will compensate Engineer for subsequent inspections. Owner will deduct amount of compensation paid to the Engineer from the payment to the Contractor. Compensation shall be at the Engineer’s standard hourly rates plus actual cost of reimbursables.”

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SC-14.05.A Add the following new paragraph immediately after paragraph G.C. 14.05.A.4, which is to read as follows:

“5. Owner may at any time request in writing Contractor to permit Owner to take over operation of any part of the Work although it may not be substantially complete. A copy of such request will be sent to the Engineer, and within a reasonable time thereafter Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected prior to final payment. If Contractor does not object in writing to Owner and Engineer that such part of Work is not ready for separate operation by Owner, Engineer will finalize the list of items to be completed or corrected and will deliver such list to Owner and Contractor together with a written recommendation as to the division of responsibility pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties, and guarantees for that part of the Work which will become binding upon Owner and Contractor at the time the Owner takes over such operation (unless they shall have otherwise agreed in writing and so informed Engineer). During such operation and prior to Substantial Completion of such part of Work, Owner shall allow Contractor reasonable access to complete or correct items on said list and to complete other related Work.”

SC-14.06.A Add the following language at the end of the second sentence of paragraph G.C. 14.06.A:

“If, after such measures are taken, subsequent inspections by the Engineer reveal that any of the previously identified items remain incomplete or defective, the Engineer will again notify Contractor in writing of the remaining items. All costs associated with any subsequent inspections, will be documented by the Engineer, and Owner will compensate the Engineer. Owner will deduct amount of compensation paid to the Engineer from the payment to the Contractor. Compensation shall be at the Engineer’s standard hourly rates plus actual cost of reimbursables.”

SC-14.06.B Add the following new paragraph immediately after paragraph G.C. 14.06.A, which is to read as follows:

B. Upon correction of deficiencies and completion of the entire work, Contractor shall notify Engineer in writing requesting a final inspection. If, in the Opinion of the Engineer, the Contractor has satisfactorily completed the Work, Contractor, Engineer, and Owner shall execute the FINAL INSPECTION AND ACCEPTANCE.

SC-16.01 Delete paragraphs G.C 16.01.A, B, and C in their entirety and replace with the following:

“A. For any conflicts that arise during the design, construction, or following completion of the Project, the Contractor and Engineer agree that all disputes between them arising out of or relating to this agreement shall be resolved, if possible, at the staff level of those involved in the project. If any conflict or dispute cannot be resolved between the Contractor and Engineer staff involved in the Project, the presidents of the respective entities will meet to attempt to resolve any dispute. If resolution is not achieved, the dispute shall be submitted to non-binding mediation.

B. The rights and remedies available to the Contractor shall be limited to breach of Contract, and no other cause or action, including, without limitation, negligence, misrepresentation,
or other theory. The Owner or Contractor may assert any such breach of Contract claim in any court of competent jurisdiction. Neither the Owner nor the Contractor shall be entitled to a jury trial for any such action. The right and remedies to the Owner hereunder shall be in addition to and shall not be construed in any way as a limitation of any rights and remedies available to the Owner which are otherwise available by law or contract, by special warranty or guarantee, or by other provisions of the Contract Documents. The provision of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which it may apply. All representations, warranties and guarantees made in the Contract Documents shall survive final payment, termination, or completion of this agreement.

C. No waiver or failure to enforce any part or provision of the Contract Documents, including, but not limited to the change order process, shall be considered a waiver by the Owner of any subsequent default or breach of the same or any other part of provision contained herein, or right to enforce the same or any part of provision contained herein."

END OF SUPPLEMENTARY CONDITIONS
DIVISION 01
GENERAL REQUIREMENTS
PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:
1. Project Description.
2. Contracts.
3. Contractual, administrative, and procedural Sections applicable to all contracts.
4. Description of Work for Contract No. 1 – General Construction.
5. Description of Work for Contract No. 2 – Electrical Construction.
6. Description of Work for Contract No. 3 – Combined General and Electrical Construction.
7. Instrumentation and Control Responsibility of Contractors and Work by Others.
8. Contractor Use of Site and Premises.
9. Owner occupancy requirements.
10. Work Sequence.
11. Temporary Construction.

1.02 PROJECT DESCRIPTION

A. The City of Fargo, North Dakota (Owner) owns and operates various water towers throughout the City’s distribution system. Water Towers No. 4 & 9 currently contains valves and process piping that are in need of upgrades. The Water Towers No. 4 & 9 – Valve Vault Improvements Project provides removal and replacement of the existing valves and process piping, and installation of additional electrical devices and controls.

B. Major components of the Project include:
1. Contract No. 1 – General Construction: Work generally includes removal and replacement of valves, piping, and fittings within and outside the valve vault of Water Towers No. 4 & 9. This work includes 16-inch gate valves, a 16-inch check valves, 12-inch gate valves, 12-inch check valves, electric actuated 12-inch plug valves, 16-inch and 12-inch underground site piping and fittings, miscellaneous appurtenances, site restoration, and other associated Work.
2. Contract No. 2 – Electrical Construction: Work generally includes removal of existing equipment and installation of electrical fittings, boxes, panels, cable and conduit, and appurtenances within two valve vaults and two water towers. This work includes installing new panels, controls and power circuitry, heaters, conduit, and associated appurtenances at two water tower and valve vault sites.
C. Project Funding:
1. Funding for the Project is being funded by the City of Fargo. All construction work must comply with the City of Fargo requirements.

1.03 PROJECT – WORK COVERED BY CONTRACT DOCUMENTS

A. Work associated with this Water Towers No. 4 & 9 – Valve Vault Improvements Project will be comprised of the following contracts:
   1. Contract No. 1 – General Construction.
   2. Contract No. 2 – Electrical Construction.
   3. Contract No. 3 – Combined General and Electrical Construction.

1.04 CONTRACTS

A. The Owner will award:
   1. Two (2) separate contracts under a lump sum/unit price contract (Contract No. 1 and Contract No. 2).
      or
   2. A single contract for all work under a lump sum/unit price contract (Contract No. 3).

B. The Contractor shall not commence work until proper execution of the contract and written authorization to proceed has been issued by the OWNER. Proper execution of the contract shall include all surety bonds and insurance requirements.

C. The division of work as made by the specifications and contract drawings is for the purpose of specifying work which is required. There is no attempt to make classification according to trades or any agreements, which may exist between contractors or subcontractors and trade unions. Classification of the work shall be the Contractor’s responsibility.

D. The location of work under these contract documents is located on property of the Owner or easements obtained by the Owner, as shown on the contract drawings.

E. Completion Dates:
   1. All Contracts:
      a. Substantial Completion – December 14, 2018
      b. Final Completion – June 14, 2019

F. Liquidation Damages for this project are as indicated in the Standard Contract between Owner and Contractor.

G. Work of each Contract is identified in the following Articles. The lists may not necessarily be all inclusive and Contractor shall confirm that all necessary specification sections and drawings required to complete the work under each contract shall be included within each Contract.
1.05 CONTRACTUAL, ADMINISTRATIVE, AND PROCEDURAL SECTIONS APPLICABLE TO ALL CONTRACTS

A. Division 00 – Contract Requirements: All Sections.

B. Division 01 – General Requirements: All Sections.

1.06 DESCRIPTION OF WORK FOR CONTRACT NO. 1 – GENERAL CONSTRUCTION

A. General: The following is provided to assist the Bidder in locating the major components and Work associated with the various Contract bid items. It is not intended to provide an all-inclusive list of every drawing or specification that describes work associated with each Contract. In addition to the work shown or specified in the Specifications and Drawings listed below, Bidder shall include all work related to each Contract in the bidder’s price for each bid.

   a. All Sections listed in Paragraph 1.05.

2. Division 02 – Existing Conditions.
   a. All Sections.

3. Division 03 – Concrete.
   a. All Sections.

4. Division 08 – Openings.
   a. All Sections.

5. Division 09 – Finishes.
   a. All Sections

   a. All Sections

   a. All Sections

8. Division 33 – Utilities.
   a. All Sections

   a. All Sections

10. Drawings:
    b. Civil Drawings: C1 through C6.
    c. Process Drawings: P1 through P7

1.07 DESCRIPTION OF WORK FOR CONTRACT NO. 2 – ELECTRICAL CONSTRUCTION

A. General: The following is provided to assist the Bidder in locating the major components and Work associated with the various Contract bid items. It is not intended to provide an all-inclusive list of every drawing or specification that describes work associated with each Contract. In addition to the work shown or specified in the Specifications and Drawings listed below, Bidder shall include all work related to each Contract in the bidder’s price for each bid.

   a. All Sections listed in Paragraph 1.05.

2. Division 02 – Existing Conditions.
   a. All Sections.
3. Division 03 – Concrete
   a. Where applicable to all Electrical Construction work.
4. Division 26 – Electrical
   a. All Sections.
5. Division 31 – Earthwork
   a. Where applicable to all Electrical Construction work.
6. Division 40 – Process Interconnections
   a. Section 40 91 00.
7. Drawings:
   a. General Drawings: G1 through G3.
   b. Civil Drawings: C1 through C6, as applicable.
   c. Electrical Drawings: E1 through E8.

1.08 DESCRIPTION OF WORK FOR CONTRACT NO. 3 – COMBINED GENERAL AND ELECTRICAL CONSTRUCTION

A. General: The following is provided to assist the Bidder in locating the major components and Work associated with the various Contract bid items. It is not intended to provide an all-inclusive list of every drawing or specification that describes work associated with each Contract. In addition to the work shown or specified in the Specifications and Drawings listed below, Bidder shall include all work related to each Contract in the bidder’s price for each bid.

1. All specification Divisions and Drawings.

1.09 WORK BY OWNER

A. Contractor shall coordinate the timing and operational requirements of the Work with the Owner and Engineer.

1.10 CONTRACTOR USE OF SITE AND PREMISES

A. Limit use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.

B. Contractors shall limit use of the site for work and storage, to allow for Owner occupancy.

C. Contractors shall confine construction equipment, storage of materials and equipment, and operations of workmen to areas permitted by law, ordinances, easements, permits, or requirements of the Contract Documents, and shall not unreasonably encumber project site with construction equipment or other materials or equipment.

D. Contractors shall assume full responsibility for the protection and safekeeping of products stored on site under their respective Contracts.

E. Contractors shall move any stored products, under Contractor’s control, which interfere with operations of the Owner or public.
F. The General Contractor shall notify and coordinate construction activity with Police Department, Fire Department, and Hospital/Ambulance Services. Notice shall include Work schedule as construction proceeds, when Work affects or obstructs streets and intersections, and when Work is completed or suitable access is available in streets and intersections.

G. The General Contractor shall notify and coordinate with right-of-way and easement owners. Notice shall include Work schedule as construction proceeds, when Work affects or obstructs intersections and streets, and when Work is completed or suitable access is available in streets or intersections.

H. The General Contractor shall provide the name, address, and telephone number of person who has immediate access to equipment and is authorized to make emergency repairs to Contractor's Work, such as to correct trench cave-ins, move excavated material, move traffic control signage, move and/or repair construction access barricades and fences, and correct other problems during weekends and off-work hours so access can be maintained for fire fighting and ambulance equipment, to maintain barricades for public safety, and to facilitate Owner occupancy requirements.

I. The Contractor shall preserve all monuments, benchmarks, reference points, and stakes. In case of destruction thereof, the Contractor will be charged with expense of replacement and shall be responsible for any mistake or loss of time that may be caused. Permanent monuments or benchmarks which must be removed or disturbed shall be protected until properly referenced for relation. The Contractor shall furnish materials and assistance for the proper replacement of such monuments or benchmarks.

1.11 EROSION CONTROL MEASUREMENTS

A. The Project does not disturb more than one (1) acre of area and will not require a NPDES/SDS Construction Storm Water Permit.

B. See Section 01 50 00 for additional erosion control requirements.

1.12 WORK ON STREET RIGHT-OF-WAY

A. All Work performed within the street right-of-way or utility easements shall be performed in accordance with the City of Fargo, North Dakota Standards for safety, protection of the public, signage, flagging, and surface restoration. Contractor shall be responsible for maintaining traffic at all times.

B. Contractors’ traffic control including signage, flagging, barricades, and other means for protection of the public shall be in accordance with the approved traffic control plan, and the Manual of Uniform Traffic Control Devices, latest versions.

C. All other costs associated with special requirements for Work on street right-of-way or utility easements shall be incidental to contract price for that item of Work being performed.
1.13 ACCESS TO STREETS

A. The General Contractor shall be responsible for all construction signage, flagging, and protection of the public. Signage shall conform to requirements as set forth in the Manual on Uniform Traffic Control devices. Signage for each area to be constructed shall be approved by the Engineer and Owner and in place prior to the start of construction in that area.

B. Whenever construction is stopped due to inclement weather, weekends, holidays or other reasons, suitable access shall be provided for all property owners at all times.

1.14 ACCESS TO PROPERTY

A. The General Contractor shall maintain driveway access or altered means of access to existing property affected by construction progress for the duration of the construction period. Cost of providing, maintaining, and removing access roadways shall be incidental to the project.

B. Maintain access at all times when construction is stopped due to inclement weather, weekends, holidays, or other reasons.

1.15 GENERAL COORDINATION

A. Coordinate Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed at a later date.

B. Verify characteristics of elements of interrelated materials are compatible; coordinate Work of various Sections having interdependent responsibilities for installing, connection to, and placing in service, such materials.

C. Contractors under each Contract shall plan, schedule, and coordinate its operations in a manner which will facilitate the simultaneous progress of the Work under other Contracts and work included under other contracts outside the scope of these Contract Documents.

1.16 WORK SEQUENCE

A. The project work will require the water tower to be drained and offline for process piping work. Contractor shall limit water tower downtime to 21 days.

B. Coordinate construction schedule and operations with Owner to accommodate Owner occupancy requirements.

C. Construct Work in logical phases as required to accommodate Owner’s occupancy and operations.

D. Contractor shall schedule and conduct construction to insure Owner’s continual use of the site.
E. During the construction period, coordinate construction schedule and operations with the Engineer.

F. Project Schedule:
   1. Contractor shall meet the substantial completion and final completion dates specified for each contract.

PART 2 PRODUCTS
   A. Not Used.

PART 3 EXECUTION
   A. Not Used.

END OF SECTION
SECTION 01 14 00 – WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:
   2. Contractor Use of Site and Premises.
   3. Owner Occupancy Requirements.
   4. Road Restrictions.
   5. Special Work Requests.

1.02 SPECIAL PROVISIONS

A. In addition to the liquidated damages as stated in Section 00 52 00 – Agreement, Contractor will also be responsible for payment of any legitimate claims made by other parties (i.e., other contractors, residents, etc.) within the area who have incurred a loss as a result of Contractor's construction practices or failure to complete the Work of this project by the specified completion date(s).

B. Contractor will not be entitled to any compensation for causes resulting in delays or hindrances to the Work. Extensions of time will be granted for unavoidable delays, which in the opinion of the Engineer are clearly beyond the control of the Contractor. Unavoidable delays include, but are not limited to, acts of God or the public enemy, acts of the Owner, fires, floods, epidemics, quarantine restrictions, strikes, and freight embargos. The Engineer must receive written request for time extension from the Contractor not more than 10 days after commencement of delay before any time extension will be considered. Requests made beyond the 10-day limit will be cause for denial. Any extension of time will not relieve the Contractor or Contractor’s sureties from their obligations, which shall remain in full force and effect until the satisfactory discharge of the Contract.

C. It shall be the Contractor's responsibility to follow OSHA standards for all Work.

D. All incidental damages to streets, driveways, berms, etc., due to Contractor's construction techniques shall be repaired at the Contractor's expense prior to making final payment.

E. Traffic signs affected by construction activity shall be removed, stored, and replaced by Contractor. Temporary replacement signs shall be erected as required. Damage or lost signs as a result of the Project shall be replaced by the Contractor and the replacement cost shall be considered incidental to the Contract.

F. CONTRACTOR shall obtain such permits and licenses that are required for completion of the Work. Permits include, but are not limited to;
   1. Building Permits, as required, from the City of Fargo.
   2. Electrical building permit from City of Fargo and State of North Dakota.
3. The Plan Review Fee associated with the Building Permit will be paid for by the City of Fargo.

1.03 CONTRACTOR USE OF SITE AND PREMISES

A. Limit use of Site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.

B. Coordinate use of premises under direction of Engineer. Contractor shall confine construction equipment, storage of materials and equipment and operations of workmen to areas permitted by law, ordinances, permits, or requirements of Contract Documents, and shall not unreasonably encumber premises with construction equipment or other materials or equipment.

C. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

D. Move any stored products, under Contractor's control, which interfere with operations of the Owner.

E. Obtain and pay for use of storage or work areas needed for operations.

F. Contractor, in coordination with Owner, shall notify and coordinate with Police Department, Fire Department, and Hospital/Ambulance Services. Notice shall include work schedule as construction proceeds, when work affects or obstructs intersections and streets, and when work is completed or suitable access is available in streets and intersections.

G. Contractor shall provide the name, address, and telephone number of person who has access to equipment and is authorized to make emergency repairs to Contractor's work, such as to correct trench cave-ins, move excavated material, and correct other problems during weekends and off-work hours, so access can be maintained for firefighting equipment, and to maintain barricades for public safety.

H. The CONTRACTOR must be satisfied through personal examination of the Site(s) as to all local conditions affecting their performance of the Contract. The CONTRACTOR is deemed to accept such conditions as found to exist.

I. The CONTRACTOR shall preserve all monuments, benchmarks, reference points, and stakes. In case of destruction thereof, the CONTRACTOR will be charged with expense of replacement and shall be responsible for any mistake or loss of time that may be caused. Permanent monuments or benchmarks which must be removed or disturbed shall be protected until properly referenced for relocation. The CONTRACTOR shall furnish materials and assistance for the proper replacement of such monuments or benchmarks.
J. Damaged Property:
1. Patch and or clean existing improvements and restore damage of property on, or adjacent to the Site(s) occasioned by the Work, including but not limited to, lawns, walks, driveways, roadways, curbs, pavements, structures, and utilities which are cut or damaged by operations and are not designated for removal, relocation, or replacement in the course of construction.
2. If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the CONTRACTOR shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the OWNER. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
3. Provide written acceptance of restoration by authority or OWNER.

K. Existing Facilities:
1. The CONTRACTOR shall take all necessary field measurements affecting all existing construction, piping, and equipment in this Contract and shall be solely responsible for proper fit between all Work under the Contract and existing structures, piping, and equipment.
2. Dimensions given on the drawings related to existing structures are based upon existing construction record drawings and it shall be the responsibility of the Contractor to verify the accuracy of all dimensions shown for existing structures, piping, and equipment. Any discrepancies shall be brought to the attention of the ENGINEER prior to the start of new construction or ordering of any materials. CONTRACTOR shall be responsible for any materials ordered that will not fit due to the failure to verify any discrepancies of existing structures, piping, and equipment prior to the start of new construction.

L. Existing Utilities:
1. Existing underground utilities, as shown on the drawings, are located in accordance with available data but locations shall be determined by the CONTRACTOR prior to beginning construction. A utility locate is required prior to any excavation.
2. CONTRACTOR shall protect all existing utilities and provide temporary removal and replacement or relocation as required for completion of the Work in the contract documents. No additional payment shall be made for this work.
3. Existing utilities not shown on the drawings and requiring relocation shall be exposed by the CONTRACTOR without damage. If damaged, the CONTRACTOR shall bear the responsibility and cost of repair or replacement.

M. Environmental Resources:
1. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this Contract. Confine activities to areas defined by the contract documents.
2. Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the OWNER. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.

3. Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using other approved techniques.

4. The erosion and sediment controls selected and maintained by the CONTRACTOR shall be such that water quality standards are not violated as a result of the CONTRACTOR’S activities. Maintain temporary erosion and sediment control measures such as fencing, berms, dikes, drains, sedimentation basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.

5. See Section 01 50 00 for additional requirements.

1.04 OWNER OCCUPANCY REQUIREMENTS

A. Owner shall operate the facility as required to meet the demands of its customers at all times. Ensure that portions of Work undertaken can be completed to meet this requirement. Cleanliness is crucial and the Contractor shall maintain a clean and orderly site at all times.

B. Pre-plan, schedule, coordinate, and stage for required materials, manpower, contractors, subcontractors, etc. to complete critical elements of Work.

C. Existing materials and equipment removed and not reused as part of the Work, and not identified elsewhere in the contract documents for salvage, shall be properly disposed of by the Contractor at no additional cost to Owner.

1.05 ROAD RESTRICTIONS

A. CONTRACTOR shall take road restrictions into consideration. Road restrictions shall not be used as an excuse for missing deadlines and CONTRACTOR shall take road restrictions into consideration in preparing their lump sum bid price.

1.06 SPECIAL WORK REQUEST

A. Saturday and Sunday work is allowed for the purposes of clean-up work only by the Contractor. Work shall not start on Saturday or Sunday before 9:00 AM.

B. If the Contractor plans to conduct work other than clean-up work, the Contractor shall submit a Special Work Request to the Engineer and Owner for written approval. Engineer shall provide the Contractor with the appropriate form. All requests shall be made at least two (2) weeks in advance of scheduled work and not more than six (6) weeks in advance.
C. Special Work Request restrictions shall apply for North Dakota state observed holidays. Contractor shall submit a Special Work Request if work is scheduled for these dates.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION
SECTION 01 23 00 – CONTRACT CONSIDERATIONS AND ALTERNATES

PART 1  GENERAL

1.01  SUMMARY

A. Section includes:
   1. Schedule of Values.
   2. Alternates.

B. Related Sections include:
   1. Section 01 11 00 – Summary of Work.
   2. Section 01 29 00 – Payment Procedures.
   3. Section 01 26 00 – Contractor Modification Procedures.
   4. Section 01 33 00 – Submittal Procedures.
   5. Section 01 61 00 – Common Product Requirements.

1.02  SCHEDULE OF VALUES

A. Submit:
   1. Typed schedule of values in format similar to EJCDC Application for Payment (form C-620, 2002 Edition).
   2. In duplicate within 15 days after date of Owner-Contractor Agreement.

B. Format:
   1. Utilize the Line Item Bid Tab items within Contract Documents.
   2. Identify line items corresponding with number and title of Specification Section, as necessary.
   3. Identify site mobilization, bonds, and insurance, as necessary.
   4. Include within each line item a direct proportional amount of Contractor's overhead and profit.

C. Revise Schedule of Values to list approved Change Orders, and submit with each Application for Payment.

1.03  ALTERNATES

A. NOT USED.

PART 2  PRODUCTS

NOT USED.

PART 3  EXECUTION

NOT USED.

END OF SECTION
SECTION 01 25 00 – SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. This section defines the procedures for proposing substitute items by "Approved Equivalent" manufacturers not listed in the specifications.

B. Acceptance of "Approved Equivalent" manufacturers will be done by addendum to the bidding documents prior to bid date and time.

1.02 QUALIFICATIONS PACKAGE FOR NON-LISTED "APPROVED EQUIVALENT" PRODUCT CONSIDERATION

A. Bidders shall submit a qualification package at least fifteen (15) days prior to the date of receipt of bids for each proposed "Approved Equivalent" manufacturer not already listed as an acceptable or approved "manufacturer" in the specifications, which the Bidder proposes to furnish. Each qualification package shall be bound with protective cover, identified by specification section number and title, and the product manufacturer's name. The Bidder shall submit all qualification packages in a sealed, sturdy box or suitable container.

B. Qualification packages for non-listed "Approved Equivalent" items shall include the following: (if an item does not apply, indicate so in the submittal):
   1. Completed Substitution Request Form. A copy of which can be found attached to the end of this section.
   2. A complete set of drawings, specifications, catalog cut-sheets, and detailed descriptive material. This information shall identify all technical and performance requirements stipulated on each drawing and in each specification section. Include all items required for shop drawing review.
   3. Provide marked-up product information showing side-by-side comparisons for both the specified products and proposed products.
   4. Detailed information for all buy-out items such as hardware, motors, bearings, reducers, belts, sheaves, motor controllers and instrumentation.
   5. Lists showing materials of construction of all components, including all buy-out items.
   6. Manufacturer’s recommended spare parts, including all buy-out items.
   7. Information on equipment field erection requirements including total weight of assembled components and weight of each sub-assembly.
   8. A maintenance schedule showing the required maintenance, frequency of maintenance, lubricants and other items required at each regular preventative maintenance period, including all buy-out items.
   9. Electrical requirements and schematic diagrams.
   10. Detailed written documentation with discussion of all deviations of equipment, including buy-out items, from the Contract Documents.
   11. A list of all process, mechanical, electrical, and structural changes and requirements for incorporating the "Prior Approved Equivalent" into the project.
12. A listing of the manufacturer's history. Unless specified otherwise in applicable specification sections, manufacturer's history is to demonstrate a minimum of three (3) years’ experience and a minimum of three (3) successful installations of the size and complexity involved in this project. Provide a complete installation list with contact names and telephone numbers.

13. Documentation easily identifying that the proposed substitution meets or exceeds the specified warranties

C. Failure to furnish the preceding information at least fifteen (15) days prior to the date of receipt of bids shall be cause for rejection of a proposed alternate item for use on this project.

D. No "Approved Equivalent" items will be considered unless, in the opinion of the ARCHITECT OR ENGINEER, they conform to the Contract Documents in all respects, except for make and manufacturer and minor details.

E. The ARCHITECT OR ENGINEER shall be the sole authority for determining conformance of a proposed "Approved Equivalent" item with the Contract Documents. Except for identification of non-compliance with the specifications, the ENGINEER will not be required to prove that an "Approved Equivalent" item is not equal to "Basis of Bid" items.

F. Substitutions or modifications to the qualification package will not be considered after opening of Bids.

G. Acceptance of "Approved Equivalent" items and their qualification packages, does not eliminate the need for shop drawing submittals and reviews during construction, nor does it eliminate the requirement that the seller satisfy the requirements of the Contract Documents.

1.03 BID REQUIREMENTS

A. Bidders proposing to furnish "Approved Equivalent" items that require changes to the Contract Documents shall notify the Engineer in writing of all process, mechanical, electrical and structural changes and requirements for incorporating the "Approved Equivalent" into the Project and shall reimburse the OWNER for associated redesign costs. Redesign and contract drawing revisions to accommodate the "Approved Equivalent" will be prepared by the ENGINEER during the shop drawing review process. Reimbursement shall be based on the ENGINEER’S standard hourly rates plus reimbursable expenses at cost.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION
SECTION 01 25 00 – ATTACHMENT

SUBSTITUTION REQUEST FORM

Engineer’s Project No: P00803-2017-010 Date: __________________________

Project Name: Water Towers No. 4 & 9 – Valve Vault Improvements

<table>
<thead>
<tr>
<th>Specification Section</th>
<th>Manufacturer Specified</th>
<th>Proposed Manufacturer</th>
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Indicate drawing sheet name in lieu of specification section where applicable.

Vendor/Supplier

Name: ___________________________________________________________________
Address: ___________________________________________________________________
Contact: __________________________ E-Mail: ___________________________________________________________________
Telephone: __________________________ Fax: ___________________________________________________________________

Reason for Substitution: ______________________________________________________

_________________________________________________________________________

_________________________________________________________________________

Does Specification Allow for Substitutions of Proposed Items? Yes: ___ No: ___
Will the Substitution Provide Cost Savings to the Owner? Yes: ___ No: ___
Are Proposed Substitutions Equivalent/Superior to those Specified? Yes: ___ No: ___

Did you submit a complete qualification package as described in Part 1.02.B of Section 00 26 00 with this form? Yes: ___ No: ___

I, _________________________________, accept responsibility for coordination of proposed substitution and accept all additional costs resulting from the incorporation of proposed substitution into the Project. (Proposers Signature Required)

For Architect/Engineer’s Use: Comments: __________________________

Accepted: ___ Not Accepted: ___ __________________________
No Action Required: ___ __________________________
Submission: Incomplete: ___ Too Late: ___ __________________________
Reviewed By: __________________________
PART 1  GENERAL

1.01  SUMMARY

A. Section includes:
1. Submittals.
5. Stipulated Price Change Order.
6. Time and Material Change Order.
7. Execution of Change Orders.
8. Correlation of Contractor Submittals.

B. Related Sections include:
1. Section 00 52 00 – Agreement Form.
2. Section 00 63 49 – Work Change Directive Form.
3. Section 00 63 63 – Change Order Form.
4. Section 00 72 00 – General Conditions.
5. Section 00 73 00 – Supplementary Conditions.
6. Section 01 22 00 – Measurement and Payment.
7. Section 01 29 00 – Payment Procedures.
8. Section 01 33 00 – Submittal Procedures.
9. Section 01 61 00 – Common Product Requirements.
10. Section 01 77 00 – Closeout Procedures.

1.02  SUBMITTALS

A. Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor’s employ or Subcontractors of changes to the Work.


1.03  DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

A. Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. Provide additional data to support computations:
1. Quantities of products, labor, and equipment.
2. Taxes, insurance, and bonds.
3. Overhead and profit (in accordance with provisions of Section 00 72 00 – General Conditions).
5. Credit for deletions from Contract, similarly documented.

D. Support each claim for additional costs, and for work done on a time and material basis, with additional information:
   1. Origin and date of claim.
   2. Dates and times work was performed, and by whom.
   3. Time records and wage rates paid.
   4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.04 CHANGE PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time by issuing supplemental instructions.

B. The Engineer may issue a Proposal Request that includes a detailed description of a proposed change with supplementary or revised Drawings and specifications and a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within five (5) days.

C. The Contractor may propose a change by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.

1.05 WORK CHANGE DIRECTIVE

A. Engineer may issue a document, signed by the Owner, instructing the Contractor to proceed with a change in the Work, which may require subsequent inclusion in a Change Order if any change in Contract Price or Contract Time is required.

B. The document will describe changes in the Work, and will designate method of determining any change in Contract Price or Contract Time. A work change directive will not include any change in Contract Price or Contract Time without written notice and approval by the Engineer for inclusion in a Change Order.

C. Promptly execute the change in Work.

1.06 STIPULATED PRICE CHANGE ORDER

A. Based on Proposal Request and Contractor’s fixed price quotation or Contractor’s request for a Change Order as approved by Engineer.
1.07 TIME AND MATERIAL CHANGE ORDER

A. Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

B. Engineer will determine the change allowable in Contract Price and Contract Time as provided in the Contract Documents.

C. Maintain detailed records of work done on Time and Material basis.

D. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.08 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract. The form to be used shall be that indicated in Paragraph 1.02.B of this Section. Engineer will then present the proposed signed Change Order to Owner for approval. Upon obtaining approval, the Change Order will be submitted to the Owner for signatures as provided in Conditions of Contract.

1.09 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.

B. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION
SECTION 01 29 00 – PROGRESS PAYMENT PROCEDURES

PART 1  GENERAL

1.01  SUMMARY

A.  Section includes:
   1.  Format and Preparation of Applications.
   2.  Submittal Procedures.

B.  Related Sections include:
   1.  Section 00 52 00 – Agreement.
   2.  Section 00 72 00 – General Conditions.
   3.  Section 01 23 00 – Contract Considerations and Alternates.
   4.  Section 01 26 00 – Contract Modification Procedures.
   5.  Section 01 33 00 – Submittal Procedures.
   6.  Section 01 77 00 – Closeout Procedures.

1.02  FORMAT AND PREPARATION OF APPLICATIONS


B.  Preparation
   1.  Present required information in typewritten form.
   2.  Execute certification by signature of authorized officer.
   3.  Use data from approved Schedule of Values as defined in Section 01 23 00 – Contract Considerations and Alternates. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
   4.  List each authorized Change Order as an extension on Continuation Sheet, listing Change Order number and dollar amount as for an original item of Work.
   5.  Prepare Application for Final Payment as specified in Section 01 77 00.

1.03  SUBMITTAL PROCEDURES

A.  Submittals
   1.  Three (3) copies of each Application for Payment.
   2.  Updated construction schedule with each Application for Payment.
   3.  Payment Periods: As stipulated in the Agreement.
   4.  Submit with transmittal letter as specified for Submittals in Section 01 33 00.
   5.  Administrative actions which must precede or coincide with submittal of final application for payment include:
      a.  Submit lien waivers, warranties and bonds, and project record documents with final application for payment.
      b.  Completion of all work not included in substantial completion as defined in General and Supplementary Conditions.
c. Completion of project closeout procedures as indicated in Section 01 77 00.
d. Removal of temporary facilities and services.
e. Removal of surplus materials, rubbish, or similar elements.
f. Final cleaning.
g. Transmittal of project construction record documents to Owner and Engineer.
h. Consent of surety for final payment.

B. The City Commission must approve all pay estimates for construction contracts before payment can be made. To allow adequate time to prepare the monthly pay estimates, the cut-off date for Work items to be included in the pay estimate shall be the last Friday of the month (or other date as agreed upon with the City and Engineer).

1.04 SUBSTANTIATING DATA

A. When Engineer requires substantiating information, submit data justifying dollar amounts in question.

B. Provide one (1) copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

C. Provide copies of invoice(s) for payment of materials stored on-site. Payment will not be made for materials that are not stored on-site or within a bonded warehouse that has been approved by Engineer and Owner.

D. Contractor shall supply substantiating information in compliance with federal and state requirements for monthly utilization reports and weekly prevailing wage and labor rates for laborers on-site.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION
SECTION 01 31 13 – PROJECT COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:
   1. Coordination and project conditions.
   2. Field engineering.

B. Related Sections include:
   1. Section 01 10 00 – Summary of Work.
   2. Section 01 29 00 – Payment Procedures.
   3. Section 01 33 00 – Submittal Procedures.
   4. Section 01 77 00 – Closeout Procedures.

1.02 COORDINATION AND PROJECT CONDITIONS

A. General:
   1. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
   2. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
   3. Coordinate space requirements, supports, and installation of mechanical and electrical Work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
   4. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
   5. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
   6. Coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

B. Responsibilities of the Contractor:
   1. Cooperate with and coordinate Work with other Contractors and the Construction Coordinator to facilitate the general progress of the Project and to prevent delaying the progress of other Contractors.
   2. Afford other Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their Work.
3. Connect and coordinate Work with other Contractors Work as required by the Contract Documents.
4. Allocate and coordinate use of Site for field offices and construction trailers and for access, traffic, and parking facilities.
5. Instruct and coordinate the use of temporary utilities and construction facilities.
6. Coordinate field engineering and layout Work.
7. Verify all shop drawing dimensions.
8. Coordinate the Work of the individual Contractors.
9. Submit (and revise) progress schedule in accordance with Section 01 33 00 – Submittal Procedures coordinating the entire project construction schedule.
10. Organize and submit Applications for Payment. Submit applications on EJCDC C-620 forms for review by Engineer.
11. Submit shop drawings, product data, and samples in accordance with Section 01 33 00 – Submittal Procedures.
12. Submit request for interpretation of Contract Documents and obtain instructions through Engineer.
13. Process requests for Change Orders through Engineer.
14. Organize all closeout submittals and preliminary inspection reports for transmittal to Engineer. Organize all record drawings and submit to Engineer. Review all drawings before submitting to Engineer.
15. Notify Engineer when all trades are ready for final inspection and organize Substantial and Final inspections.
16. Provide record drawing information to Engineer.
17. Ensure punch list items are completed prior to scheduling final inspection by Engineer.

C. Construction Coordinator
1. Provided under Contract No. 1 – General Construction. Duties and responsibilities in scheduling and performance of the Work are as follows:
   b. Allocate and coordinate use of Sites for field offices and construction trailers and for access, traffic, and parking facilities. Limited space is available for the installation of field office(s) and construction trailer(s) on the Sites. Coordinate installation, if necessary, with Engineer and Owner.
   c. Instruct and coordinate the use of temporary utilities and construction facilities.
   d. Coordinate field engineering and layout Work.
   e. Coordinate the Work of the individual Contractors.

1.03 FIELD ENGINEERING
A. Control datum for construction is that shown on Drawings.
B. Contractor shall locate and protect survey control and reference points, if any.
C. Contractor shall confirm Drawing dimensions and elevations. Notify Engineer concerning errors or ambiguities.

D. Contractor shall establish and maintain required elevations, lines, and levels utilizing recognized engineering practices. Obtain services of a licensed surveyor as required to assure Work is installed per Drawing dimensions and elevations.

E. Site service utilities are shown in their approximate locations on the Drawings. Contractor shall be responsible to field verify all utility locations as required to accommodate construction activities.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION
SECTION 01 31 19 – PROJECT MEETINGS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:
   1. Preconstruction meeting.
   2. Site mobilization meeting.
   3. Progress meetings.
   4. Pre-installation meeting.

B. Related Sections include:
   1. Section 01 10 00 – Summary of Work.
   2. Section 01 77 00 – Closeout Procedures.

1.02 PRECONSTRUCTION MEETING

A. Engineer will schedule a meeting at the Project Site after Notice of Award.

B. Attendance required by
   1. Contractor.
   2. Contractor’s superintendent.
   3. Owner.
   4. Engineer.
   5. Major Subcontractor(s).

C. Agenda:
   3. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
   5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Use of premises by Owner and Contractor.
   8. Procedures for testing.
   10. Requirements of the primacy agencies.

D. Engineer will record minutes and distribute copies after meeting within fourteen (14) days to participants and those affected by decisions made.

1.03 SITE MOBILIZATION MEETING

A. Engineer and Owner will schedule a meeting at the Project Site prior to Contractor occupancy.
B. Attendance required by:
   1. Contractor(s).
   2. Contractor’s Superintendent(s).
   3. Owner.
   4. Engineer.
   5. Major Subcontractor(s), if any.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements and partial occupancy.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   7. Procedures for testing.
   8. Requirements for start-up of equipment.
   9. Inspection and acceptance of equipment put into service during construction period.

D. Engineer will record minutes and distribute copies after meeting within fourteen (14) days to participants and those affected by decisions made.

1.04 PROGRESS MEETINGS

A. Engineer will:
   1. Schedule and administer meetings at the Project site throughout progress of the Work as deemed necessary by the Engineer.
   2. Make arrangements for hosting meetings.

B. Attendance required by:
   1. Contractor
   2. Contractor(s) Job Superintendent.
   3. Owner.
   4. Engineer.
   5. Major Subcontractors and suppliers.
   6. Others as appropriate to agenda topics for each meeting.

C. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding Work period.
   10. Coordination of projected progress.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

D. Engineer will record minutes and distribute copies within seven (7) days after meeting to participants and those affected by decisions made.

1.05 PRE-INSTALLATION MEETING

A. When required in individual Specification sections, convene a pre-installation meeting at the site prior to commencing Work of the section.
1. Require attendance of parties directly affecting, or affected by, Work of the specific section.
2. Notify Engineer seven (7) days in advance of meeting date.
3. Prepare agenda and preside at meeting.
4. Review conditions of installation, preparation and installation procedures.
5. Review coordination with related Work.

B. Engineer will record minutes and distribute copies within fourteen (14) days after meeting to participants and those affected by decisions made.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION
SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1  GENERAL

1.01  SUMMARY

A. This Section includes:
   1. Submittal Procedures.
   2. Submittal Schedules
   3. Construction Progress Schedules.
   4. Proposed Products List.
   5. Tabulation of Subcontractors.
   6. Tabulation of Suppliers.
   7. Product Data.
   8. Request for Interpretation
   9. Shop Drawings.
  10. Samples.
  11. Test Reports.
  12. Manufacturer’s Certificates.
  13. Manufacturer's Instructions.
  14. Manufacturer's Field Reports.
  15. Excessive Shop Drawing Reviews.

B. Related Sections include:
   1. Section 01 45 00 – Quality Control.
   2. Section 01 77 00 – Closeout Procedures.
   3. Section 01 78 23 – Operations and Maintenance Data.
   4. All Specification Divisions.

1.02  SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Submit revised submittals with original number and a sequential alphabetic suffix.

C. Contractor shall send each submittal in electronic format to be distributed by Engineer for review. Upon approval, Contractor shall submit four (4) hard copies to be retained by Engineer and Engineer’s Subconsultants.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

E. Contractor shall completely review all submittal materials prior to submission to Engineer. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
F. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

G. Engineer will attempt to complete a review of each submittal in a timely manner within 30 calendar days of receipt of each submittal. Failure of Engineer to review a submittal within the estimated review timeframe shall not be basis for the Contractor to request or receive additional Contract Price or Contract Time.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work. Highlight and/or clearly designate specific product details and information so as to confirm product meets or exceeds Specifications.

I. Provide space for Contractor and Engineer review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements. Clearly transmit Engineer review comments to suppliers and subcontractors as required to minimize product delivery errors and miscommunications.

L. Submittals not requested will not be recognized or processed.

M. Engineer will review submittals in order received unless Contractor requests, in writing, a revised order of review. A revision in order may add to the length of review time required for previously submitted submittals.

N. Submittal of more than three major submittals per week may add to the required length of review time. Engineer shall notify Contractor of submittal review scheduling conflicts.

1.03 SUBMITTAL SCHEDULES

A. Contractor shall submit a schedule of submittal dates for shop drawings, product data, and samples.

B. The submittal schedule shall identify specification sections and anticipated submittal dates. Indicate any critical submittals and dates for Engineer’s review.

C. Provide decision dates for selection of finishes and samples.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date of Owner-Contractor Agreement.

B. Revise and resubmit as required.
C. Submit revised schedules with each Application for Payment, identifying changes since previous version. Application for Payment will not be processed until updated construction schedule has been submitted.

D. Prepare schedules as a horizontal bar chart with separate bar for each major portion of Work or operation, identifying first workday of each week as well as the proposed start and completion dates of each major portion of Work.

E. Sheet Size: Minimum 11x17 inches. Large sizes than 11x17 inches shall be in multiples of 8½x11 inches.

F. Content
   1. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction. Indicate the early and late start, early and late finish, float dates, and duration.
   2. Identify each item by Specification section number.
   3. Identify Work of separate stages and other logically grouped activities.
   4. Provide sub-schedules to define critical portions of the entire schedule.
   5. Include conferences and meetings in schedule.
   6. Indicate estimated percentage of completion for each item of Work at each submission.
   7. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Engineer. Allow sufficient time for review by Engineer. Indicate decision dates for selection of finishes.
   8. Coordinate content with schedule of values.

G. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule.

H. Distribution
   1. Distribute copies of reviewed schedules to Project Site file, Subcontractors, suppliers, and other concerned parties.
   2. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

1.05 PROPOSED PRODUCTS LIST

A. Within fifteen (15) days after date of Owner-Contractor Agreement, submit list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 TABULATION OF SUBCONTRACTORS

A. Contractor shall submit a complete list of subcontractors who will provide work on the project.
B. The submitted list shall include the following information for each subcontractor:
1. Name
2. Address
3. Type of work to be provided
4. Applicable specifications sections
5. Contact person

C. Contractor’s use of specific subcontractors shall be subject to the requirements included in the specifications.

1.07 TABULATION OF SUPPLIERS

A. Contractor shall submit a list of suppliers who will provide materials, equipment, or components which are integral to the Work.

B. The submitted list shall include the following information for each subcontractor:
1. Name
2. Address
3. Type of work to be provided
4. Applicable specifications sections
5. Contact person

C. Contractor’s use of specific suppliers for providing equipment, materials, or components shall be subject to the requirements of the specifications.

1.08 REQUESTS FOR INTERPRETATION

A. Contractor shall submit in writing all requests for interpretation or for information regarding the Contract Documents on the form provided by the Engineer.

B. Engineer does not guarantee that a response can be provided in the amount of time requested, but Engineer shall respond in writing to Contractor’s request within a reasonable amount of time given the extent of the request for interpretation of information required.

1.09 PRODUCT DATA

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

B. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record document purposes described in Section 01 77 00.

C. Submit the number of copies that the Contractor requires, plus five (5) copies that will be retained by the Engineer and Engineer’s Sub consultant.
D. Mark each copy to identify applicable Products, models, options, and other data. Supplement manufacturers’ standard data to provide information specific to this Project.

E. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service of functional equipment and appliances.

F. Premium and High Efficiency Product Data: The City will participate in various rebate programs for premium and high-efficiency equipment and products. Provide Proof of Purchase and Compliance product data as needed to complete the various rebate forms. Rebate forms are included as attachments to Section 01 66 00 – Common Product Requirements.

1.10 SHOP DRAWINGS

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

B. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record document purposes described in Section 01 77 00.

C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Submit in electronic format for Engineer’s review. Upon approval, submit four (4) hard copies that will be retained by the Engineer and Engineer’s Subconsultant.

E. All shop drawings shall be submitted through the Contractor in accordance with the procedures outlined in this specification. Shop drawings received from anyone other than through the Contractor will not be reviewed.

F. Shop drawings shall include data and technical drawings prepared specifically for this Project, including where required, but not limited to the following:
   1. Fabrication drawings
   2. Installation drawings
   3. Shopwork manufacturing instructions
   4. Templates or patterns
   5. Coordination drawings
   6. Schedules
   7. Design calculations
G. Shop drawings shall contain complete detail showing conformance with the Contract Documents and such other specified information as required, including but not limited to the following:
   1. Related work with applicable cross references
   2. Physical configuration
   3. Dimensional information, including any variations from actual conditions
   4. List of materials
   5. Structural construction and assemblies
   6. Anchor bolt details showing type, size, embedment, and locations
   7. Machinery and equipment details
   8. Auxiliary items to machinery and equipment
   9. Protective coatings and factory finishes
   10. Electrical information including motor sizes, wiring and circuit diagrams, and instrumentation
   11. Testing results

H. Detail all connections required to complete the work.

I. Approval of shop drawings by Engineer shall not relieve the Contractor from responsibility of deviations from drawings or specification, unless deviations or changes have been brought to Engineer’s attention at time of submission, nor shall it relieve the Contractor from responsibility for errors or omissions in shop drawings.

1.11 SAMPLES

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

B. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record document purposes described in Section 01 77 00.

C. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit the number of samples specified in individual Specification sections; one (1) of which will be retained by Engineer.

F. Reviewed samples that may be used in the Work are indicated in individual Specification sections.

G. Samples will not be used for testing purposes unless specifically stated in the Specification section.
1.12 TEST REPORTS
A. Submit for the Engineer's knowledge as Contract Administrator or for the Owner.
B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.
C. Retain one (1) copy of all test reports and results on-site in a location accessible to Engineer.

1.13 MANUFACTURER'S CERTIFICATES
A. When specified in individual Specification sections, submit certification by the manufacturer, installation/application Subcontractor, or the Contractor to Engineer, in quantities specified for Product Data.
B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.14 MANUFACTURER'S INSTRUCTIONS
A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
C. Refer to Section 01 45 00 – Quality Control, Manufacturers' Field Services article.

1.15 MANUFACTURER'S FIELD REPORTS
A. Submit reports for the Engineer's benefit as Contract Administrator or for the Owner.
B. Submit report in duplicate within 15 days of observation to Engineer for information.
C. Submit the manufacturer’s field reports for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.16 EXCESSIVE SHOP DRAWING REVIEWS
A. The maximum number of submittal reviews for any one product or specification section shall be two (2).
B. Compensation for third or subsequent reviews will be required as outlined below:
   1. Owner will compensate Engineer for “additional services”.
   2. Owner will deduct amount of such compensation from payment to Contractor.
   3. Engineer’s compensation shall be at Engineer’s standard hourly rates, plus reimbursable expenses at cost.

PART 2  PRODUCTS

   NOT USED.

PART 3  EXECUTION

   NOT USED.

END OF SECTION
PART 1  GENERAL

1.01  SUMMARY

A.  Section includes:
   1.  Quality Assurance - Control of Installation.
   2.  Tolerances.
   3.  References and Standards.
   5.  Manufacturers' Field Services.

B.  Related Sections include; but are not limited to:
   1.  Section 01 33 00 – Submittal Procedures.
   2.  Section 01 61 00 – Common Product Requirements.

1.02  QUALITY ASSURANCE - CONTROL OF INSTALLATION

A.  Monitor quality control over suppliers, manufacturers, Products, services, Site conditions, and workmanship, to produce Work of specified quality.

B.  Comply with manufacturer's instructions, including each step in sequence.

C.  Should the manufacturer's instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D.  Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E.  Perform Work by persons qualified to produce required and specified quality.

F.  Verify that field measurements are as indicated on Contract Drawings, shop drawings, or as instructed by the manufacturer.

G.  Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.03  TOLERANCES

A.  Monitor fabrication and installation tolerance control of Products to produce acceptable Work.  Do not permit tolerances to accumulate.

B.  Comply with manufacturers' tolerances.  Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C.  Adjust Products to appropriate dimensions; position before securing Products in place.
1.04 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by Product specification sections.

D. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING SERVICES

A. Contractor will employ services of an independent firm to perform inspection and testing. Contractor shall pay for all services required. Testing services companies shall be approved by Engineer prior to use.

B. The independent firm will perform tests and other services specified in individual specification sections.

C. Testing and source quality control may occur on or off the Site. Perform off-Site testing as required by the Engineer or the Owner.

D. Three copies of each testing report will be submitted by the independent firm, with two copies submitted to the Engineer and one copy submitted to the Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm: assist with sampling of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Engineer and independent firm 48 hours prior to expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing does not relieve Contractor from performing Work according to Contract requirements.

G. Re-testing or an increase in the frequency of testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Engineer shall determine the need for increase in testing frequency due to non-compliance. Payment for re-testing and payment for the increase in the frequency of testing caused by non-compliance will be paid by the Contractor.
H. Comply with pertinent codes, regulations, and industry standards except when more stringent standards or tolerances are specified.

1.06 MANUFACTURERS’ INSTRUCTIONS

A. Comply with manufacturer’s instructions in full detail for storage, installation, assembly, installation, start-up, and adjustment. Contractor shall follow appropriate sequencing as recommended by manufacturer.

B. Should manufacturer’s instructions conflict with Contract Documents, Contractor shall request clarification from Engineer prior to proceeding.

C. If required by individual product or equipment specification sections, Contractor shall submit manufacturer’s printed instructions prior to assembly and installation.

1.07 MANUFACTURERS’ CERTIFICATES

A. Submit manufacturer’s certificate indicating that equipment or products meet or exceed specified requirements where required in the individual specification sections.

B. Certificates shall be submitted prior to shipment of equipment or products.

1.08 MANUFACTURERS’ FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and other services as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer subject to approval of Engineer.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers’ written instructions.

D. Refer to Section 01 33 00 – Submittal Procedures.

1.09 QUALIFICATION TESTS

A. Should a product, material, or method for assembly of unknown or questionable quality to the Engineer be proposed by the Contractor, additional tests may be required by the Engineer.

B. Additional testing as required by the Engineer shall be used as a basis to establish acceptance or rejection.
1.10 LABORATORY TESTS

A. Laboratory tests shall be conducted and test reports shall be submitted where this type of test is specified. All laboratory tests shall be made by an independent laboratory approved by the Engineer. These tests shall be performed in accordance with applicable ASTM standards.

B. Laboratory tests may be witnessed by representatives of the Owner or Engineer.

C. Submit two (2) copies of all laboratory tests to the Engineer for record.

1.11 PRODUCT FIELD TESTS

A. Product field tests shall be set up and completed by the Contractor. Contractor shall provide all tools, equipment, instruments, personnel, and other facilities required for the completion of each test.

B. Product field tests shall be conducted where this type of test is specified.

C. Product field tests include the determination of performance, capacity, efficiency, function, tightness, leakage, and other special requirements. Product field tests shall be performed in accordance with applicable standards and test codes.

D. Product field tests may be witnessed by representatives of Owner and Engineer.

E. Submit two (2) copies of all product field tests to the Engineer for record.

F. All Architectural Special Inspections shall be in accordance with City of Fargo Standard Specifications for Construction.

G. Contractor shall schedule to have additional inspections performed as required by the City of Fargo. City of Fargo required commercial inspections are attached to the back end of this Specification Section.

H. Contractor shall provide notification for scheduling of required field testing and assist in coordination with independent testing laboratory.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate preparation, primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION
### REQUIRED COMMERCIAL INSPECTIONS

<table>
<thead>
<tr>
<th>BUILDING INSPECTIONS: 241-1561</th>
</tr>
</thead>
<tbody>
<tr>
<td>A separate plan review may be required.</td>
</tr>
<tr>
<td><strong>Footing inspection</strong> - Call when footing forms and reinforcing are in place but prior to the placement of any concrete.</td>
</tr>
<tr>
<td><strong>Foundation wall inspection</strong> - Call when wall forms are complete and all reinforcing is in place but prior to the placement of any concrete.</td>
</tr>
<tr>
<td><strong>Concrete slab inspection</strong> - Call when forms and reinforcing are in place but prior to the placement of any concrete.</td>
</tr>
<tr>
<td><strong>Framing (intermediate) inspection</strong> - Call when structural components are complete and prior to concealing with insulation or finishes. <strong>NOTE:</strong> This inspection may not be called for until required electrical, plumbing and mechanical inspections have been complete and work approved.</td>
</tr>
<tr>
<td><strong>Energy/Insulation inspection</strong> - See table on the back of this form for requirements.</td>
</tr>
<tr>
<td><strong>Shear wall</strong> - For wood frame, 3 story buildings - Call when shear walls are complete, including required sheathing.</td>
</tr>
<tr>
<td><strong>Lath and/or gypsum wallboard inspection</strong> - Call when gypsum/wallboard is installed but prior to the application of joint and fastener treatments.</td>
</tr>
<tr>
<td><strong>Final inspection</strong> - Call when project is complete but prior to occupying the structure if new construction.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELECTRICAL INSPECTIONS: 241-1565</th>
</tr>
</thead>
<tbody>
<tr>
<td>A separate electrical permit is required.</td>
</tr>
<tr>
<td><strong>Temporary service</strong> - Call when temporary service and support pole have been installed.</td>
</tr>
<tr>
<td><strong>Permanent service</strong> - Call when electrical panel is installed.</td>
</tr>
<tr>
<td><strong>Rough-in inspection</strong> - Call when electrical wiring is completed but prior to covering wiring with either insulation or finishes.</td>
</tr>
<tr>
<td><strong>Final Electrical inspection</strong> - Call when the electrical portion of the project is complete.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PLUMBING INSPECTIONS: 241-1560</th>
</tr>
</thead>
<tbody>
<tr>
<td>A separate plumbing permit is required.</td>
</tr>
<tr>
<td><strong>Sewer inspection</strong> - Call when new or replacement sewer is installed.</td>
</tr>
<tr>
<td><strong>Ground work inspection</strong> - Call when below floor plumbing lines are installed and pressure test is on.</td>
</tr>
<tr>
<td><strong>Waste and vent inspection</strong> - Call when all plumbing drains and vents have been installed and pressure test is on but prior to concealing any piping with insulation or sheetrock.</td>
</tr>
<tr>
<td><strong>Final Plumbing inspection</strong> - Call when all fixtures are installed and the project is complete.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MECHANICAL INSPECTIONS: 476-6702</th>
</tr>
</thead>
<tbody>
<tr>
<td>A separate mechanical permit is required.</td>
</tr>
<tr>
<td><strong>Gas line inspection</strong> - When gas line air pressure test has been begun and is holding at test pressure.</td>
</tr>
<tr>
<td><strong>Final mechanical inspection</strong> - When all mechanical equipment including all venting and ductwork has been installed and prior to concealing any venting or ductwork.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZONING INSPECTIONS: 241-1561</th>
</tr>
</thead>
<tbody>
<tr>
<td>A separate Land Development Code review may be required.</td>
</tr>
<tr>
<td><strong>Site Inspection</strong> - Call when all required landscaping has been completed.</td>
</tr>
</tbody>
</table>

**NOTE:** While this list represents the "required" inspections, inspectors will make additional inspections at the request of the permit holder if questions arise which necessitate an on-site visit. Failure by the permit holder to make sure that all required inspections are complete may result in the withholding of the Certificate of Occupancy for the project. This could complicate financing, refinancing, or resale of your property.
# TABLE 502.2(1)
## BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES
### Climate Zone 7 for Cass County, North Dakota

<table>
<thead>
<tr>
<th></th>
<th>All Other</th>
<th>Group R</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roofs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation entirely above deck</td>
<td>R-25ci</td>
<td>R-25ci</td>
</tr>
<tr>
<td>Metal Buildings (with R-5 thermal blocks&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>R-13 +</td>
<td>R-19 +</td>
</tr>
<tr>
<td></td>
<td>R-19</td>
<td>R-10</td>
</tr>
<tr>
<td>Attic and other</td>
<td>R-38</td>
<td>R-38</td>
</tr>
<tr>
<td><strong>Walls, Above Grade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>R-15.2ci</td>
<td>R-15.2ci</td>
</tr>
<tr>
<td>Metal Building&lt;sup&gt;b&lt;/sup&gt;</td>
<td>R-19 +</td>
<td>R-19 +</td>
</tr>
<tr>
<td></td>
<td>R-5.6ci</td>
<td>R-5.6ci</td>
</tr>
<tr>
<td>Metal Framed</td>
<td>R-13 +</td>
<td>R-13 +</td>
</tr>
<tr>
<td></td>
<td>R-7.5ci</td>
<td>R-15.6ci</td>
</tr>
<tr>
<td>Wood framed and other</td>
<td>R13 +</td>
<td>R13 +</td>
</tr>
<tr>
<td></td>
<td>R7.5ci</td>
<td>R7.5ci</td>
</tr>
<tr>
<td><strong>Walls, Below Grade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below grade wall&lt;sup&gt;d&lt;/sup&gt;</td>
<td>R-7.5ci</td>
<td>R-10ci</td>
</tr>
<tr>
<td><strong>Floors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>R-15ci</td>
<td>R-16.7ci</td>
</tr>
<tr>
<td>Joist/Framing (steel/wood)</td>
<td>R30</td>
<td>R-30&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Slab-on-Grade Floors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unheated slabs</td>
<td>R-15 for 24 in. below</td>
<td>R-15 for 24 in. below</td>
</tr>
<tr>
<td>Heated slabs</td>
<td>R-20 for 24 in. below</td>
<td>R-20 for 48 in. below</td>
</tr>
<tr>
<td>Opaque doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swinging</td>
<td>U-0.50</td>
<td>U-0.50</td>
</tr>
<tr>
<td>Roll-up or sliding</td>
<td>U-0.50</td>
<td>U-0.50</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm. ci = continuous insulation. NR = No Requirement.

a. When using R-value compliance method, a thermal spacer block is required, otherwise use the U-factor compliance method. [see Tab.es 502.1.2 and 5402.2(2)]

b. Assembly descriptions can be found in Table 502.2(2).

c. R-5.7 ci is allowed to be substituted with concrete block walls complying with ASTM C 90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu-in./hr · ft² · °F.

d. When heated slabs are placed below grade, below-grade walls must meet the exterior insulation requirements for perimeter insulation according to the heated slab-on-grade construction.

e. Steel floor joist systems shall be R-38.
PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Temporary Electricity.
3. Temporary Heating.
4. Temporary Ventilation.
5. Fire Protection.
6. Temporary Piping and Plumbing.
7. Telephone/Email Service.
8. Temporary Water Service.
10. First Aid Facilities.
11. Fencing.
14. Temporary Controls.
   a. Storm Water Permits.
   c. Sediment Control Practices
   d. Dewatering and Basin Drainage.
   e. Inspections and Maintenance of SWPPP.
   f. Pollution Prevention Management Measures.
   g. Dust Control.
   h. Noise Control.
   i. Road Cleaning.
15. Protection of Installed Work.
18. Parking.
21. Field Offices and Sheds.

B. Related Sections include:

1. Section 01 11 00 – Summary of Work.
2. Section 01 61 00 – Common Product Requirements.
3. Section 01 77 00 – Closeout Procedures.
4. Division 26 – Electrical.
1.02 TEMPORARY ELECTRICITY

A. By Contractor
   1. Contractor shall have access to Owner supplied power on site. Contractor is responsible for supplying and coordination connection to this power source including but not limited to:
      a. Coordinate with requirements of Division 26.
      b. Provide temporary electric feeder from existing or new electrical service at all sites. Do not disrupt Owner’s use of service.
      c. Provide separate metering so the Owner is able to track electric usage and bill the contractor accordingly.
      d. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
      e. Provide main service disconnect and over-current protection at convenient location.
      f. Permanent convenience receptacles may be utilized during construction.
      g. Pay for power required and used from utility source during construction operations
      h. Exercise measures to conserve power usage.
   2. Should the Contractor need to utilize an onsite power generator the contractor shall make provisions to limit noise from the generator. The generator shall not operate above 75Dba within 25 feet of the generator.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. By Contractor
   1. Contractor shall provide and pay for fuel-powered light plants or other light generating equipment for construction operations as required at all staging, assembly, and construction areas.
   2. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
   3. Maintain lighting and provide routine repairs.
   4. Permanent building lighting may be utilized during construction. Replace lamps at final completion for all permanent fixtures.

1.04 TEMPORARY HEATING

A. By Contractor
   1. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
   2. If required, provide separate metering or reimburse Owner for cost of energy used.
   3. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
4. Maintain minimum ambient temperature of 50 degrees F in areas, unless indicated otherwise in product sections.
5. Exercise measures to minimize construction heating.

1.05 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Coordinate use of existing facilities with Owner. Contractor shall extend and supplement with temporary units as required to meet construction requirements.

1.06 FIRE PROTECTION

A. Contractor shall provide and maintain in working order throughout the entire construction period fire extinguishing equipment in each separate construction area. Fire extinguishing equipment shall be of adequate size, number, and capacity for the required areas in accordance with all applicable codes and satisfactory to the local Fire Marshall.

B. Fire extinguishers shall be non-freeze type such as A-B-C rated dry chemical and be of the size and capacity required for each individual area.

C. Contractor shall provide and maintain in working order fire extinguishing equipment within enclosed construction sheds and field offices.

1.07 TEMPORARY PIPING AND PUMPING

A. Contractor shall provide and maintain temporary pumps, piping, automatic controls, and related appurtenances to allow bypassing and continuous operation of facilities during construction where required.

B. Contractor shall submit to Engineer for approval a temporary pumping and piping plan for all bypassing activities required. Plan shall include methods, pump information, piping layouts, inlet and discharge locations, control system, and duration of bypassing operation.

C. All costs including power, installation, operation, maintenance, and removal shall be the Contractor’s responsibility.

D. Bypassing operations should be scheduled and limited to the minimum time required to complete required construction activities.

E. In the event of an emergency, Contractor shall have on standby, a means to provide a temporary bypass to collect and dispose of sewage.

F. Standby power shall be provided for all bypass pumping systems.
1.08 TELEPHONE/EMAIL SERVICE
A. Provide, maintain, and pay for telephone and E-mail service to project superintendent from time of project mobilization to final completion.

1.09 TEMPORARY WATER SERVICE
A. Contractor shall verify location of temporary water supply on or near site and shall provide piping, hoses, meter, and fittings required to distribute it as required by the Work. Contractor shall supply approved backflow prevention and metering equipment.
B. Contractor shall not be charged for reasonable water use throughout the construction period. Contractor shall make all reasonable efforts to conserve water. Owner reserves the right to charge Contractor for water use deemed to be excessive.
C. Contractor shall not damage plumbing at source of temporary water.
D. Where water source is not available at or near site, Contractor shall make arrangements with Owner for source of water at appropriate hydrant locations. Contractor shall provide tanker truck, and metering equipment necessary to measure water from hydrant locations.

1.10 TEMPORARY SANITARY FACILITIES
A. Contractor shall provide and maintain required facilities and enclosures. Provide from time of project mobilization to final completion.

1.11 FIRST AID FACILITIES
A. First aid facilities shall be provided and maintained by the Contractor in accordance with all federal, state, and local laws and regulations.

1.12 FENCING
A. By Contractor:
   1. Provide temporary fencing around open excavation areas.
   2. Owner and Engineer shall be provided with any keys necessary to access the project site.

1.13 BARRIERS
A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
B. Provide protection for plants designated to remain. Replace damaged plants.
C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.14 ENCLOSURES

A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with locks; Owner shall have access to site at all times.

B. Provide temporary partitions with access doors to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment. Temporary partitions shall be double walled made of wood framing and plastic sheeting (or approved equivalent) to completely seal off new Work from the rest of the existing facility. Dust is not allowed to enter the contained areas of the existing facility. All areas affected by dust will be cleaned at Contractor's expense and all motors affected by dust shall be replaced at Contractor's expense. Ventilation shall be provided for prep/coating Work and use of the existing building ventilation system is not acceptable. The Contractor shall exhaust the air to the exterior atmosphere at a minimum of 6 air changes per hour to prevent the buildup and migration of dust and fumes. All areas of the existing structure removed/ altered shall be replaced or repaired to existing or better condition as determined by the Engineer.

C. Temperatures inside the enclosures and/or enclosed parts of structures shall be not less than 60 degrees F for 48 hours prior to and during time when concrete work, cement finishing, or masonry work are being completed or curing and not less than 50 degrees F when other trades are working.

D. Provide temporary partitions and ceilings as required to separate work areas from existing Owner occupied areas, to prevent the penetration of dust and moisture.

E. Provide temporary closures over wall and floor openings to enclose work.

1.15 TEMPORARY CONTROLS

A. Storm Water Permits
   1. Contractor shall obtain all necessary permits from Watershed Districts or responsible regulatory agencies for temporary erosion control measures. Contractor shall obtain an NPDES storm water permit for construction disturbing more than one acre of area in conjunction with the Owner.
   2. Contractor shall provide and maintain all best management practices necessary for erosion prevention, sediment control, dewatering and basin draining, and pollution prevention management measures at the Site in accordance with the requirements of the NPDES Storm Water permit and associated storm water pollution prevention plan (SWPPP) to be
submitted to the NDDH following award of the contract and prior to beginning construction.

3. The following paragraphs outline general best management practices that will be included in the SWPPP submitted to the NDDH. The SWPPP and NPDES shall be located at the site at all times during the construction. Contractor shall meet the general requirements as outlined below and any additional requirements required as a part of the review and approval of the NPDES storm water permit and SWPPP.

B. Erosion Prevention Practices:
1. Contractor shall schedule construction activities and conduct operations so as to minimize erosion of soils.
2. Contractor shall phase construction activities to minimize the amount of disturbed areas at one time. Provide temporary seeding, vegetative buffer strips, mulch or wood fiber blanket, and/or sod stabilization in disturbed areas not being actively worked and not yet ready for final grading and stabilization. Exposed soils shall be stabilized as soon as possible but in no case wait longer than 14 days without providing temporary or permanent stabilization.
3. If Contractor chooses to disturb more than 10+ acres at one time, temporary sediment basins shall be constructed in accordance with the following:
   a. Provide storage for a 2-year, 24-hour storm, but not less than 1800 feet per acre.
   b. Prevent discharge of floating debris.
   c. Allow for maintenance.
   d. Provide emergency overflow.
   e. Be built concurrent with start of soil disturbance.
   f. Consider public safety.
4. Temporary sediment control basins may also be necessary for steep slope areas or high erodible soils. Contractor shall construct temporary sediment control basins as necessary to meet additional requirements following review and approval of the NPDES storm water permit and associated SWPPP.

C. Sediment Control Practices:
1. Provide temporary measures such as silt fencing, berms, dikes, and turf establishment to prevent erosion. Construct drainage facilities and turf establishment concurrently with earthwork operations.
2. Incorporate erosion control measures at the earliest time practical time during construction. Provide erosion control measures as directed prior to the disturbance of in-place ground cover in critical areas which are tributary to public waters.
3. Contractor shall maintain all temporary erosion control measures throughout the duration of the project and remove them upon completion of permanent erosion control measures and turf establishment.
4. Protect all existing and new storm drain inlets.
5. Control temporary soil stockpiles.
6. Control vehicle tracking with stone pads, concrete, steel wash racks, or equivalent.
7. Provide gravel construction entrances at field entrances to the Site.
8. Remove sediment tracked onto streets within 24 hours of detection.
9. Contractor shall be responsible for periodically cleaning out and disposing of all sediment once the storage capacity of the drainage feature or structure receiving the sediment is reduced by one-half.
10. Contractor shall be responsible for cleaning out and disposing of all sediment at the completion of the project.
11. The contractor is responsible for removing the temporary erosion and sediment control devices and verifying the cleaning out of all storm drainage structures, including flumes, pipes, and ditches once final stabilization has occurred.
12. Maintain temporary erosion control devices until permanent facilities are constructed and final soil stabilization has occurred.

D. Dewatering and Basin Drainage:
1. Grade site to drain and maintain excavations free of water.
2. Dewatering and basin draining must discharge to a temporary or permanent sedimentation basin.
3. Provide, maintain, and operate pumping equipment as required.
4. Prevent erosion and scour at dewatering or pumping locations, disperse over natural rock riprap, sand bags, plastic sheeting, or other accepted measures.
5. Provide water barriers as required to protect site from soil erosion.

E. Inspections and Maintenance of SWPPP:
1. Shall be conducted by Contractor.
2. Occur every seven days.
3. Occur within 24 hours of ½” storm.
4. Be routinely recorded and kept with the SWPPP.
5. Occur once a month on final stabilized area.
6. Ensure integrity and effectiveness of erosion prevention and sediment control measures.
7. Repair or replace nonfunctional best management practices or erosion control measures.
8. Drain and remove sediment from basins.
9. Inspect surface waters, drainage ditches and conveyance systems for sediment.
10. Remove sediment deposits and stabilize any exposed soil during sediment removal.
11. Inspect and clean vehicle exits.
12. Ensure infiltration areas are protected.

F. Pollution Prevention Management Measures:
1. Contractor shall provide proper collection and disposal of solid waste. All construction debris and solid waste shall be contained in dumpsters or roll off boxes. All dumpsters and roll off boxes shall be located behind erosion control devices and a minimum of 10 feet from any catch basin structure.
2. All construction material shall be stored in an orderly manner.
3. All chemicals on site shall be kept in sealed containers with their original labeling and Material Safety Data sheets available.
4. All appropriate agencies shall be notified of any spill of fuel, oil, or other hazardous chemicals immediately upon detection.
5. Establish a specific truck washing site.
6. There shall be no on site engine degreasing.

G. Dust Control:
1. Contractor shall be responsible for dust control throughout the duration of the Project.
2. Work shall be executed by methods to minimize raising dust from construction operations.
3. Provide appropriate dust control measures as required to prevent excessive dust from dispersing into the air.

H. Noise Control:
1. Contractor shall be responsible for noise control throughout the duration of the Project.
2. Avoid the use of tools and equipment which produce harmful noise.
3. Restrict the use of noise making tools and equipment to required hours of construction.

I. Road Cleaning:
1. As required, the Contractor shall sweep or clean all roads and streets that are affected by vehicle traffic entering or leaving the site.

1.16 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.17 TEMPORARY CONSTRUCTION PROTECTION

A. Shoring and Bracing:
1. Contractor shall provide and maintain temporary supports, shoring, and bracing as required for protection of work.
2. Contractor shall assure the adequacy of all temporary shoring and bracing.
3. Repair or replace damaged work occasioned by inadequate temporary supports, shoring, or bracing.
4. Leave temporary supports, shoring, and bracing in place until permanent construction is complete to point where installed work is properly supported.

1.18 SECURITY

A. Provide security and facilities to protect Work, and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

C. Deliveries, Contractor shall inform
   1. Engineer and Owner of all equipment deliveries at least 24 hours in advance of
   2. Equipment/material arrivals scheduled for delivery to Owner occupied facilities.

D. Security will be the Contractor's responsibility for any Work occurring after normal operating hours. Upon completion of this Work, Contractor shall ensure project site doors and gates are locked and secure. No claims shall be made against Engineer or Owner for any act of an employee or trespasser, and Contractor shall make good on any damage to Owner’s property, resulting from Contractor’s failure to provide sufficient security in the absence of the Engineer and Owner.

E. Contractor to discuss security with his employees and sub-contractors and advise them to immediately report anything suspicious which could be a security issue.

1.19 PARKING

A. Contractor and personnel shall park all personal vehicles in an area acceptable to Owner and applicable property owners.

B. Do not block or hinder access to local property, driveways, or walkways.

1.20 VEHICLE ACCESS

A. By General Contractor.
   1. Maintain access roads leading into Site.
   2. Provide means of removing mud from vehicle wheels before entering streets and roads.
   3. Construct and maintain temporary roads accessing public roads to serve construction areas.
   4. Provide aggregate materials as an incidental to the Contract is access roads are not suitable for truck and equipment traffic or to accommodate local rainfall events.
5. When finished using access road(s) remove temporary access roads and return surface to pre-existing or better condition, as an incidental to the project.

B. Traffic Control
1. Contractor shall provide and maintain signs, warning lights, and barricades to adequately protect warn and protect the public from hazardous protrusions, materials, excavations, and equipment resulting directly or indirectly from construction activities.
2. All traffic control devices including signs, warning lights, and barricades shall conform to the requirements of the North Dakota Department of Transportation (ND DOT).
3. Traffic control setup and layout shall conform to requirements of the ND DOT and shall be the sole responsibility of the Contractor.
4. Contractor shall give Owner and Engineer at 48 hours’ notice prior to a partial blockage or closure of any street or public right of way. When working in the right of way of county roads, Contractor shall be responsible for acquiring the necessary permits for working in a right-of-way.
5. Traffic control devices shall be inspected daily. Warning lights should be checked for proper operation and cleaned as required. All broken or ineffective traffic control devices shall be replaced immediately.
6. Contractor shall designate an individual and one alternate to have responsible charge of proper installation and maintenance of the traffic control devices. These individuals shall be available on a 24-hour on call basis.

1.21 PROGRESS CLEANING AND WASTE REMOVAL
A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
C. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.
D. Contractor shall salvage all existing pumps and blowers and shall store them on the site at a location to be determined by the Owner, where the Owner will retain possession of the items. At the discretion of Owner, Contractor shall salvage select control panels and shall store them on the site at a location to be determined by the Owner, where the Owner will retain possession of the items.
E. Contractor shall maintain site clean and free of obstructions that may cause injuries or otherwise prevent staff (Owner, Engineer, Contractors, etc.) from performing their job effectively.
1.22 FIELD OFFICES AND SHEDS
   A. Construction Field Office (trailer or shed): At Contractor’s option.
   B. Locate Field Offices and construction trailer or shed a minimum distance of 30 feet from existing and new structures. Owner’s approval of location is required.

1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS
   A. Remove temporary utilities, equipment, facilities, and materials, prior to Final Application for Payment inspection.
   B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
   C. Clean and repair damage caused by installation or use of temporary work.
   D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS
   NOT USED.

PART 3 EXECUTION
   NOT USED.

END OF SECTION
SECTION 01 61 00 – COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:
   1. Products.
   2. Transportation and Handling.
   4. Product Options.
   5. Substitutions.

B. Related Sections include, but are not limited to:
   1. Section 00 21 13 – Instructions to Bidders.
   2. Section 00 72 00 – General Conditions.
   3. Section 00 73 00 – Supplementary Conditions.
   4. Section 01 45 00 – Quality Control.

1.02 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work. Products may also include existing materials or components designated for re-use.

B. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

D. Provide interchangeable components of the same manufacturer for components being replaced.

1.03 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.
1.04 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.
B. Store with seals and labels intact and legible.
C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.
D. For exterior storage of fabricated Products, place on sloped supports above ground.
E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
F. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.
G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
H. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
I. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.
J. Contractor shall be responsible to arrange for, receive, inspect, and unload all shipments of materials or equipment. Contractor shall provide haul route information to shipping companies.

1.05 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
C. Products Specified by Naming One or More Manufacturers with an option for an “Or Equal” or “Approved Equivalent” or “Prior Approved Equivalent” Manufacturer: Submit a request for the “or equal/approved equivalent” in accordance with the following substitutions article. Requests and Engineer’s acceptance of “Or Equal” or “Approved Equal” or “Prior Approved Equivalent” Manufacturers is allowed during bidding only.

1.06 SUBSTITUTIONS

A. See Specification Section 01 25 00 Substitution Procedures.
B. “Equal” or “Approved Equivalent” or “Acceptable” or “Prior Approved Equivalent” products will be considered only if written request is made at least 14 days prior to Bid opening.

C. Substitutions will be considered when a Product becomes unavailable through no fault of the Contractor.

D. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

E. A request constitutes a representation that the Bidder: Contractor:
   1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
   2. Will provide the same warranty for the Substitution as for the specified Product.
   3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner and Engineer for redesign services associated with re-approval by authorities.

F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

G. Substitution Submittal Procedure:
   1. Submit two copies of request for consideration. Limit each request to one proposed Substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.
   3. Fully identify the substitutions effects on all facets of the Work and construction schedule.
   4. The Engineer will notify Contractor in writing of decision to accept or reject request.
   5. Accepted substitutions will be listed by addendum.

PART 2 PRODUCTS

2.01 UNIFORMITY

A. For any type of similar equipment, i.e., motors, drive units, etc., provide equipment of the same manufacturer.

B. Inform all subcontractors and suppliers of the selected manufacturers to ensure equipment uniformity.

C. Obtain each separate type of product from the same manufacturer.
2.02 TOOLS

A. For any equipment or equipment components requiring special tools, the Contractor shall supply the Owner with such tools to allow for the maintenance and removal/replacement of equipment components.

2.03 CONSUMABLES

A. Provide Owner with all consumable items that are required during start-up and initial operation (90 days minimum) of all Project components including, but not limited to; coolant, fluids, oil, grease, other lubricants, filters, bulbs, batteries, etc.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all equipment in full compliance with the manufacturer’s recommendations.

B. Obtain services of qualified and approved factory representatives to install, check, and approve the installation of all equipment.

C. Service representative:
   1. Present for the start-up and initial operation of all equipment.
   2. Certify in writing that:
      a. Equipment is properly installed and ready for operation.
      b. Equipment properly aligned.
      c. Direction of rotation checked.
      d. Lubrication is proper.
      e. Unit is free from undue stress from connecting pipe or anchorage.
      f. Unit has operated at full load conditions.
      g. Unit has operated in full compliance with the project specifications and the manufacturer’s recommendations.

END OF SECTION
SECTION 01 73 29 - CUTTING AND PATCHING

PART 1  GENERAL

1.01  SUMMARY

A. This Section includes:
1. Requirements and limitations for cutting and patching of Work.

B. Related Sections include:
1. Section 01 10 00 – Summary of Work.
2. Section 01 33 00 – Submittal Procedures.
3. Section 01 61 00 – Common Product Requirements.
4. Individual Product Specification Sections:
   a. Cutting and patching incidental to Work of this Section.
   b. Advance notification to other Sections of openings required in Work of those Sections.

1.02  SUBMITTALS

A. Submit written request in advance of cutting or alteration that affects:
1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
5. Work of Owner or separate contractor(s).

B. Include in request:
1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and Products to be used.
5. Alternatives to cutting and patching.
6. Effect on work of Owner or separate contractor(s).
7. Written permission of affected separate contractor(s).
8. Date and time Work will be executed.

PART 2  PRODUCTS

2.01  MATERIALS

A. Those required for original installation.

B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 61 00 – Common Product Requirements.
PART 3  EXECUTION

3.01  EXAMINATION

A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, assess conditions affecting performance of Work.

C. Understand and become familiar with required coating systems, application requirements, and spatial concerns, issues, and dimensions required to perform the Work.

D. Beginning of cutting or patching means acceptance of existing conditions.

3.02  PREPARATION

A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas that may be exposed by uncovering Work.

C. Verify that all materials are clean and free from defects.

3.03  CUTTING

A. Execute cutting and fitting to complete the Work.

B. Uncover work to install improperly sequenced Work.

C. Remove and replace defective or non-conforming Work.

D. Remove samples of installed Work for testing, when requested.

E. Coordinate openings in the Work for penetration of process, mechanical and electrical Work, where required.

F. Employ original installer of new Work to perform cutting for weather exposed and moisture resistant elements, and sight-exposed surfaces. Employ experienced personnel or original supplier for applying specialized coating systems.

G. Cut rigid materials, masonry, prestressed concrete, and concrete using masonry saw or core drill. Pneumatic tools not allowed without prior approval. Protect finished water reservoirs from materials produced during saw cutting and core drilling.
3.04 PATCHING

A. Execute patching to complement adjacent Work.

B. Fit Products together to integrate with other Work.

C. Execute Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

D. Employ original installer of new Work to perform patching for weather and moisture resistant elements, and sight-exposed surfaces.

E. Restore Work with new Products in accordance with requirements of Contract Documents.

F. Fit Work airtight and water tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Identify any hazardous substance or condition exposed during the Work to the Architect/Engineer for decision or remedy.

3.05 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in Product sections; match existing Products and Work for patching and extending Work.

B. Employ skilled and experienced installer to perform alteration Work.

C. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

D. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.

E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with a neat transition to adjacent finishes.

F. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Engineer for review.
H. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition; to Engineer for review request instructions from Engineer.

I. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

J. Finish surfaces as specified in individual Product Sections.
SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   2. Substantial Completion.
   3. Final Completion.
   4. Final Cleaning.
   5. Project Record Documents.
   6. Spare parts and Maintenance Products.
   7. Warranties and Bonds.
   8. Withholding Affidavit for Contractors.
   10. Final Adjustment of Accounts.

B. Related Sections include:
   1. Section 00 72 00 – General Conditions.
   2. Section 00 73 00 – Supplementary Conditions.
   3. Section 01 31 13 – Project Coordination.
   4. Section 01 50 00 – Temporary Facilities and Controls.
   5. Section 01 78 23 – Operation and Maintenance Data.

1.02 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all portions of the Project.

1.03 SUBSTANTIAL COMPLETION

A. Prior to substantial completion CONTRACTOR shall review Contract Documents for items which are not complete or need to yet be completed including submittal of all manuals, and testing reports. CONTRACTOR shall make a list of incomplete work, a value of the incomplete work, and reasons why work is incomplete. CONTRACTOR shall complete all items required to be completed as part of substantial completion.
B. CONTRACTOR shall provide a written notice to ENGINEER that the work, or specific portions of the work, is substantially complete and ready for review. If there are any items remaining to be corrected or completed CONTRACTOR shall submit a list of these items along with the notice of substantial completion. Along with the list of items the CONTRACTOR should provide a written explanation of why these items are not considered necessary for substantial completion.

C. Upon receipt of CONTRACTOR’S notice of substantial completion, ENGINEER will proceed with inspection for substantial completion.

D. Following the substantial completion inspection by the ENGINEER and ENGINEER’S subconsultants, ENGINEER will either prepare certificate of substantial completion, or notify the CONTRACTOR in writing that substantial completion has not been meant listing the various reasons.

E. CONTRACTOR shall promptly complete the items required to meet substantial completion and submit a second notice of substantial completion to the ENGINEER.

F. ENGINEER will review the work a second time do determine the status of substantial completion.

G. When ENGINEER considers the project to be substantially complete, ENGINEER will prepare the preliminary certificate of substantial completion along with a substantial completion punch list of items to be completed prior to final payment. ENGINEER will deliver preliminary certificate and punch list to OWNER and consider any objections by the OWNER as provided in the Conditions of the Contract.

H. Upon agreement by OWNER and ENGINEER of substantial completion and punch list items, ENGINEER will execute and deliver to the CONTRACTOR and OWNER a final certificate of substantial completion along with substantial completion punch list of items to be completed prior to final payment.

I. A maximum of two (2) reviews of substantially complete work will be completed by ENGINEER and ENGINEER’S subconsultants for any one portion of work under the Contract. Should a third or subsequent reviews be necessary the following requirements will be met:
   1. OWNER will compensate ENGINEER for additional reviews.
   2. OWNER will deduct the amount of compensation paid to the ENGINEER for additional reviews from the payment to the CONTRACTOR.
   3. Compensation shall be at ENGINEER’S standard hourly rates plus actual cost of reimbursables.

1.04 FINAL COMPLETION

A. Following substantial completion CONTRACTOR shall complete remaining work and items to be corrected as part of substantial completion punch list as well as final cleaning and transferring site to OWNER.
B. When CONTRACTOR considers that all work is complete, CONTRACTOR shall provide written notice of final completion to ENGINEER.

C. Following receipt of final completion certification, ENGINEER and ENGINEER’S subconsultants shall review the work to verify that the requirements for final completion have been met.

D. Upon review of work for final completion ENGINEER will either request the CONTRACTOR to make closeout submittals or will notify CONTRACTOR that the work is not complete with a list of incomplete or defective work. CONTRACTOR shall promptly take steps to correct all listed deficiencies and incomplete work before sending a second written notice of final completion certification to ENGINEER.

E. If final completion was not met following first review, ENGINEER will review work a second time to determine if the requirements for final completion have been met.

F. A maximum of two (2) reviews of final complete work will be completed by ENGINEER and ENGINEER’S subconsultants for any one portion of work under the Contract. Should a third or subsequent reviews be necessary the following requirements will be met:
   1. OWNER will compensate ENGINEER for additional reviews.
   2. OWNER will deduct the amount of compensation paid to the ENGINEER for additional reviews from the payment to the CONTRACTOR.
   3. Compensation shall be at ENGINEER’S standard hourly rates plus actual cost of reimbursables.

G. When ENGINEER considers all work to be complete in accordance with the Contract Documents, ENGINEER shall request the CONTRACTOR to make closeout submittals.

1.05 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean exterior glass, surfaces exposed to view; remove temporary labels, stains, and foreign substances, and polish transparent and glossy surfaces.

C. Clean debris from roofs, gutters, downspouts, and drainage systems.

D. Clean site; sweep paved areas, rake clean landscaped surfaces.

E. Remove waste and surplus materials, rubbish, and construction facilities from the site.
1.06  PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling current and future reference by Owner and Engineer.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

G. Submit documents to Engineer with claim for final Application for Payment.

1.07  SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.08  WARRANTIES AND BONDS

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
C. Provide Table of Contents and assemble in D size three ring binders with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance.

1.09 MAINTENANCE SERVICE

A. Furnish service and maintenance of components during the warranty period.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

1.10 FINAL ADJUSTMENT OF ACCOUNTS

A. CONTRACTOR shall submit a final statement of accounting to ENGINEER. Statement shall reflect all adjustments to the contract sum and include the following:
   1. Original contract sum.
   2. Additions and deductions resulting from:
      a. All previous change orders
      b. Allowances
      c. Unit prices
      d. Deductions for uncorrected work
      e. Penalties and bonuses
      f. Deductions for liquidated damages
      g. Deductions for multiple reviews
      h. Other adjustments
   3. Total contract sum as adjusted.
   4. Previous payments.
   5. Sum remaining due.

B. ENGINEER will prepare a final change order, reflecting approved adjustments to the contract sum which were not previously made by change orders.
PART 2  PRODUCTS

NOT USED.

PART 3  EXECUTION

NOT USED.

END OF SECTION
SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1  GENERAL

1.01  SUMMARY

A.  Section includes:
   1.  Quality Assurance.
   2.  Format.
   5.  Instruction of Owner's personnel.

B.  Related Sections include:
   1.  Section 01 33 00 – Submittal Procedures.
   2.  Section 01 45 00 – Quality Control.
   3.  Section 01 77 00 – Closeout Procedures.

1.02  QUALITY ASSURANCE

A.  Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.03  FORMAT

A.  Prepare data in the form of an instructional manual. Arrange data in numerical format.
   1.  Binders:
      a.  Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers.
      b.  2 inch maximum ring size.
      c.  When multiple binders are used, correlate data into related consistent groupings.
   2.  Cover; Identify:
      a.  Each binder with typed title OPERATION AND MAINTENANCE INSTRUCTIONS.
      b.  Title of Project.
      c.  Subject matter of contents.
      d.  Volume number.
      e.  Year of construction.
   3.  Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

B.  Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

C.  Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages. Folded paper should be unfoldable without removal from binder.
D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties.
   e. Bonds.

E. Compact Disc:
   1. Compact Discs (CD or DVD) shall be provided with all documents included with an index, tabs, and labels as previously required for the binders.

1.04 CONTENTS OF EACH VOLUME

A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Engineer, Subconsultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

F. Warranties: Prepare and submit per Section 01 77 00 – Closeout Procedures.

G. Bonds: Prepare and submit per Section 01 77 00 – Closeout Procedures.
H. Flash Drive: A flash drive shall be provided with all volume contents in electronic format or scanned to a portable document file (.pdf). The documents shall be placed as required under the appropriate tabs and labels as previously required for the compact discs. Each file shall be adequately labeled to identify the contents without opening the document.

1.05 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

B. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

C. Include manufacturer's printed operation and maintenance instructions.

D. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

E. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage, and local sources of supply.

F. Additional Requirements: As specified in individual Product specification sections.

G. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

H. Flash Drive: A flash drive shall be provided with all manuals in electronic format or scanned to a portable document file (.pdf). The documents shall be placed as required under the appropriate tabs and labels as previously required for the compact disc. Each file shall be adequately labeled to identify the contents without opening the document.

1.06 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.07 SUBMITTALS

A. Submit electronic copies of preliminary draft or proposed formats and outlines of contents before Substantial Completion. Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit electronic copies of completed volumes fifteen (15) working days prior to final inspection. One (1) copy will be returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.

D. Submit two (2) sets of revised final volumes in final form within ten (10) days after final inspection.

E. Submit a minimum of two (2) complete copies of the CDs or DVDs with final documents in electronic format within (10) days after final inspection.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION
FINAL INSPECTION AND ACCEPTANCE

Contractor: ____________________________

Address: ____________________________

Project: Fargo Water Towers No. 4 & 9 – Valve Vault Improvements
       City Project No. WA1854
       Fargo, ND

Contract: ____________________________

On this date, _______, 20___, a final inspection of the project as constructed has been made.

The Contractor hereby certifies that the construction has been performed in accordance with the
plans and specifications, approved Change Orders, and terms of the contract. The Contractor
further certifies that there are no unpaid bills or labor disputes in connection with this contract and
that the amount of $__________________ shown on the final estimate is the total amount due
him for all Work completed for the project.

The Owner does hereby agree that all construction and engineering Work on the project is
complete and does satisfy all terms of appropriate construction or engineering agreements.

The Project Engineer has observed the construction and to the best of his knowledge the
construction has been performed in accordance with the plans, specifications, approved change
orders, and terms of the contract and that the facility has been inspected and approved by all
agencies having jurisdiction.

Owner and Contractor do hereby acknowledge that the one year correction period will begin on
_______________, 20__.

The undersigned give approval of acceptance of the Work construction under the conditions and
guarantee of the contract.

________________________________________________________________________
AE2S City of Fargo, ND
Project Engineer Owner

By: ________________________________ By: ________________________________
Date: ______________________________ Date: ______________________________

________________________________________________________________________
Contractor

By: ________________________________
Date: ______________________________
DIVISION 02
EXISTING CONDITIONS
DIVISION 02 – EXISTING CONDITIONS
SECTION 02 41 19 – SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY
   A. Section includes:
      1. Demolition and removal of selected portions of building or structure.
      2. Demolition and removal of selected portions of the piping, valves, pumps, and miscellaneous facility appurtenances.

1.02 MATERIALS OWNERSHIP
   A. Unless otherwise indicated, demolition waste becomes property of Contractor. Owner reserves the right to retain selective items removed during demolition.

1.03 PRE-INSTALLATION MEETINGS
   A. Pre-demolition Conference: Conduct conference at Project site.

1.04 INFORMATIONAL SUBMITTALS
   A. Schedule of selective demolition activities with starting and ending dates for each activity.
   B. Pre-demolition photographs or video.

1.05 FIELD CONDITIONS
   A. Owner will need to continue the use of the pump station during selective demolition. Conduct selective demolition so that Owner’s operations will not be disrupted.
      1. Contractor shall prepare a schedule for selective demolition.
      2. Contractor shall submit the schedule to Engineer and Owner for review and approval prior to starting selective demolition.
   B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
   C. Notify Architect/Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
   D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
      1. Hazardous materials will be removed by Owner before start of the Work.
      2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect/Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.
E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

F. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.06 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

E. Inventory and record the condition of items to be removed and salvaged.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems.

3.03 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

C. Remove temporary barricades and protections where hazards no longer exist.

3.04 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Maintain fire watch during and after flame-cutting operations.

4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

5. Dispose of demolished items and materials promptly. Comply with state and local requirements.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
C. Removed and Salvaged Items:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect/Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.05 CLEANING

A. Remove demolition waste materials from Project site and recycle or dispose of them.
1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION
DIVISION 03
CONCRETE
SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1  GENERAL

1.01  RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02  SUMMARY

A. This Section specifies cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Slabs-on-grade.

1.03  DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

B. Hot Weather – A period when one or more of the following environmental conditions takes place that can impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration.
   1. High ambient temperature over 85°F.
   2. High concrete temperature, as delivered, of over 75° F.
      a. Low relative humidity, dew points below 45° F.
      b. High wind velocity of 15 mph sustained speeds or higher.
      c. Ambient temperature over 75° F combined with 15 mph sustained wind speeds.
      d. Solar radiation or bright sunlight combined with warmth and wind.
      e. Any of the above conditions by itself or in combination that cause a loss of moisture through evaporation of 0.2 lbs. per surface foot of concrete per hour or more.

C. Hot weather concreting – Any operations of placing, finishing, curing, and protection of concrete during hot weather when the conditions described above could cause harm to concrete.

D. Cold weather – A period when for more than three successive days the average daily outdoor temperature drops below 40° F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50° F occur during more than half of any 24 hour duration, the period shall no longer be regarded as cold weather.
E. Cold weather concreting – Operations concerning the placing, finishing, curing, and protection of concrete during cold weather.

F. Protection period – The required time during which the concrete is maintained at or above a specific temperature in order to prevent freezing of the concrete or to ensure the necessary strength development for structural safety.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Detailed procedures: For the production, transportation, placement, protection, curing, and temperature monitoring of concrete during hot or windy weather.
   1. In the submittal, include procedures to be implemented upon abrupt changes in weather conditions or equipment failures.
   2. Do not begin concrete work in hot weather until these procedures have been reviewed and accepted.
   3. Submit products that will modify the effects on concrete by hot, windy or sunny conditions.
   4. Submit workmanship methods including earlier start times that may allow mixing, transportation, and placement prior to the high heat times of the day. Avoid exceeding the peak temperature of hydration with the peak ambient temperature.

E. Detailed procedures: For the production, transportation, placement, protection, curing, and temperature monitoring of concrete during cold weather.
   1. In the submittal, include procedures to be implemented upon abrupt changes in weather conditions or equipment failures.
   2. Do not begin cold weather concreting until these procedures have been reviewed and accepted.

F. Construction Joint plan to be submitted and approved prior to placement of slabs and walls.

G. Field quality-control test and inspection reports
1.05 TERMINATION OF CONCRETE WORK

A. If high wind conditions, low humidity, excessive sunlight, high temperatures or a combination of these conditions exist and procedures are not in place for protecting concrete from these effects do not allow concrete to be placed.

B. Maximum temperature for concrete to be used is 75° F.

C. At an air temperature of 40° F or below persist for more than 6-hours: If adequate measures to protect concrete from the effects of cold weather are not provided, or the distance of travel results in cement delivered to the application point below 60° F, concrete shall not be placed.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
   2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Specifications.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require
representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
  a. Contractor’s superintendent.
  b. Ready-mix concrete manufacturer.
  c. Concrete subcontractor.

PART 2  PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Products: Subject to compliance with requirements, provide one of the products specified or obtain approval of another before bidding.

2.02 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.


D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
   3. Furnish ties with integral water-barrier plates for walls indicated to receive dampproofing or waterproofing.

2.03 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed, unless noted otherwise

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed where indicated or where reinforcing is field or shop welded.
C. Plain-Steel Wire:  ASTM A 82, as drawn.

D. Plain-Steel Welded Wire Reinforcement:  ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets

2.04 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars:  ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Bar Supports:  Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place.  Manufacture bar supports from steel wire, plastic, according to CRSI's "Manual of Standard Practice":
   1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.05 CONCRETE MATERIALS

A. Cementitious Material:  Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement:  ASTM C 150, Type II gray.
      a. Fly Ash:  ASTM C 618, Class C, Coal Creek Station.

B. Normal-Weight Aggregates:  ASTM C 33, Class 3S coarse aggregate or better, uniformly graded using at least a 3-bin aggregate blend.  Provide aggregates from a single source with documented service record data of at least 10 years’ satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
   1. Maximum Coarse-Aggregate Size:
      a. 3/4 inch nominal for footings and walls less than 16” thick.
      b. 1 ½” for walls greater than 16” thick.
   2. Fine Aggregate:  ASTM C33, free of materials with deleterious reactivity to alkali in cement.


2.06 ADMIXTURES

A. Air-Entraining Admixture:  Masterbuilders MB-AE-90 or equal meeting ASTM C 260, and AASHTO  M 154.

B. Chemical Admixtures:  If provided, all admixtures must be certified by manufacturer to be compatible with other admixtures and will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete.  Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture:  ASTM C 494/C 494M, Type A.
      a. No decrease in cement is permitted as result of use of water reducing admixture.

Water Towers No. 4 & 9 – Valve Vault Improvements
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2. High Range Water Reducer shall comply with ASTM C494, Type F or G.
   a. HRWR shall be added to the concrete mix at the project site.
   b. The high range water reducing admixture shall be able to maintain the plasticity range for extended periods of time (2 hours if necessary) without a rise in concrete temperature.
   c. With the use of these admixtures, slump limit shall be between 7 inches and 9 inches, unless otherwise authorized by the manufacturer.
   d. High range water reducing agent shall be Rheobuild by Master Builders or equal.
   e. A representative of the HRWR shall be present during any large placement, placement of slabs, or during times of unusual circumstance which may require changes to the product formulation.
   f. If unsatisfactory results are obtained (voids, cracking, etc.), the use of HRWR may be terminated by the ENGINEER.
3. Retarding Admixture: ASTM C 494/C 494M, Type B, Pozzolith 100XR by Masterbuilders or equal.
4. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D, Pozzolith 100XR by Masterbuilders or equal.

C. Waterproofing Admixture: Admixture must be certified by manufacturer to be compatible with all cementitious materials and other admixtures.
   1. Waterproofing admixture to be added to concrete at the time of batching.
   2. Waterproofing admixture shall be Xypex C-500 or C-1000 manufactured by Xypex Chemical Corporation and recommended by manufacturers technical services representative.
   3. Waterproofing admixture shall be added at dosages recommended by manufacturers technical representative upon their review of approved project concrete mix design.

2.07 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape and 6" lap lengths at all panels edges.

2.08 FLOOR AND SLAB TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
   1. Available Products:
      a. ChemTec International; ChemTec One.
      b. Dayton Superior Corporation; Day-Chem Sure Hard.
      c. L&M Construction Chemicals, Inc.; Seal Hard.
2.09 CURING MATERIALS

A. General: Contractor shall select a curing method that is suitable for the specified floor treatments and usage. Contractor shall select from one or more of the specified methods:
   1. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry

2.10 RELATED MATERIALS

A. Underslab Drainage Fill: Type A4, Spec 02207.

B. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber. [or] [ASTM D 1752, cork or self-expanding cork).

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
   1. Types I and II, non-load bearing for bonding hardened or freshly mixed concrete to hardened concrete.
   2. Sikadur 32, Hi Mod LPL or equal.

D. Crack repair materials:
   1. Non-water storage basins, walls, floors: ASTM C881 low-viscosity, 2-part epoxy for use as a structural repair epoxy

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
   1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 15 percent
      a. Concrete supplier may submit higher proportions of fly ash for prior approval if they can improve plastic and hydrated properties of the concrete.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
D. Admixtures: Use admixtures according to manufacturer’s written instructions.

2.12 CONCRETE MIXTURES

A. Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength 4000 psi at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.45
   3. Slump Limit: +/- 1.5” from slump limit estimated from approved mix design submittals.
   4. Air Content:
      a. 6 percent, plus or minus 1.0 percent at point of delivery for 3/4-inch nominal maximum aggregate size
      b. 5 percent, plus or minus 1 percent for 1 ½” nominal aggregate size.
      c. Omit air entraining admixture and limit air content to 3% entrapped air for interior floor slabs and for topping slabs.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI’s "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.

PART 3 EXECUTION

3.01 FORMWORK

A. Erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities of formed surfaces, designated by ACI 347R as abrupt or gradual, as follows:
   1. Unexposed: Class B, 1/4 inch for rough-formed finished surfaces
   2. Exposed: Smooth-formed finished, Class A, 1/8” maximum.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure
units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete, including equipment pads.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Obtain approval before framing openings in structural members that are not indicated on drawings.

K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.03 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

B. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
C. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

D. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

E. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.04 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover.

D. Do not weld reinforcing bars unless indicated otherwise.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.05 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Place slabs on grade and exterior stoop slabs in continuous operations with minimal construction joints. If construction joints are planned, place them in symmetric arrangements.
   1. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into approximately square panels with any side not exceeding 8’-0”. Construct contraction joints where indicated on Drawings.
   1. Sawed Joints: Form contraction joints with early-entry dry-cut saws or conventional power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
3.06 HOT WEATHER

A. RE-TEMPERING WITH WATER
   1. Adding water at the job site to concrete is not acceptable. If the slump of
      the concrete or other properties such as air content or temperature are
      incorrect or the concrete shows signs of set the concrete must be
      rejected.
      a. Re-tempered concrete is not acceptable and is subject to
         replacement by the installing contractor.

B. PREPARATION BEFORE CONCRETING
   1. All materials, equipment and methods required for work in hot weather
      concreting must be available at the project site before any work begins or
      concrete is delivered.
   2. Before beginning concrete placement, completely moisten/dampen the
      sub-grade, forms, reinforcing and all other materials which will contact the
      cement. However do not leave puddles or excess water in the forms or
      on the ground.
   3. Review methods being used by the mixing plant to cool the water, the
      aggregate or use of lower temperature cements.
   4. Review with testing laboratory and concrete supplier products mentioned
      in Part 2 to produce and deliver concrete that will withstand hot weather
      conditions.
   5. Shelter areas of Concrete pour especially slabs.
   6. Provide adequate numbers of workmen so that concrete placement,
      screeding and finishing are not delayed.
   7. Ensure that delivery of concrete is coordinated so that delays in use of
      fresh concrete do not occur which may lead to cold joints.
   8. Provide a moist sand cushion on top of a vapor barrier directly below the
      slab where indicated on the Drawings.
   9. Place Thermocouples to monitor cement temperature during placement
      and temperature rise during finishing and curing.

C. Hot-Weather Placement: Comply with ACI 305.

3.07 COLD WEATHER

A. PREPARATION BEFORE CONCRETING
   1. Remove all snow, ice, and frost from the surfaces, including
      reinforcement, against which the concrete is to be placed.
   2. Before beginning concrete placement, completely thaw the subgrade and
      any forms or reinforcing that will be in contact with the concrete.
   3. Do not place concrete around massive embedments unless such
      embedments will be maintained at a temperature above freezing in the
      same manner as the concrete.

B. CONCRETE TEMPERATURE
   1. Placement temperature – The minimum temperature of concrete
      immediately after placement shall be as specified in Column 2 of Table A
      (below).
2. The temperature of concrete as placed shall not exceed the values shown in Column 2 of Table A (below) by more than 20° F.

3. Concrete temperature table (All temperatures must be measured with thermocouples)

**Table A: Concrete Temperature Table:**

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least dimension of section, in inches</td>
<td>Minimum temperature of concrete as placed and maintained during a protection period of 4 days, °F*</td>
<td>Maximum gradual decrease in surface temperature during any 24 hr after end of protection, °F</td>
</tr>
<tr>
<td>Less than 12</td>
<td>55</td>
<td>50</td>
</tr>
<tr>
<td>12 to less than 36</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>36 to 72</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Greater than 72</td>
<td>40</td>
<td>20</td>
</tr>
</tbody>
</table>

4. Protection temperature – Unless otherwise specified, the minimum temperature of concrete during the protection period shall be as shown in Column 2 of Table A (above).
   a. Temperatures specified to be maintained during the protection period shall be those measured at the concrete surface, whether the surface is in contact with formwork, insulation, or air.
   b. Measure the temperature with a surface temperature-measuring device (thermocouple) having an accuracy of ± 2° F.
   c. Measure and record the temperature of concrete each day.

5. Termination of protection – The maximum decrease in temperature measured at the surface of the concrete in a 24-hour period shall not exceed the values shown in Column 3 of Table A (above).
   a. Protection shall be maintained as necessary to prevent decrease in temperature from exceeding these limits until the surface temperature of the concrete is within 20° F of the ambient or surrounding temperatures.
   b. When the surface temperature of the concrete is within 20° F of the ambient or surrounding temperature, all protection may be removed.

C. Cold-Weather Placement: Comply with ACI 306.1

**3.08 CONCRETE PLACEMENT**

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation and consolidate with vibrators. Do not use vibrators to transport concrete inside forms.

D. Maximum drop height for placement of basin or below grade walls is 4'-0".

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Slope all surfaces uniformly to floor drains.
   2. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.09 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.

B. It is the Contractors responsibility to consult with the Concrete supplier, the Engineer, the testing firm and Industry Suppliers to use the best means and methods of dealing with hot weather concrete issues.

C. Combustion heaters – Vent flue gases from combustion heating units to the outside of the enclosure. Do not use air from the enclosed space for combustion. Use only fresh outside air.

D. Overheating and drying – Place and direct heaters and ducts to avoid areas of overheating or drying of the concrete surface.

E. Maximum air temperature – During the protection period, do not expose the concrete surface to air having a temperature more than 20° F above the values shown in Column 2 of Table A, unless higher values are required by an accepted curing method.

F. Protection against freezing – Cure and protect concrete against damage from freezing for a minimum period of 4 days.
   1. Maintain the surface temperature of the concrete during that period in accordance with Column 2 of Table A.
      a. Whenever the air temperature is below 40° F., all concrete to be
b. Adequate means including full sheltering and proper heating devices shall be provided to maintain the temperature at not less than 70° F. for 72 hours or as necessary to insure proper curing of concrete.

2. The protection period may be reduced to 3 days if use of one or more of the following to alter the concrete mixture is accepted:
   a. Type III Portland cement meeting the requirements of ASTM C 150.
   b. A strength accelerating admixture meeting the requirements of ASTM C 494.
   c. 100 lb/yd$^3$ of additional Portland cement.

G. During periods not defined as cold weather, but when freezing temperatures may occur, protect concrete surfaces against freezing for the first 24 hours after placing.

H. Floor slabs, in which mechanical or other equipment has been placed in or under the bottom of the slab, must not be exposed to below freezing temperature at any time after their placement.

I. Protection for structural safety – If the concrete strength is required for structural safety, extend the duration of the protection period to ensure the necessary strength development.
   1. The strength required for formwork removal, for reshoring, or for continued construction shall be as specified in section 3.03.
   2. Verify whether the required strength has been attained by using one or more of the following methods:
      a. Test additional cylinders as noted in section 3.15.

J. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

K. Cure concrete according to ACI 308.1 and by methods compatible with the penetrating sealant. Contractor may select from one of the following methods:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with water, water-fog spray, or saturated absorptive cover.
      a. If water curing is used, terminate use at least 24 hr before any anticipated exposure of the concrete to freezing temperatures.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Reccoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

L. If the procedures as listed in this section are not followed and damage occurs (as defined by Engineer) to the concrete, Contractor shall at no further expense to the Owner replace all damaged concrete and all materials effected by the damaged concrete.

M. If there is any question as to whether the protective measures have been followed, or if the concrete may have been damaged, the Contractor at his own expense shall utilize a professional testing agency to perform non-destructive or destructive tests on the concrete in question. Tests shall be in accordance with ASTM C42-94, and C805

3.10 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

B. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

C. Do not apply to concrete until sufficient curing time has elapsed according to the manufacturer’s recommendations.

D. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

E. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer’s written instructions.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval. All repair methods shall be prepared by the Contractor and submitted to the engineer for approval.

B. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete
surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried.

2. Fill form-tie voids with hydraulic repair mortar/waterstop according to manufacturer’s recommendations. Available products are:
   a. W.R. Meadows “Meadow-Patch 5”
   b. Sonneborn “SonoPlug”
   c. L&M Construction Chemicals “DuraPlug”

3. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

4. Repair defects on concealed formed surfaces that affect concrete’s durability and structural performance as determined by Engineer.

C. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, high or low areas that do not comply with the surface tolerance requirements, and other objectionable conditions.

D. Perform structural repairs of concrete, subject to Engineer’s approval, using epoxy adhesive and patching mortar. Use injection methods to repair cracks using specified repair materials.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: CONTRACTOR shall engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control shall include those specified in this Article.

B. Testing Agency Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172. Obtain at least one composite sample for each 50 cu. yd. or fraction thereof of each concrete mix placed each day. Tests on each composite sample shall be performed according to the following requirements:

1. When frequency of testing will provide fewer than two composite for each concrete mix, testing shall be conducted from at least two composite samples.

   2. Slump: ASTM C 143; one test at point of placement for each composite sample. Perform additional tests when concrete consistency appears to
change. Reports shall include the slump limit from the approved mix design.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

5. Unit Weight: ASTM C 138, fresh unit weight of structural concrete; one test for each composite sample.

6. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of a minimum of three standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39; test a minimum of one laboratory-cured specimens at 7 days and two at 28 days.

8. Estimated ambient temperature, wind speed and direction, and other pertinent weather observations at time of placement.

9. Additional compressive strength tests consisting of two specimens may be performed at earlier test dates to determine achievement of design compressive strength for the purposes of removing formwork, shores and re-shores. This additional testing is performed at the Contractor’s expense.

C. The Contractor shall prepare a minimum of three compressive strength test specimens according to ASTM C31 for each 25 cu. yd of concrete placed. ASTM C39 compressive strength tests shall be performed on a minimum of one specimen at 7 days and two specimens at 28 days.

D. Strength of each concrete placement will be satisfactory if the following conditions are achieved:

   1. Compressive-strength test equals or exceeds specified compressive strength,
   2. When the strength is lower than the design strength, if the arithmetic average of the three previous or subsequent strength tests meets the strength specification and when either of the two individual test values comprising a compressive strength test is not more 500 psi below the design compressive strength.

E. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Project, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests. Report shall also include estimated ambient temperature, wind speed and direction, and other pertinent weather observations at time of placement.
F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer to verify strength of the concrete but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Engineer.

END OF SECTION
SECTION 08 31 13 – ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Access Hatches.

B. Related Work:
   1. All Work or items attached to, covering, abutting, supporting or supported by metal fabrications – includes Divisions 2 through 44.

1.02 REFERENCES

A. Reference Standards include, but are not limited to:

1.03 QUALITY ASSURANCE

A. Qualifications of Personnel: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Prepare Shop Drawings for all structural metal fabrications under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in North Dakota.

1.04 SUBMITTALS

A. General: Comply with provisions of Section 01300.

B. Submit:
   1. Manufacturers' specifications and other data required to demonstrate compliance with specified requirements.
   2. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   3. Templates for anchor and bolt installation by other trades.
4. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
5. Indicate welded connections using standard AWS A2.0 welding symbols.
6. Indicate net weld lengths.

1.05 FIELD MEASUREMENTS

A. Verify field measurements are consistent or match shop drawing measurements/dimensions.

1.06 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the Work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Metal Surfaces, General: For fabrication of the Work of this Section which will be exposed to view, use only those materials which are smooth and free from surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness.

B. Aluminum Alloy and Temper: Provide alloy and temper as shown or specified, or as otherwise recommended by the aluminum producer or finisher.

C. Standards: All materials shall comply with:
2. Aluminum Bars, Rods, and Wire: ASTM B211.
5. Concrete inserts: Threaded or wedge type, galvanized ferrous castings, either malleable iron ASTM A47 or cast steel ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized, ASTM A153.
7. Stainless Steel Bolting Materials: ASTM A193. Stainless steel bolting materials, including concrete anchor bolts, all threaded rod, and other fastening materials and components are to be used for all submerged, semi-submerged, and intermittently submerged applications.
8. Welding Materials: AWS D1.1; type required for materials being welded.
2.02 PREFABRICATED VAULT ACCESS HATCHES:

A. Surface Mount Hatch and Frame Units: Surface mounted access doors with fully gasketed, overlapping cover formed aluminum for minimum 300 psf load rating. All shapes and components shall be fabricated from aluminum alloy T6061-T6.
   1. Flush Hatch panel and frame with continuous EPDM gasket to seal the hatch to the frame.
   2. Frames and anchors: 1/4" thick angle frames with minimum 7/16" diameter holes through horizontal leg of the mounting frame. Provide continuous EPDM gasket between the mounting surface and the underside of the mounting flange.
   3. Hatch Panels:
      a. Minimum 1/4" thickness
      b. Aluminum checkered floor plate meeting ASTM B632
      c. Reinforced with formed channels as needed.
   4. Size: 42 x 42 inch clear opening
   5. Hardware:
      a. All components shall be stainless steel.
      b. Hinge: 175 degree opening range, tamper-proof concealed hinge within the frame with minimum 3/8" hinge pin, all components made from stainless steel.
      c. Lock: Fully welded padlock hasp of at least 3/8" thick aluminum plate.
      d. Operating Mechanism: Gas-assisted strut with automatic hold-open locking arm with release handle.
   6. Finish: Mill finish or better, manufacturer’s standard finish.
   7. Approved manufacturers include:
      a. Bilco
      b. Halliday
      c. Approved equivalent

PART 3 EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which miscellaneous metal items are to be installed, and correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings. Secure rigidly in place.
C. Position units to provide convenient access to the concealed work requiring access.

D. Coat aluminum surfaces embedded in concrete with bituminous paint.

3.03 CLEANUP AND PROJECT CLOSEOUT

A. Clean up and properly dispose of all residual components and materials.

END OF SECTION
DIVISION 09
FINISHES
DIVISION 09 – FINISHES
SECTION 09 96 00 – HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Surface preparation and field painting/protective coatings of all process piping, process pipe support systems, associated process system appurtenances, and vault substrates.
   2. Water Tower spot paint repair (if damaged by contractor work)

B. Related Sections include, but are not limited to:
   1. Section 01 33 00 – Submittal Procedures.
   2. Section 01 45 00 – Quality Controls.
   3. Section 01 61 00 – Common Product Requirements.
   4. Division 03 – Concrete.
   5. Division 05 – Metals.
   6. Division 26 – Electrical.

1.02 REFERENCES

A. Reference Standards include, but are not limited to:
   1. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

1.03 DEFINITIONS

A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

1.04 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish Products with ten (10) years’ experience.

B. Applicator: Company specializing in commercial painting and finishing with five (5) years documented experience.

C. Contractor provide:
   1. Manufacturer’s certification that proposed coating system meets specified performance requirements.
   2. SSPC visual standards on-Site.
3. Wet and dry paint thickness measurement instrument on-Site for steel and masonry surfaces.

1.05 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00. Indicate each material and cross-referenced specified coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

B. Provide Product data on all Products including manufacturer's technical information, label analysis, and instructions for handling, mixing, storing, and applying each coating material. Submit manufacturer's application instructions under provisions of Section 01 33 00.

C. Submit five (5) full color sample sheets illustrating available colors for each scheduled surface finish Product. During the shop drawing review process, Engineer and Owner will select color choices for surfaces to be coated. Submit samples under provisions of Section 01 33 00.

D. Potable Water Certification: Submit certification that liner has been classified by an ANSI certified laboratory to ANSI/NSF 61 in tanks, pipes, and joints.

E. Manufacturer's Quality Assurance: Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.

F. Applicator's Quality Assurance: Submit list of minimum of five (5) completed projects of similar size and complexity to this Work. Include for each project:
   1. Project name and location
   2. Name of owner.
   3. Name of contractor.
   4. Name of engineer.
   5. Name of coating manufacturer.
   6. Approximate area of coatings applied.
   7. Date of completion.
   8. Name and number of contact person at project site.

G. Maintenance Manual: Submit maintenance manual containing instructions for the Owner on how to properly maintain coatings.

H. Warranty: Submit to Owner manufacturer's standard warranty.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Refer to Section 01 61 00.

B. Deliver Products to Site in manufacturer’s original, sealed, and labeled containers with the following information:
   1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.
9. Drying time.
10. Cleanup requirements.

C. Deliver products to Site shall be inspected to verify acceptance.

D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions. Maintain storage containers in a clean condition, free of foreign materials and residue. Protect from freezing. Keep storage area neat and orderly.

E. Take precautionary measures to prevent fire hazards and spontaneous combustion. Remove all paint waste from site daily and dispose of properly.

F. Container labeling to include manufacturer's name, type of coating, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Weather:
1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.
2. Surface Temperature:
   a. Minimum of 5 degrees F above dew point and rising.
   b. Do not apply to porous substrates when substrate or ambient temperatures are rising.
   c. Do not apply to porous substrates when substrate is in direct sunlight.
   d. Do not apply over substrates that are frozen or contain frost.
   e. Provide lighting level of 80 foot candles measured mid-height at substrate surface.
   f. Consult manufacturer for cold weather application instructions.
3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.
4. Precipitation:
   a. Do not prepare surfaces or apply coatings in rain, snow, fog, mist, or when moisture is imminent.
   b. Do not apply when the surface may become wet within 4 hours after application.
5. Wind: Do not spray coatings if wind velocity is above manufacturer's limit.
B. Ventilation:
   1. Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWA D102 and these specifications.
   2. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

C. Dust and Contaminants:
   1. Schedule coating work to avoid excessive dust and airborne contaminants.
   2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.
   3. Refer to Paragraph Error! Reference source not found. – Error! Reference source not found. of this specification for additional requirements.

1.08 EXTRA STOCK

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels fully describing contents and color application location and room location in addition to the Manufacturer’s label. Deliver extra materials to Owner.

B. Quantity: Furnish Owner with extra paint materials for each finish coat and each color in an amount equal to 1 gallon for each material and color applied.

1.09 REGULATORY REQUIREMENTS

A. Conform to applicable North Dakota Department of Health, Environmental Protection Agency, Ten States Standards, Uniform Building and Uniform Fire Codes and Standards.

B. All Products that may come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. All paint materials selected for coating systems for each type of surface shall be the Product of one manufacturer.
   1. Tnemec Company, Inc.
3. Approved Equivalent.

2.02 MATERIALS

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer’s best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer’s product identification will not be acceptable.

C. Colors: Selected by Engineer from manufacturer’s full range.
   1. Quantity of colors selected will be as required for exterior features and interior features (different colors for ceiling, walls, floors, doors, etc.)
   2. Colors for the all piping shall be selected to meet Ten States Standards – 2.14 Piping Color Code.

D. Coatings: Ready mixed, except field-catalyzed coatings. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

E. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.

F. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners, and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

G. Materials shall contain no lead.

2.03 FINISHES

A. Refer to schedule at end of Section for surface finish.

B. Colors shall be selected by the Engineer and Owner or as recommended by Ten States Standards 2003 Edition, Section 2.14 Piping Color Code.

C. Where more than one coat is required, there shall be contrasting colors for each coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator’s acceptance of surfaces and conditions within a particular area.
3. Report any condition that may potentially affect proper application.

B. Verify that surfaces are ready to receive Work as instructed by the Product manufacturer.

C. Test shop applied primer and finishes for compatibility with subsequent cover materials.

D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
   1. Notify Engineer about anticipated problems when using the materials specified over substrates primed by others.

3.02 PREPARATION

A. General:
   1. Prepare surfaces per Drawings, Specifications, and manufacturer’s recommendations.
   2. Remove and protect electrical plates, hardware, hardware accessories, light fixture trim, machined surfaces, and fittings prior to preparing surfaces or finishing. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
   3. Correct minor defects and clean surfaces which affect Work of this Section.
   4. Seal marks which may bleed through surface finishes.
   5. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to thoroughly dry.
   6. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
   7. Concrete and Concrete Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Areas that currently have existing insulation may require sand blasting to remove adhesive left after removal of the wall insulation. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
   9. Wood and Metal Doors Scheduled for Painting: Seal top and bottom
edges with primer.

B. Surface Preparation of Materials:
1. Aluminum (SW-1):
   a. Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.

2. Concrete Masonry Units (SW-3):
   a. Remove all loose mortar and foreign material from block. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners.
   b. New masonry units and mortar must be cured at least 30 days at 75°F.
   c. The pH of the surface should be between 6 and 9.
   d. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface.
   e. Fill bug holes, air pockets, and other voids with a cement patching compound.

3. Concrete (SW-5):
   a. Cure: Concrete must be cured prior to coating application. Cured is defined as concrete poured and aged at a material temperature of at least 75°F for at least 30 days. The pH of the surface should be between 6 and 9.
   b. Moisture (ASTM D4263): Concrete must be free of moisture as much as possible (12% or less for walls, 7% for floors). Test for moisture or dampness by taping the four edges of an 18-inch by 18-inch plastic sheet (4 mils thick) on the bare surface, sealing all of the edges. After a minimum of 16 hours, inspect for moisture, discoloration, or condensation on the concrete or the underside of the plastic. If moisture is present, the source must be located and the cause corrected prior to painting. Verify with ASTM F1869 at 3 lbs per 1,000 square feet per 24 hours.
   c. Temperature: Air, surface and material temperature, must be at least 50°F (10°C) during the application and until the coating is cured.
   d. Contamination: Remove all grease, dirt, loose paint, oil, tar, glaze, laitance, efflorescence, loose mortar, and cement by the recommendations Methods A, B, C, or D, listed below.
   e. Surface Condition: Hollow areas, bug holes, honeycombs, voids, fins, form marks, protrusions, or rough edges are to be ground or stoned to provide a smooth, continuous surface of suitable texture for proper adhesion of the coating. Imperfections may require filling with a compatible material.
   f. Concrete Treatment: Hardeners, sealers, form release agents, curing compounds, and other concrete treatments must be compatible with the coatings, or be removed.

4. Methods of Surface Preparation for Concrete
   a. Prepare surfaces per SSPC-SP13.
   b. Method “A” – Blast Cleaning: Includes dry blasting, water blasting, water blasting with abrasives, and vacuum blasting with abrasives.
1) Use 16 - 30 mesh sand and oil-free air.
2) Remove all surface contamination.
3) Stand approximately 2 feet from the surface to be blasted.
4) Move nozzle at a uniform rate.
5) Laitance must be removed and bug holes opened.
6) Surface must be clean and dry and exhibit a texture similar to that of medium grit sandpaper.
7) Vacuum or blow down and remove dust and loose particles from the surface.
8) All existing interior floors within the WTP shall be cleaned using this method or approved equal method by the Engineer.

c. Method “B” – Acid Etching:
1) Remove all surface contamination.
2) Wet surface with clean water.
3) Apply a 10-15% Muriatic Acid or 50% Phosphoric Acid solution at the rate of one gallon per 75 square feet.
4) Scrub with a stiff brush.
5) Allow sufficient time for scrubbing until bubbling stops.
6) If no bubbling occurs, the surface is contaminated with grease, oil, or a concrete treatment that is interfering with proper etching. Remove the contamination with a suitable cleaner and then etch the surface.
7) Rinse the surface two or three times. Remove the acid/water mixture after each rinse.
8) Surface should have a texture similar to medium grit sandpaper.
9) It may be necessary to repeat this step several times if a suitable texture is not achieved with one etching. Bring the pH (ASTM D4262) of the surface to neutral with a 3% solution of tri-sodium phosphate or similar alkali cleaner and flush with clean water to achieve a sound, clean surface.
10) Allow surface to dry and check for moisture.

d. Method “C” – Power Tool Cleaning or Hand Tool Cleaning:
1) Use needle guns or power grinders, equipped with a suitable grinding stone of appropriate size and hardness, which will remove concrete, loose mortar, fins, projections, and surface contaminants. Hand tools may also be used.
2) Vacuum or blow down to remove dust and loose particles from surface.
3) Test for moisture or dampness by taping the four edges of an 18-inch by 18-inch plastic sheet (4 mils thick) on the bare surface, sealing all of the edges. After a minimum of 16 hours, inspect for moisture, discoloration, or condensation on the concrete or the underside of the plastic. If moisture is present, the source must be located and the cause corrected prior to painting.

e. Method “D” – Surface Cleaning:
1) The surface must be clean, free of contaminants, loose
cement, mortar, oil, and grease. Broom cleaning, vacuum cleaning, air blast cleaning, water cleaning, and steam cleaning are suitable as outlined in ASTM D4258.

2) Concrete curing compounds, form release agents, and concrete hardeners may not be compatible with recommended coatings. Check for compatibility by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet.

3) Allow concrete to dry one week before testing adhesion per ASTM D3359. If the coating system is incompatible, surface preparation per methods outlined in ASTM D4259 are required.

5. Copper (SW-7):
   a. Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning. Preparation shall include solvent clean (SSPC-SP1 Solvent Cleaning) and light abrasion for an anchor profile.

6. Drywall – Interior and Exterior (SW-8):
   a. Drywall must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
   b. Exterior surfaces must be spackled with exterior grade compounds.
   c. Spot prime defects after repairs are complete.

7. Previously Coated Surfaces (SW-12):
   a. All surface contamination such as oil, grease, loose paint, loose mill scale dirt, foreign matter, loose rust, mold, mildew, mortar, efflorescence, and sealers must be removed to assure sound bonding to the tightly adhering old paint and sound substrate.
   b. Glossy surfaces of old paint films must be clean and dull before repainting. Thorough washing with an abrasive cleanser may clean and dull in one operation, or, wash thoroughly and dull by sanding.
   c. Spot prime any bare areas with an appropriate primer.
   d. Recognize that any surface preparation short of total removal of the old coating may compromise the service length of the system. Check for compatibility by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet. Allow surface to dry one week before testing adhesion per ASTM D3359. If the coating system is incompatible, complete removal is required (per ASTM 4259, S-W 5, Method “A”).
   e. All existing interior walls shall use this method to determine interior wall surface preparation. If coating system is incompatible, Contractor shall do a complete removal per SW-5, Method “A”. If no compatibility issues are evident, Contractor may use SW-3.

8. Steel: Structural, Plate, etc. should be cleaned by one of the surface preparations described below:
   a. Hand Tool Cleaning (SW-14, SSPC-SP2):
1) Remove all loose mill scale, loose rust, and other detrimental foreign matter by hand chipping, scraping, sanding, and wire brushing.

2) Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP 1.

b. Power Tool Cleaning (SW-15, SSPC-SP3):
1) Remove all loose mill scale, loose rust, and other detrimental foreign matter by power tool chipping, descaling, sanding, wire brushing, and grinding.

2) Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP 1.

c. Commercial Blast Cleaning (SW-17, SSPC-SP6 or NACE 3)
1) Removal of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter such that staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied paint.

2) Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.

d. Water Blasting (SW-21, NACE Standard RP-01-72)
1) Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

3.03 PROTECTION

A. Protect elements surrounding the Work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by Work of this Section.

C. Furnish and utilize drop cloths, shields, containment, and other necessary protective methods to prevent blast media, fumes, overspray, or droppings from disfiguring other surfaces.

D. The Contractor shall maintain explosion-proof ventilation during surface preparation, coating operations, and curing periods in compliance with OSHA and the North Dakota Department of Labor standards.

E. Remove empty paint containers from Site. Do not deposit in Owner receptacles for disposal. This includes empty containers, drop cloths, and other miscellaneous painting items.

3.04 APPLICATION
A. Apply products in accordance with manufacturer's instructions.
B. Do not apply finishes to surfaces that are not dry.
C. Apply each coat to uniform finish.
D. Apply each coat of paint slightly darker than preceding coat, unless otherwise approved.
E. Sand lightly between coats to achieve required finish.
F. Allow applied coat to dry before next coat is applied.
G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
H. Prime back surfaces of interior and exterior woodwork with primer paint.
I. Prime back surfaces of interior woodwork scheduled to receive stain or varnish with gloss varnish reduced 25 percent with mineral spirits.

3.05 CLEANING

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
B. During progress of Work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers, and remove daily from Site. Do not deposit in Owner receptacles.

3.06 FIELD QUALITY CONTROL

A. Test questionable coated areas as directed by ENGINEER. Inspection by the Engineer or others does not absolve the Contractor from his responsibilities for quality control inspection and testing as specified herein or as required by the Manufacturer's instructions.
B. Check for holidays on interior steel immersion surfaces using holiday detector per NACE Standard SPO-188-90 – Recommended Practice for Discontinuity (Holiday) Testing of Non-Conductive Coatings Applied over a Conductive Substrate.
C. Verify coatings and other materials are as specified.
   1. Inspect all materials upon receipt to ensure that all are supplied by the approved Manufacturer.
D. Verify surface preparation and application are as specified.
E. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.
   1. Wet-Film Thickness shall be taken every 100 square feet (9 square meters) in accordance with ASTM D 4414 and recorded.
   2. The Dry-Film Thickness can be determined using a surface area calculation for material consumption.

F. Verify curing of the coating materials in accordance with the Manufacturer's instructions.

G. Contractor is responsible for keeping the Engineer informed of all progress so that Engineer may provide additional quality control at his discretion.

3.07 SHOP PRIMED ITEMS

A. Refer to individual Sections for shop primed and pre-finished surfaces.

3.08 PAINT SCHEDULE REQUIREMENTS

A. Provide containment when possible while working in existing facilities. Containment area ventilation required to atmosphere.

B. In general, all new and modified items, including but not limited to the following surfaces, shall be painted, unless otherwise noted.
   1. Exterior, interior, and submerged ferrous metals.
   2. Paint shop-primed equipment and fixtures.
   3. Prime and paint all surfaces of new process pipes (non-insulated), electrical conduit, valves, fittings, meters, boxes, hangers, brackets, collars, and supports, except where items are prefinished.
   4. Prime and paint all new unburied exterior steel, ductile iron, galvanized, and/or PVC piping.
   5. Replace identification markings on mechanical or electrical equipment when painted accidentally.
   6. Paint galvanized surfaces, except seat angles and grating.
   7. Paint all interior concrete surfaces, including ceiling, floors, walls, and manway of the valve vault.
   8. Paint all piping, valves, fittings, conduits, and appurtenances within the valve vault.
   9. Paint exposed conduit and electrical equipment occurring in finished areas.
   10. Paint both sides and edges of plywood backboards for electrical equipment before installing equipment.
   11. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.
   12. Paint all modified steel water tower areas according to the requirements within this specification.
C. Water Tower Interior Dry Coating Repair.
1. Repair Area: Area damaged by contractor work.
2. Surface Preparation: Power tool clean interior dry surfaces affected by project work in accordance with NACE 2 SSPC-SP 3 Cleaning. Feather edges of existing coating. All surfaces shall be free of oils, grease, dirt, and other foreign contaminants prior to field painting.
3. Primer: The interior surfaces shall be primed with Tnemec Series 91-H2O Hydro-Zinc 2000 at 2.5 to 3.5 mils DFT.
4. Intermediate Coat: An intermediate coat shall be applied on the interior dry surfaces and shall consist of one coat of Tnemec Series N140-1255 Beige at 4.0 to 6.0 mils DFT.
5. Finish Painting: All interior surfaces shall be finish painted with Tnemec Series N140-11WH White at 4.0 to 6.0 mils DFT. At no additional cost to the Owner, the Contractor may elect to incorporate Tnemec Series 44-700 Accelerator for all applications of Series N140 when colder temperatures are anticipated, and painting in such conditions is approved by the Engineer.

D. Water Tower Exterior Coating Repair.
1. Repair Area: Area damaged by contractor work.
2. Surface Preparation: Exterior surfaces of the tower shall be cleaned of all paint, grease, oil, rust, mill scale, and other foreign or loose materials before any primer or coating is applied. Power tool clean surfaces affected by project work. Remove all surface contaminants in accordance with SSPC-SP 1 Solvent Cleaning. Spot repair the exterior, where the coating has been damaged by modifications. Feather edges of existing coating, at spot cleaned areas, using SSPC-SP 3 Power Tool Cleaning methods.
3. Primer: The primer shall consist of one coat of Tnemec Series N140-color Pota-Pox Plus at 3.0 to 5.0 mils DFT. The color shall be similar but noticeably different from the intended finish coat color.
4. Intermediate Coat: The intermediate coat shall consist of one even coat of Tnemec Series 1075-color Semi-Gloss Endura-Shield II at 2.0 to 3.0 mils DFT.
5. Finish Coat: The finish painting shall consists of one even coat of Tnemec Series 1075 Endura-Shield II at 2.0 to 3.5 mils DFT.
6. Each coat thickness shall be checked in accordance to SSPC-PA2, Section IV, Paint Thickness Measurement.
7. Color Schedule: Match existing color.

E. The following surfaces shall not be painted, unless otherwise shown on the Drawings.
1. Stainless steel.
2. Exterior masonry surfaces.
3. Porcelain sinks and toilets.
4. Aluminum ladders and miscellaneous aluminum items.
5. Bronze or brass items.
6. Prefinished items, unless noted otherwise.
### 3.09 PAINTING SCHEDULE

<table>
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<tr>
<th>SYSTEM</th>
<th>SURFACE TO BE PAINTED</th>
<th>NOTES</th>
<th>PRIME COAT</th>
<th>FIRST COAT</th>
<th>SECOND COAT</th>
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<td>P2</td>
<td>P3</td>
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<td>P2</td>
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<td>P13*</td>
<td>P12</td>
<td>P3</td>
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<td>Interior Exposure</td>
<td>13</td>
<td>P13*</td>
<td>P12</td>
<td>P2</td>
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</tbody>
</table>

* - Reference 3.01.C for compatibility test with prefinished items.

** - Apply one coat of block filler (Tnemec 54-660 or PPG Pitt Glaze WB Series 16-90 or Kem Cati-Coat HS Epoxy Filler/Sealer) to all interior masonry surfaces at 75 to 100 square feet per gallon.

Masonry (Standard Weight)

| M-A | Interior | 7** | -- | P2 | P2 |
| M-B | Grout Mortar Joints | 8 | -- | P2 | P2 |

Concrete

| C-A | Interior | 7,9 | -- | P2 | P2 |
| C-B | Interior Floors | 10 | -- | P5 | P4**** |
| C-E | Manholes Joints | 8 | P14**** |

**** - Apply second floor coat as two separate 6.0 mil coats (12 mil second coat total thickness) to eliminate possible uneven appearance.

***** - Multiple passes at timed intervals are required to achieve recommended dry film thickness. Curing time for film thickness will be at least 14 days.

Miscellaneous

| MI-A | Insulated Pipe | 13 | -- | P7 | P7 |
| MI-B | PVC Piping     | 11 | -- | P2 | P2 |
### 3.10 COATING PRODUCTS

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>GENERIC NAME</th>
<th>MANUFACTURER AND PRODUCT</th>
<th>REQUIRED DFT, (MILS)</th>
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<td><strong>Protective Paints</strong></td>
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<tr>
<td>P1</td>
<td>Epoxy Polyamidoamine Primer</td>
<td>“T” Series N69-1211 Hi-Build Epoxoline II</td>
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<td>“T” Series 1095 – color Endura-Shield</td>
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<td>Acrylic Urethane</td>
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<td>Hi-Solids Polyurethane – color B65-300 Series</td>
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<td>Ultra-High Solids*</td>
<td>GP 3746</td>
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<td>Ultra-High Solids* Epoxy Primer</td>
<td>“T” Series 201-clear Epoxoprime</td>
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<td>GP 3579</td>
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<td>Acrylic</td>
<td>“T” Series 180</td>
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<td>“PPG” Series 4-110 – color Pitt-Flex</td>
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<td>REQUIRED DFT, (MILS)</td>
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<td>P7</td>
<td>Protective Paints</td>
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<td>&quot;PPG&quot; Series 6-2 Speedhide Interior Latex Sealer</td>
<td>1.0-2.0/coat</td>
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<td>Preparite 200 Interior Latex Primer B28W200</td>
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<td>P10</td>
<td>Waterborne</td>
<td>&quot;T&quot; Series 113 – color H.B. Tnemc-Tufcoat</td>
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</table>
CODE NO.  GENERIC NAME  MANUFACTURER AND PRODUCT  REQUIRED

Protective Paints

P13  Factory Primed

P14  Modified Polyurethane  “T” Series 264 or 265TG
      Elasto-Shield

Elastomeric Urethane  CIM 1061 NSF Elastomeric
      Urethane Membrane

Elastomeric Urethane  Sherflex or Polycote 115

A. Notes for Surface Preparation Schedule
2. Prime non-shop-primed surfaces.
3. Contact paint supplier representative for recommended surface
   preparation.
4. SSPC-SP1 followed by brush off blast. Clean and dry surface.
5. SSPC-SP6. Clean and dry surface.
6. SSPC-SP10. Clean and dry surface.
7. Block filler.
8. Allow mortar to cure for 28 days. Level protrusions and mortar splatter
   and thoroughly clean.
10. Shot blast or mechanically abrade. Clean and dry surface.
11. Scarify surface, wipe to remove dust.
12. Sand rough areas. Seal knots and pitch pockets. Fill cracks and nail
    holes after primer is dry.
13. Clean and dry surface.
14. Allow new concrete to cure 28 days. Brush-off blast all surfaces. Clean
    and dry surface.

END OF SECTION
DIVISION 26
ELECTRICAL
SECTION 26 00 00 - ELECTRICAL GENERAL CONDITIONS

PART 1  GENERAL

1.01  SUMMARY

A. The General Conditions of these Specifications shall form a part and be included under this section of the Specifications. The Contractor shall provide all supervision, labor, material, equipment, machinery and any other items necessary to complete the electrical systems. All items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated on the Drawings, and as required for complete systems.

1.02  WORK UNDER THIS DIVISION

A. It shall be noted that this Section of the Specifications includes:

1. A - GENERAL
2. B - ELECTRICAL REQUIREMENTS

1.03  CODES, RULES, PERMITS, FEES

A. The Contractor shall give all necessary notices, obtain all permits and pay all government and state sales taxes, fees, and other costs, including utility connections or extensions, in connection with his work; file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Engineer before request for acceptance and final payment of the work.

B. All materials furnished and all work installed shall comply with the current adopted Edition of the National Electrical Code, with the requirements of local utility companies, and with the requirements of all governmental departments having jurisdiction.

C. All material and equipment for the electrical portion of the system shall bear the approval label, or shall be listed by Underwriter's Laboratories, Incorporated or another Nationally Recognized Testing Laboratory (NRTL) approved by OSHA.

1.04  INTENT

A. It is the intention of these specifications and drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

1.05  SURVEYS AND MEASUREMENTS

A. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check correctness of same as related to the work.

B. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Engineer, through the General
Contractor, and shall not proceed with his work until he has received instructions from the Engineer.

1.06 DRAWINGS
   A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. The engineering drawings and details shall be examined for exact locations of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the Engineer.
   B. The Contractor shall follow drawings in laying out work, and check drawings of other trades to verify spaces in which work will be installed.

1.07 "OR EQUAL"
   A. Wherever the words "or equal" or "equal to" or "equivalent" are used in connection with any specified material, it is to be understood that such words mean any material or work of any kind claimed to be an equal in quality to the work or material specified, but does not require prior written approval by the Engineer.
   B. Wherever the words "approved equal" are used in connection with any specified material, it is to be understood that such words mean any material or work of any kind claimed to be an equal in quality to the work or material specified and shall be so approved in writing by the Engineer.
   C. It is further understood that no material or work shall be presented to the Engineer as work or material equal to that specified with the full understanding on the part of the manufacturers and agents for the so called "equal" material, and the full understanding on the part of the Contractor, that the Engineer is to use his own judgment in the matter, that his decision is final, and that in the event of an adverse condition, no claim of any sort shall be made against the Owner or Engineer.

1.08 SHOP DRAWINGS
   A. The Contractor shall submit for approval, detailed shop drawings of all equipment and all material required to complete the project, and no material or equipment may be delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the particular material or equipment. The shop drawings shall be completed as described by Specification Section 01300 – Submittals.

1.09 EQUIPMENT DEVIATIONS
   A. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring, or any other part of the mechanical, electrical, or structural layout, all such redesign and all new drawings and detailing required therefore shall be prepared by the Contractor at his own expense and approved by the Engineer.
   B. Where such approved deviation requires a different quantity and arrangement of wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such controllers, motors, starters,
electrical wiring and conduit, and any other additional equipment required by the system at no additional cost to the Owner.

1.10 COOPERATION WITH OTHER TRADES

A. This Contractor shall give full cooperation to other trades and shall furnish in writing to the Contractor, with copies to the Engineer, any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Where the work of the Contractor will be installed in close proximity to, or will interfere with work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If the Contractor installs his work before coordinating with other trades or so as to cause any interference with work of other trades, he shall make the necessary changes in his work to correct the condition without extra charge.

C. The Contractor shall furnish to other trades, as required, all necessary shop details for the proper installation of work and for the purpose of coordinating adjacent work.

D. Refer to other Divisions of the Specifications for equipment furnished by others and work required thereof by the Contractor.

1.11 PROTECTION

A. The Contractor shall protect all work and material from damage by his work or workmen, and shall be liable for all damage thus caused.

B. The Contractor shall be responsible for work and equipment until finally inspected, tested, and accepted; he shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site, which is not immediately installed. He shall close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

1.12 SCAFFOLDING, RIGGING, HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any electrical equipment and electrical apparatus furnished. Remove same from premises when no longer required.

1.13 MATERIAL AND WORKMANSHIP

A. All materials and apparatus required for the work, except as specifically specified otherwise, shall be new of first class quality, and shall be furnished, delivered, erected, connected, and finished in every detail, and shall be so selected and arranged as to fit properly into the available spaces. Where no specific kind or quality of material is given, a first class standard article as approved by the Engineer shall be furnished.

B. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation or work, together with all skilled workmen, helpers, and labor required to unload, transfer, erect, connect up,
adjust, start, operate, and test each system. The job superintendent shall be a Master Electrician licensed in the State that the work is being performed.

C. Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed with the approval of the Engineer in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

1.14 APPLICABLE STANDARDS

A. Provide work in accordance with applicable rules, codes, ordinances and regulations of local, state, federal governments, and other authorities having lawful jurisdiction. Conform to the latest editions and supplements of codes, standards, and recommended practices.

B. Drawings and specifications indicate minimum construction standards. Should any work indicated be substandard to any ordinances, lower codes, rules or regulations bearing on work, the Contractor shall promptly notify the Engineer in writing, through the General Contractor, of any necessary changes to be adjusted. However, if Contractor provides any work knowing it to be contrary to any ordinances, laws, rules and regulations, he shall thereby have assumed full responsibility and bear all costs involved for correction and compliance. In any instance where the specifications call for materials for construction of a better quality or larger size than required by codes, provisions of these specifications shall take precedence. Codes shall govern in case of direct conflict between codes, plans and specifications.

1. SAFETY CODES:
   b. Occupational Safety and Health Standard (OSHA) - Department of Labor

2. NATIONAL FIRE CODES:

3. UNDERWRITERS LABORATORIES, INC.
   a. All applicable UL standards as referenced in other section.

4. Third Party Certification
   a. All equipment not bearing a UL listing shall be provided with a third party certification stamped by registered Professional Engineer licensed in the state of which the work is being performed.

5. NORTH DAKOTA STATE ELECTRICAL BOARD
   a. Laws, Rules, Wiring Standards, and all applicable local state standards.

1.15 TESTS AND OPERATION RECORDS

A. General: Test all equipment installed under this specification and demonstrate its proper operation to the Engineer. No equipment shall be tested or operated for any other purpose, such as checking motor rotation, until it has been fully lubricated in accordance with manufacturer's instructions and, if it is a centrifugal
pump, until it has been connected to piping systems and supplied with sufficient water so that it will not run dry.
1. Any defects in workmanship, material, equipment or any grounds or short circuits shall be corrected by the Contractor before final acceptance.
2. Submit at least eight (8) copies of data noted below to Engineer prior to final inspection.
3. Maintain a marked set of drawings to record all deviations made from routes, locations, circuiting, etc. shown on contract drawings. Prior to final inspection submit one new set of project drawings with deviations and changes clearly indicated.

B. Testing: The entire electrical system shall be tested by Contractor in presence of the Engineer. Every local switch, panelboard, service breaker, safety switch, and circuit breaker shall be operated under load conditions. Every fixture and equipment tested and operated. Test shall include any tests specified in any part of this section.
1. Contractor shall measure resistance of electrical system with a "Megger" from busses of main switch to ground with main breaker open, and bonding jumper between neutral and ground temporarily removed. Values are to be determined with all panelboards, motor controls and switch circuits open. If any value measured is less than 100,000 ohms, each feeder shall be measured and must exceed those set forth in Article 110 of National Electrical Code, before they shall be accepted. Typewritten test results shall be furnished to the Engineer.

C. Recording and Distribution
1. Record nameplate horsepower, amperes, volts, phase, efficiency, service factor and other necessary data on motors, and other electrical equipment furnished and/or connected under this contract.
2. Record motor starter catalog number, size and rating and/or catalog number of thermal overload units installed in all motor starters furnished and/or connected under this contract. See motor starter specifications for instructions for proper sizing of thermal overload units.
3. Record ampere per phase at normal or near normal loading of each item of equipment furnished and/or connected.
4. Record voltage and ampere per phase readings taken at service entrance equipment after completion of project with operation at normal electrical load.
5. Record all VFD settings, solid-state motor controller settings, electronic overload relay settings, relay settings, device settings, and related electronic equipment setting.
6. Record all instrumentation and device calibration settings.
7. Distribute copies of all recorded information to the Engineer along the project O&M manuals.

1.16 DEMONSTRATION OF COMPLETED ELECTRICAL SYSTEMS
A. General: Upon completion of entire electrical systems, Contractor shall demonstrate to Engineer's satisfaction that all installed electrical systems are in perfect operating condition, that they perform all power and control functions intended and that they are installed in strict accordance with project drawings and specifications.
B. Materials: Contractor shall provide all necessary testing equipment, tools, materials, dummy loads, etc., required to properly demonstrate performance.

1.17 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Provide O/M manuals per Specification Section 01730 – Operation and Maintenance Data.

PART 2  ELECTRICAL REQUIREMENTS

2.01 BASIC MATERIALS

A. General: Material and equipment installed under this contract shall be new, unused, and without damage. Physical size of equivalent or substitute equipment shall not be larger than space provided including space required for access and maintenance of equipment.

END OF SECTION
SECTION 26 05 02
EXCAVATING, TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SUMMARY
A. Section Includes:
   1. Provide all trenching/backfill/compaction/surface restoration required to install all electrical
      as noted in drawings and specifications.

B. Related Work:
   1. Section 260534 – Conduit
   2. Section 260543 – Underground Duct and Raceways for Electrical Systems

1.02 QUALITY ASSURANCE:
A. Engineer may have compaction tests taken by an independent testing laboratory. Cost will be
   paid by Owner unless tests indicate compaction does not meet Specifications in which case
   costs of initial test and any retesting will be paid by the Contractor and not charged to the
   Owner.

B. Properly protect existing surfaces and items not included in this work and repair any damage to
   original condition.

C. Take precautions to guard against movement, settlement, collapse, or other damage of existing
   construction and finish grade and repair any damage to original condition.

D. Perform construction stakes, lines and grades under direct supervision of Registered Land
   Surveyor or Registered Civil Engineer. Refer to General Conditions.

1.03 EXISTING CONDITIONS:
A. Determine exact locations of existing utilities before commencing work. Contractor is
   responsible for damages incurred by his failure to locate and preserve underground utilities. It
   is Contractor's responsibility to contact “One Call Locators” prior to performing any excavation.

PART 2 PRODUCTS

2.01 GENERAL BACKFILL REQUIREMENTS
A. SPECIAL FILL GRAVEL (INSIDE BUILDING LINE): WASHED TYPE WITH 100% passing 3/4"
   sieve and gradation to insure compactability with no more than 5% passing No. 200 sieve.

B. Outside Building Line: Clay backfill.

PART 3 EXECUTION

3.01 INSTALLATION
A. Strip topsoil from new construction and grading areas and stockpile enough for finish grading in
   area directed by Engineer. Remove excess from site.

B. Excavate to depths as indicated on Drawings or as required by NEC, whichever is greater.

C. Provide electrical ribbon marker tape above conduits in each trench.

D. Notify Engineer immediately if during progress of work, subsurface conditions are encountered
   which are different from those ordinarily encountered.

E. Excavated material, free from foreign material, may be used for backfilling outside building and
   rough grading. Stockpile as directed by Engineer. Remove any excess from site.

F. Fill excavation below required depth with compacted special gravel fill.

G. Protect bottom of excavation from frost and do not place structures or conduit on frozen
   ground.

H. FILL WITHIN BUILDING (Under Concrete Slabs on Grade):
   1. Place and compact fill in successive layers not to exceed 9 inches before compaction.
       Compact to minimum of 95% per ASTM D698.
I. At contractor's option, accessible non organic material from building excavating may be used for fill within building.

J. Place a six inch layer of Special Fill Material immediately below the floor slab.

K. BACKFILL OUTSIDE BUILDING:
   1. Do not start backfilling until work which will be covered is completed, areas are free of foreign material and Engineer has approved.

L. Non organic material excavated from foundation areas may be used as backfill in exterior areas.

M. Compact backfill to 95% maximum density.

N. Special care shall be given to ensure that the backfill under and adjacent to the transformer pad is fully compacted so that the pad doesn't settle. Do not use frozen backfill in or around this area.

3.02 ROUGH GRADING
   A. Clean areas of foreign material. Using stockpile excavation materials or off site material of equal quality, bring grades to within 6 inches of finish grade elevations.

3.03 FINISH GRADING
   A. Using stockpile topsoil from stripping or off site topsoil of equal quality finish grade areas within construction limits to given minimum of 6 inches material depth. Bring to elevations indicated on Drawings or existing elevations.

3.04 BLACK DIRT
   A. Place 6 inches under lawns.
   B. Restore surface to original condition.

END OF SECTION
SECTION 26 05 19
POWER AND INSTRUMENTATION CABLE - LESS THAN 600V

PART 1 GENERAL

1.01 SUMMARY
A. Section Includes:
   1. Furnish and install all conductors to accomplish the circuiting, control and power
distribution as shown on the Drawings.

B. Related Work:
   1. Section 26 05 34 - Conduit

1.02 REFERENCE STANDARDS:
A. U.L. 486A - Wire connectors
B. NEMA WC5-1973
C. NEMA WC30-1976
D. NFPA 70 (National Electrical Code)

1.03 DELIVERY, STORAGE, AND HANDLING:
A. Deliver conductors to project on standard coils or reels and suitably protected from weather and
damage during storage and handling.

PART 2 PRODUCTS

2.01 CONDUCTORS
A. Type P1 - 600V Rated General Purpose Single Conductor Cable
   1. Construction:
      a. No. 14 AWG and larger: Stranded Copper, (THHN/THWN-2). Solid Copper is
         acceptable for lighting and branch circuits.
      b. All conductors shall contain factory color coded insulation in all standard colors to
         match the voltage level used.
      c. Sequential footage markers shall be factory installed on the insulation jacket.
      d. Provide Cable Tray (CT) rated cable where installed in cable tray.
      e. Aluminum conductors not permitted.
   2. Feeder Conductors:
      a. 98 percent conductivity copper, 600 volt insulation.
   3. Branch Circuit Conductors:
      a. 98 percent conductivity copper, 600 volt insulation.
      b. Conductors smaller than No. 14 AWG not permitted except in control panel.
   4. Project Use Areas:
      a. All general use indoor building circuiting.
   5. Manufacturers:
      a. Service Wire Co.
      b. Okonite Co.
      c. Southwire
      d. Belden
      e. Alpha Wire

B. Type P2 - 600V Rated Special Purpose Single Conductor Cable
   1. Construction:
      a. XHHW insulation which is moisture, heat, and flame retardant cross-linked
         polyethylene covered with a overall flame retardant, moisture and sunlight resistant
         PVC jacket.
      b. Stranded Copper
      c. All conductors shall contain factory color coded insulation in all standard colors to
         match the voltage level used.
d. Sequential footage markers shall be factory installed on the insulation jacket.
e. Provide Cable Tray (CT) rated cable where installed in cable tray.
f. Aluminum conductors not permitted.

2. Project Use Areas:
a. All 600V and less service entrance conductors and feeders routed underground from the exterior to the interior.

3. Manufacturers:
a. Service Wire Co.
b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

C. Type C1 - Multiconductor Control Cable
1. Construction
   a. No. 14 AWG, conductor quantity as shown on the Drawings
   b. Insulation: High dielectric strength, heat and moisture-resistant, colored PVC rated for continuous 90 deg C dry or wet to meet UL-83 requirements for Type THHN or THWN-2 wire.
   c. Conductor group bound with spiral wrap of barrier tape
   d. Color Code: In accordance with ICEA, Method 1, with printed number.
   e. Overall Jacket: A flame retardant sunlight-resistant black PVC jacket.

2. Ratings/Listings
   a. UL 1581 listed as Type THHN/THWN rated VW-1
   b. UL 83
   c. Passes the ICEA T-29-520 210,000 Btu per hour Flame Test.

3. Project Use Areas:
a. Any and all control circuiting requiring numerous conductors from a control panel to a field instrument or similar application.

4. Manufacturers:
a. Service Wire Co.
b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

D. Type S1 - Signal Cable - Single Pair - Shielded/Twisted
1. Construction
   a. NFPA 70, Type CMP Single pair, twisted, 100% shield coverage, Class B, 16 AWG, stranded (19 x 29) tinned copper conductors (7 strand minimum).
   b. 600V minimum insulation rating
   c. 15 mil (nominal), 90 deg C PVC primary insulation with a flame retardant, low smoke PVC, plenum rated.
   d. Conductors shall be shielded with a .35 x 5 mil (min.), 100% coverage, aluminum or copper mylar tape shield, or equal with an 18 gauge strand copper drain wire.

2. Ratings/Listings:
   a. Flame Resistance: Comply with UL 1685 & NFPA 262
   b. UL Temperature Rating: 75 deg C Dry, 90 deg C wet
   c. ICEA S-73-532, S-61-402

3. Project Use Areas:
a. Any and all control circuiting requiring one shielded twisted pair from a control panel to a field instrument or similar application.

4. Manufacturers:
a. Service Wire Co.
b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

2.02 CORD CONNECTOR GRIPS
   A. Manufacturer: Killark “Z” series or equal
   B. Type: Aluminum cord connector, stainless steel mesh grips, straight or 90° as required in eliminating sharp cable bending radii.
   C. Use: To support all cables/cords from the enclosure at their point of use and/or wherever cables/cords enter or leave the bottom of conduit risers (above grade). Required for all cord connections to motors or enclosures.

2.03 BOLTED, PRESSURE TYPE CONNECTORS
   A. Manufacturer: Burndy or equal
   B. Use: Connecting conductors to busbars, suitable for copper and aluminum conductors.
   C. Size: As required for conductor.

2.04 SOLDERLESS CONNECTORS
   A. Manufacturer: 3M “Scotchlok” or equal
   B. Type: Twiston, spring tension.
   C. Use: With copper conductors only.

PART 3  EXECUTION

3.01 INSTALLATION
   A. Draw conductors into conduit only after conduit system is complete. Install in a manner so as not to injure insulation.
   B. Use stranded, copper conductors only. Solid conductors are not acceptable.
   C. Make splices on branch circuit conductors with solderless stapleless, mechanical wire connectors.
   D. Tighten bolted, pressure type connectors to manufacturer's recommendations.
   E. No. 10 AWG and smaller shall be stranded copper for all motor and control circuits. Branch circuits for lighting and convenience outlets shall be solid copper.
   F. All branch circuit homeruns greater than 50 feet shall be #10 minimum.
   G. Make splices and terminations in control panel by using bolted, pressure type connections. Install according to manufacturer's recommendations.
   H. Provide strain relief cord connectors and stainless steel mesh on all cords entering motor termination boxes, junction boxes or conduits.
   I. Use factory color coded conductors with separate color for each phase and neutral conductor by integral pigmentation for all conductor sizes.
   J. Use following codes:

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<th>CONDUCTOR SYSTEM VOLTAGE-120/208, THREE PHASE</th>
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<tbody>
<tr>
<td>Phase A</td>
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<tr>
<td>Phase B</td>
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<tr>
<td>Phase C</td>
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<tr>
<td>Neutral</td>
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<tr>
<td>Equipment Ground</td>
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### CONDUCTOR SYSTEM VOLTAGE-120/240, THREE PHASE

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<tr>
<td>Neutral</td>
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<tr>
<td>Equipment Ground</td>
<td>Green</td>
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### CONDUCTOR SYSTEM VOLTAGE-277/480, THREE PHASE

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<td>Neutral</td>
<td>Gray</td>
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<tr>
<td>Equipment Ground</td>
<td>Green</td>
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</tbody>
</table>

K. Lace or clip groups of feeder conductors in control panel, pull boxes, and wireways.
L. Use wiring pulling lubricant for pulling No. 4 AWG and larger wire.
M. Splice only in accessible junction or outlet boxes.

**END OF SECTION**
SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1  GENERAL
1.01  SUMMARY
   A. Section Includes:
      1. Furnish and install a complete grounding system for all electrical equipment at the facility and for each antenna mast. Also, provide equipotential ground loop around perimeter of building(s) where shown on the Drawings and bond to main service equipment. Furnish and install accessible ground bars and ground test wells throughout the facility at locations indicated on the Drawings.

   B. Related Work:
      1. Section 26 05 34 - Conduit
      2. Section 26 05 19 - Power And Instrumentation Cable - Less Than 600V
      3. Section 26 24 16 - Panelboards
      4. Section 26 27 26 - Wiring Devices

1.02  DESCRIPTION OF SYSTEM
   A. Bond electrical equipment, control panels, panelboards, etc. to the metallic conduit system through conduit connectors or bonding jumpers, as required, to provide effective electrical continuity.

1.03  QUALITY ASSURANCE
   A. NFPA - 70, Article 250.

PART 2  PRODUCTS
2.01  GROUNDING CONDUCTORS
   A. Copper, with green identification as specified in Section 26 05 19.

2.02  GROUND RODS
   A. Type: Copper clad steel, 5/8-inch diameter, 10 feet long.

2.03  GROUND CLAMPS (CONCEALED)
   A. Compression type grounding which meets IEEE 837.
   B. Manufacturer: Panduit StructuredGround

2.04  GROUND FITTINGS AND LUGS (EXPOSED)
   A. Manufacturer: Equal to Burndy Company

2.05  GROUND LUG
   A. Located in electrical equipment as indicated on the Drawings.

PART 3  EXECUTION
3.01  POWER SYSTEM GROUNDING
   A. Main Service
      1. Provide a grounding grid consisting of driven ground rods with #4/0 bare stranded copper interconnecting conductor and an connection to water service ground as indicated on the Drawings. From two points on the ground grid, provide ground conductor to the ground bars indicated on the Drawings. From the service ground bus, provide ground conductor to neutral of main service (main bonding jumper strap). Also bond all equipment to equipotential ground plane where noted on the Drawings.

   B. Distribution System
      1. Install grounding bars and grounding studs at locations indicated within the facility, distribution centers, pull boxes and panelboards. Bond all metallic conduit systems and metallic piping with metallic clamps and bonding conductor for ground continuity.
C. Provide a properly sized copper grounding conductor in all branch circuit and feeder conduits. Size the conductor according to Table 250-122 of the National Electric Code. Connect the grounding connector to grounding points (grounding bars, ground studs, etc.) in all electrical enclosures, electrical equipment, junction boxes and outlet boxes.

D. Ground and bond in accordance with National Electric Code, Article 250.

E. Provide one additional ground rod adjacent to each SCADA antenna location and bond to metallic antenna mast. Provide #6 AWG bare stranded copper conductor in nonmetallic conduit from the antenna mast to ground and connect with proper exothermic weld type ground clamps.

END OF SECTION
SECTION 26 05 34
CONDUIT

PART 1  GENERAL

1.01  SUMMARY
A. Section Includes:
   1. Furnish and install a complete conduit system for all conductors. Low voltage control conductors and fiber optic cabling shall be installed within a conduit as well.
B. Related Work:
   1. Section 26 05 19 - Power And Instrumentation Cable - Less Than 600V
   2. Section 26 05 37 - Boxes
   3. Section 26 05 02 - Excavating, Trenching and Backfilling

1.02  REFERENCE STANDARDS:
A. U.L. 6 - Rigid metal conduit.
C. U.L. 651 - Rigid non-metallic conduit.
D. NEMA Standard Publication TC-2 - Rigid PVC for underground installations.

1.03  DELIVERY, STORAGE AND HANDLING:
A. Store in a dry area, protected from the weather.

PART 2  PRODUCTS

2.01  RIGID METAL CONDUIT
A. Manufacturer: Equal to the Wheatland Steel Company
B. Type: Steel heavy wall, galvanized unless noted otherwise on Drawings.
C. Minimum trade size is 3/4-inch; other sizes as required by NEC based on quantity of conductors.

2.02  PVC EXTERNALLY COATED STEEL CONDUIT
A. Manufacturer: Equal to Plasti-Bond
B. Type:
   1. PVC externally coated, galvanized steel.
C. Minimum trade size is 3/4”; other sizes as required by NEC based on quantity of conductors.
D. The PVC coated galvanized rigid conduit must be ETL Verified to the Intertek ETL SEMKO High Temperature H2O PVC Coating Adhesion Test Procedure for 200 hours. The PVC coated galvanized rigid conduit must bear the ETL Verified PVC-001 label to signify compliance to the adhesion performance standard.

2.03  FLEXIBLE METAL CONDUIT (LIQUID-TIGHT)
A. Manufacturer: Equal to Alflex
B. Type: Steel
C. Weatherproof covering

2.04  METALLIC EXPANSION FITTINGS
A. Manufacturer: Equal to OZ Electrical Manufacturing Company.
B. Minimum trade size is 3/4-inch.

2.05  HANGERS AND SUPPORTS
A. Manufacturer: Equal to B-Line Products.
2.06 NON METALLIC CONDUIT (HEAVY WALL)
   A. Manufacturer: Equal to Carlon.
   B. Minimum trade size is 3/4-inch.
   C. Type: Schedule 80 polyvinyl chloride, except where Schedule 40 is specifically called for on Drawings.

2.07 NON METALLIC EXPANSION FITTINGS
   A. Manufacturer: Equal to Carlon.
   B. Type: Suitable for use with non metallic conduit.
   C. Minimum trade size is 3/4-inch.

PART 3  EXECUTION

3.01 INSTALLATION
   A. Size conduits as shown on the Drawings or as required by National Electrical Code (whichever is larger) for number and size of conductors installed.
   B. Minimum trade size for home runs is 3/4-inch.
   C. Support all conduits from structural system, independent of ductwork, ceiling system supports and main runners. Do not support conduit from conduit.
   D. Cut conduit joints square and ream smooth. Make bends with an approved bender, or utilize standard conduit elbows.
   E. Building walls are mainly concrete or concrete block. Contractor shall core drill walls or coordinate reinforced, boxed out areas as required to install all conduit in a neat and workmanlike manner. Contractor shall also patch all wall penetrations and prepare surface for final paint by General Contractor. Coordinate routing of larger conduits (3” and larger) with other trades and with Field Engineer prior to installation.
   F. Contractor shall provide sleeves or reinforced concrete boxed out openings through footings for all underground conduits. Coordinate with General Contractor.
   G. Securely fasten conduit and raceways with malleable iron clamps (hot dipped galvanized, with clamp backs), or galvanized unistrut and hangers with suitable fastenings for all indoor dry applications. Utilize stainless steel unistrut and clamps for all exterior applications as well as damp or corrosive indoor applications such as below grade spaces and chemical rooms. The intent is to keep an air gap between conduit and finished wall surfaces to reduce the potential of moisture induced corrosion. All anchors shall be lead, expansion type with stainless steel hardware. Route all conduits parallel to and at right angles to building lines. Conduits mounted directly in contact with wall surface will not be acceptable.
   H. Tie wires to hang or strap conduits not permitted.
   I. Route conduit continuous from outlet to outlet, outlet to cabinets, outlet to pull or junction boxes. Secure conduit to all boxes with locknuts and bushings in such manner that each system is electrically continuous throughout.
   J. Surface mount conduit in all areas, unless noted otherwise. All conduits and outlet boxes on the building exterior shall be flush mounted where possible. If not, install conduits within the building and then penetrate the wall directly into the back of light/outlet/etc. Intent is to eliminate/minimize the usage of surface mounted conduit on the exterior face of the building.
   K. Cap ends of conduit to prevent entrance of foreign materials during construction.
   L. Locate conduits poured in concrete entirely in the middle 1/3 of the concrete member.
   M. Provide a 4 inch high watertight barrier for conduits that pass vertically through a floor with a metal sleeve or concrete curb. Provide “link seal” around all conduits penetrating exterior walls/footings and wet wells. Nuts on link seal shall remain accessible from inside the building once link seal is installed. Non shrinking grout is acceptable for penetrations above finished grade.
N. Provide watertight installation where conduits pass through roof, wall or waterproofing membranes.

O. Conduit systems must be installed complete before conductors are pulled in.

P. Repair any damage done to insulation or interior vapor barrier where any conduit enters air plenums.

Q. Fill conduits which can admit air to or release air from air plenums through the connecting conduit system with sealing compound.

R. Provide firestopping around all conduits penetrating fire rated walls as determined by the Architect and Engineer.

3.02 ELECTRICAL METALLIC TUBING

A. Electrical metallic tubing (EMT) is only permitted where specifically indicated on the Drawings. Such areas are typically finished areas of the facility like offices, restrooms, electrical room etc.

B. Where EMT tubing is allowed, stamped steel boxes are acceptable.

3.03 RIGID METAL CONDUIT (HEAVY WALL)

A. Rigid metal conduit is permitted in floor slabs or as specifically called for on the drawings.

B. Paint conduit that is in contact with earth with heavy coat of bitumastic paint. Paint couplings after assembly. Where bitumastic paint is applied the paint must be thoroughly dried before backfilling.

3.04 FLEXIBLE METAL CONDUIT: (PVC JACKETED)

A. Use rain tight flexible metal conduit with rain tight fittings for final connections to motors (non hazardous areas), and fixed control devices (non hazardous areas) that do not come with factory installed cords. Minimum trade size is 3/4-inch.

B. Use Class I, Division 1, Group D flexible metal conduit with listed fittings for final connections to motors (hazardous areas), and fixed control devices (hazardous areas). Minimum trade size is 3/4-inch.

C. Provide sufficient length conduit to avoid transmission of vibration and noise, 12 inch minimum.

3.05 RIGID NON METALLIC CONDUIT (HEAVY WALL)

A. Use rigid non metallic, Schedule 80 PVC conduit for all direct burial and exposed wet, caustic or corrosive installations unless specifically noted otherwise on Drawings. Cut conduit square with round edges removed from ends to protect the wires from abrasion. Make connections by solvent welding. Install fittings in accordance with the manufacturer's recommended procedures. All elbows 2” and larger shall be rigid metal conduit. Provide expansion joints wherever there are long runs of conduit and a wide temperature differential exists. Use PVC coated RMC sweeps whenever penetrating through concrete floors.

B. Provide grounding conductor in all control circuit, branch circuit and feeder conduits.

C. Typical applications included underground and in chemical or caustic areas.

3.06 RIGID STEEL CONDUIT

A. Use rigid Steel conduit throughout entire project unless other types of conduit are specifically called for on Drawings or elsewhere in these specifications. Intent is to use Steel conduit everywhere except below finished grade or in floor slabs/ suspended ceilings. Fittings type to be threaded. Use threaded hubs (equal to Myers hub) where rigid conduit is connected to a thread less box or enclosure for indoor and outdoor applications. Lock nut with O-Ring is not an acceptable alternative.

END OF SECTION
SECTION 26 05 37
BOXES

PART 1  GENERAL

1.01 SUMMARY
  A. Section Includes:
     1. Furnish and install all outlet boxes, junction boxes and pull boxes required to accomplish
device and equipment installation, wire pulling shown on the Drawings and to comply with
National Electric Code requirements for conduit and conductor installation.
  B. Related Work:
     1. Section 26 05 34 - Conduit
     2. Section 26 05 19 - Power And Instrumentation Cable - Less Than 600V
     3. Section 26 27 26 - Wiring Devices

1.02 SHOP DRAWINGS AND PRODUCT DATA:
  A. Submit in accordance with Specification Section 01 33 00 – Submittals.

1.03 WORK INSTALLED BUT FURNISHED BY OTHERS:
  A. Back boxes for selected items of equipment are furnished by the equipment supplier. Refer to
individual Specification Sections for mounting, size, etc.

1.04 REFERENCE STANDARDS:
  A. U.L.
  B. NEMA

1.05 DELIVERY, STORAGE AND HANDLING:
  A. Store materials in a dry area, protected from the weather.

PART 2  PRODUCTS

2.01 PULL BOXES
  A. Manufacturer: Hoffman or Equal
  B. Type: Metal construction, conforming to National Electric Code, with screw on or hinged cover,
unless specifically noted otherwise on drawings.
  C. NEMA 12, 4, 4X, 7 as noted on drawings.
  D. All boxes, and fittings throughout Odor and Corrosion Control Room, and within Wet Wells
(Class I, Division 1, Group D) shall be Explosion proof.
  E. Overlapping covers with flush head cover retaining screws, prime coated for flush mounted pull
boxes.

2.02 SURFACE MOUNTED OUTLETS
  A. Manufacturer: Crouse Hinds, Appleton, or equal.
  B. Type: FS or FD Condulet Cast Device Boxes (# gangs as required).
  C. Matching iron alloy (Feraloy) covers as required for device(s) used.
  D. All outlets/boxes, and fittings in Class I, Division 1, Group D, or Class I, Division 2, Group D
areas shall be listed for use in those respective areas as noted on drawings.

PART 3  EXECUTION

3.01 INSTALLATION
  A. Do not use sectional or handy boxes.
  B. Protect outlet boxes from entrance of foreign materials, including paint, during the construction
period.
  C. Surface mount all interior outlet boxes.
D. Install outlets at the heights and approximate designated positions as shown on the Drawings or indicated in Specifications, unless specifically noted otherwise.

E. Locate outlets to clear piping, access hatches, and other obstructions.

F. Install switch outlets on latch side of door except where type of construction dictates otherwise.

G. Mounting heights indicated on Drawings are to center line of outlet unless indicated otherwise.

H. Pull boxes and junction boxes are not indicated on Drawings except for special requirements. Install pull boxes or junction boxes as required to facilitate pulling wire. Size pull boxes and junction boxes as required by National Electric Code.

I. Mount receptacles in the equipment rooms and in other unfinished areas at 48 inches unless noted otherwise on drawings. Match mounting heights of similar existing devices in the immediate area if present.

J. All conduits entering pull boxes shall have the conduit ID as shown on the cable and conduit schedule clearly labeled on the inside of the pull box using permanent marker.

K. Provide ventilated skirt under the jbox where indicated on the drawings.

END OF SECTION
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1  GENERAL

1.01  SUMMARY
A. Section Includes:
   1. Equipment to be identified includes panelboards, disconnects, transformers, relays, contactors, system control panels, variable frequency drives, separately mounted control stations, pilot lights, control switches and all wires and terminations.

PART 2  PRODUCTS

2.01  INSTRUCTION SIGNS
A. Plastic sandwich-type construction of contrasting colors. Engraving through top layer exposes inner layer.
B. Color: Black with white letters.
D. Punched or drilled for mechanical fasteners. Fasteners shall be self tapping stainless steel screws with nuts and flat lock washers.

2.02  EQUIPMENT IDENTIFICATION LABELS
A. Mechanically fastened, engraved, laminated acrylic or melamine label.
B. Color: Black with white letters.
D. Punched or drilled for mechanical fasteners. Fasteners shall be self tapping stainless steel screws with nuts and flat lock washers.

2.03  WIRE MARKERS
A. Manufacturer: Raychem, Brady or equal
B. Type: Shrink tubing type with typewritten wire codes.

2.04  WARNING LABELS AND SIGNS
B. Self adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated. Weather resistant, non fading, metal backed or baked enamel signs to be used for outdoor installations.

2.05  POWER SOURCE LABELS FOR EQUIPMENT AND DEVICES
A. Mechanically fastened label, installed on the front cover, door, or other access to equipment and devices unless otherwise indicated. Weather resistant, non fading, metal backed or baked enamel signs to be used for outdoor installations.
B. Self adhesive labels, shall be Brady or equal.
C. Apply to all panels, junction boxes, receptacle faceplates, switch faceplates, front covers, doors, or other access to equipment unless otherwise indicated. See Part 3 for Execution.

PART 3  EXECUTION

3.01  INSTALLATION
A. Identify with black laminated plastic plates with white engraved letters mounted with drive pins or other approved fasteners.
B. Use the following for identifying disconnects, panels and starters.
   1. EXAMPLE: Raw Wastewater Pump #1
      480 volt, 3 phase, 300 H.P.
3.02 PANELS
A. Label panel per NEC Article 210.5 (C) and with the following information: Panel name, voltage, phase and amperage/type of main.
   1. EXAMPLE:
      Panel L
      120/208 volt
      Three phase
      225 amp Main Circuit Breaker
B. Provide each panelboard with a neatly typed directory, with clear plastic cover, of circuits describing loads served.
C. All markings are to be plainly visible, fit over the insulation of the conductor and begin 1/8” from where the insulation begins.
D. Wire markers shall be provided by the Contractor and placed on both ends of all wires prior to termination.
E. All wiring shall be checked for circuit completeness to verify correct circuiting, identification and labeling at the terminals. Terminal markings and wire markings shall match “record schematics” as provided by Control Integrator.
F. Hand lettering of identification not permitted. Completely remove temporary labels used during construction and repaint surface if required.

3.03 POWER SOURCE LABELS FOR EQUIPMENT AND DEVICES
A. Provide an mechanically fastened power source label at all equipment and devices with the following information:
   1. EXAMPLE: LPA-11 or LPA-13,15 or DPA-1,3,5.
B. All equipment and devices such as panels, junction boxes, receptacle faceplates, switch faceplates, front covers, doors, or other access to equipment shall include an adhesive backed label that indicates the power source for said equipment.

3.04 CONDUIT AND CIRCUIT LABELING AT POINT OF ENTRY TO LARGE ENCLOSURES
A. Use a black permanent marker and hand label all conduits and circuits at the point of entry to large enclosures (control panels, pullboxes, junction boxes, motor control centers, etc.) with the conduit/circuit number from the Cable and Conduit Schedule.
B. Labeling shall be done on the interior of the enclosure or on the floor near each conduit/circuit, or on the conduit itself in some cases. All conduits/circuits that enter enclosures shall be labeled.
C. Labeling with a permanent marker shall be in addition to any circuit tags installed around the cables themselves.

END OF SECTION
PART 1  GENERAL

1.01  SUMMARY

A. Section Includes:
   1. Furnish and install circuit breaker type panelboards for branch circuit distribution to lighting, general receptacle and small motor loads.

B. Related Work:
   1. Section 26 05 34 – Conduit
   2. Section 26 05 19 – Power and Instrumentation Cable – Less than 600V
   3. Section 26 05 53 – Identification for Electrical Systems
   4. Section 26 43 00 – Surge Protective Devices (SPD)

1.02  QUALITY ASSURANCE

A. NEMA PB-2
B. U.L. listed

1.03  SHOP DRAWINGS AND PRODUCT DATA

A. Submit in accordance with Specification Section 01 33 00 – Submittals.
B. Clearly indicate (for each panelboard) amperage and phase of main bus, amperage of main circuit breaker, wire size and quantity of main lugs, grounding bar location, neutral bar location, quantity, arrangement and amperage of branch circuit breakers, quantity of spaces, physical dimension of enclosure, weight, directory card location and type, type of lock, flush or surface cover, short circuit withstand rating in R.M.S. amperes.

1.04  DELIVERY, STORAGE AND HANDLING

A. Box, crate, or otherwise completely enclose and protect all equipment during shipment, handling, and storage.
B. Protect equipment from exposure to elements and keep all items thoroughly dry at all times.
C. Store in a dry area, protected from the weather.
D. Painted Surfaces: Protect against impact, abrasion, discoloration, and other damage.

1.05  OPERATION AND MAINTENANCE DATA

A. Include manufacturer's instructions in accordance with Specification Section 01 78 23 – Operation and Maintenance Data for maintenance, including cleaning, tightening conductor connections, testing, and addition or replacement of circuit breakers.

PART 2  PRODUCTS

2.01  LIGHTING AND APPLIANCE PANELS (120/208V OR 120/240V)

A. Utilize lighting and appliance panels (denoted by L prefix) for 120/208 volt, 3 phase operation or 120/240V for single phase operation as indicated on the Drawings. Install bolt-on, thermal magnetic circuit breakers with a minimum interrupting rating of 22,000 amperes R.M.S. unless noted otherwise on Drawings.
B. Circuit breakers shall have a trip indication different from the "off" or "on" position.
C. Install in a NEMA 1 surface mount enclosure, unless indicated otherwise on the Drawings. Provide a hinged front breaker access door and a separate hinged front cover (two separate hinges) for personnel/contractor access without completely removing front panelboard cover.
D. Install common trip multipole circuit breakers. Handle ties are not permitted.
E. Full cabinet height bussing includes active, spare and blank breaker locations with sizes, branches, mounting, main circuit breakers, etc., as shown in Schedule on the Drawings.
F. Provide adequate wiring space according to the National Electric Code.
G. Provide panels with a flush, hinged door with lock. Key locks alike.
H. Isolated neutral bar and ground bar in all panelboards. Provide 200% rated neutrals where indicated on the Drawings.
I. Provide distributed phase bussing.
J. Metal framed circuit directory and card with plastic covering located on the inside.
K. Tin plated copper bussing, SPD protection and additional requirements as noted on Panelboard “L” Schedule on Drawings.
L. Provide a separately mounted, SPD type surge protective device per Section 26 43 00 on all panelboards. Tap the panelboard tub and install the SPD device above, below or to the side of the tub as project details allow. Keep the SPD leads as short as possible.

2.02 EXISTING LIGHTING AND APPLIANCE PANELS (120/208V OR 120/240V)
A. Existing lighting panels shall have all existing circuit terminations re torqued to insure proper contact.
B. All new breakers as called out on drawings shall match existing part numbers where possible and be compatible with panelboard bussing.
C. All new breakers as called out on drawings shall be bolt on type where possible.
D. Panelboards that have been added to or modified during construction shall have new, typed circuit directories installed on the inside of the panel cover. Hand Written circuit directories shall not be acceptable. Contractor to verify circuits to existing equipment and adjust schedule as required.
E. Existing panelboards shall be cleaned and cleared.
F. Install remote mounted SPD per specification 26 43 00 as indicated on drawings and panelboard schedules.

2.03 MANUFACTURERS
A. New Lighting and Appliance Panels (L Prefix): Water Tower No. 9
   1. Square D Type NQOD
   2. General Electric equal
   3. Siemens equal
   4. Cutler Hammer equal
B. Existing Lighting Panel Breakers: Water Tower No. 4
   1. Square D Type QO, 10kA

2.04 CABLE TIES
A. Equal to Thomas and Betts "TY-RAP"

PART 3  EXECUTION

3.01 INSTALLATION
A. Install all panelboards plumb with top at 72” above the finished floor or in locations as shown on drawings.
B. Type circuit directory with spare positions left blank. Hand lettering not acceptable.
C. Existing panelboards shall have new, typed circuit directories placed in panels.
D. Carefully clean panelboard to remove all wire scraps, dirt and dust.
E. Neatly dress conductors and bundle with nylon cable ties.
F. Tighten all lugs and bolts to manufacturer's recommendations.
G. Use touch up paint, as recommended by the manufacturer, to repair scratches and other surface defects.
H. Install SPD as recommended by the SPD manufacturer at each project panelboard. Install with leads as short as possible and so that SPD indicating lights are visible.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY
A. Section Includes:
   1. Furnish and install all wiring devices and device plates where shown on the Drawings.
B. Related Work:
   1. Section 26 05 37 – Boxes

1.02 WORK INSTALLED BUT FURNISHED BY OTHERS
A. Where indicated, install devices supplied by Division 1 through 15.

1.03 QUALITY ASSURANCE
A. NEMA U.L. listed.

1.04 SHOP DRAWINGS AND PRODUCT DATA
A. Submit in accordance with Specification Section 01 33 00 – Submittals. Clearly indicate device type, voltage, amperage, NEMA configuration, color.

1.05 DELIVERY, STORAGE AND HANDLING
A. Store in a dry area, protected from the weather.

1.06 OPERATION AND MAINTENANCE DATA
A. Submit in accordance with Specification Section 01 78 23 – Operation and Maintenance Data, a list of all devices used, including manufacturer and type.

PART 2 PRODUCTS

2.01 DUPLEX RECEPTACLES: (SURFACE MOUNTED IN FINISHED AREAS)
A. Manufacturer: Equal to Hubbell #5352 Series, Slater #5352 Series, Bryant #5352, Leviton #5352, or Eagle #5352.
B. Type:
   1. Specification grade
   2. Gray in color (normal applications); yellow for UPS applications.
   3. 20 ampere
   4. 120 volt
   5. 3 wire grounding

2.02 GROUND FAULT RECEPTACLE
A. Manufacturer: P & S #1591, Eagle 646-2
B. Type:
   1. 20 ampere capacity
   2. Gray
   3. 120 volt with 5 milliampere trip

2.03 TOGGLE SWITCHES
A. Manufacturer: Equal to P & S #20AC, Eagle 2221
B. Type:
   1. Specification grade
   2. Gray in color
   3. 20 ampere
   4. 120/277 volt
   5. Quiet operation, keyed switch where indicated, single pole unless noted otherwise.
2.04 PILOT LIGHTED SWITCHES
   A. Manufacturer: Equal to P & S #20AC1-RPL, Eagle 2221PL
   B. Type:
      1. Red in color
      2. 20 ampere
      3. 120/277 volt
      4. Quiet operation
   C. Neon type that is illuminated when switch is in the "on" position
   D. Specification grade

2.05 PILOT LIGHTS
   A. Manufacturer: Equal to Arrow Hart
   B. Type:
      1. Neon with red jewel

2.06 DEVICE PLATES
   A. Provide device wall plates per Specification Section 260537 and as required by NEC.

2.07 WEATHERPROOF COVERS
   A. Provide weatherproof device covers on all exterior devices, wet area devices, chemical room devices and in other areas indicated on the Drawings and as required by the NEC.
   B. Unless indicated otherwise, covers shall be of the "weather protected while in use" variety and shall consist of the following:
      1. Exterior Applications: cast aluminum, lockable, sized as required for the application. Manufacturer/Model: Intermatic / Type WP10, or equal.
      2. Wet, Chemical or Caustic Interior Areas: clear plastic or PVC construction, Carlon, or equal.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Install devices and device plates where shown on the Drawings.
   B. Provide blank plates for unused openings.
   C. See Section 26 05 53 - Identification for Electrical Systems for engraving requirements for pilot lights and pilot lighted switches.

END OF SECTION
SECTION 26 43 00
SURGE PROTECTIVE DEVICES (SPDS)

PART 1 GENERAL

1.01 SUMMARY
A. This section describes the materials and installation requirements for Surge Protective Devices (SPD) as shown on the drawings and specified herein.
B. Related Work:
   1. Section 26 05 34 - Conduit
   2. Section 26 05 19 - Power and Instrumentation Cable – Less than 600V
   3. Section 26 24 16 – Panelboards

1.02 REFERENCES AND QUALITY ASSURANCE:
B. National Electrical Manufacturers Association (NEMA LS1)
C. National Fire Protection Association (NFPA 70)
D. Underwriters’ Laboratories (UL 1449 and 1283)

1.03 SUBMITTALS
A. For each SPD indicated:
   1. Product Data Sheets in NEMA LS-1 format - Publication for Low Voltage Surge Protection Devices (SPDs).
   2. Installation and Operating Instructions.
   3. UL 1449 Edition 3 Listing Certificate.
   4. UL 1449 Edition 3 Suppressed Voltage Ratings.
   5. Independent let through voltage test results to ANSI IEEE C62.41 Cat A3 Ringwave, B3 and C3 Combination waves (For service entrance SPDs).
   6. Independent test report showing product meets manufactures claimed single shot surge rating (For service entrance SPDs).

1.04 MANUFACTURES QUALIFICATIONS
A. Manufacturers shall be ISO9000 certified.
B. Manufacturers shall have been engaged in the design and manufacturing of such devices for at least ten (10) years.
C. The following manufacturers will be approved, provided they meet all specifications:
   1. ERICO Inc.
   2. Eaton equivalent
   3. Square D equivalent
   4. Siemens equivalent
   5. Or prior approved equal.

1.05 WARRANTY
A. The manufacture shall warrant the SPD against defects in material and workmanship for period of 10 years.

PART 2 PRODUCTS

2.01 LIGHTING PANELBOARDS 400A OR LESS
A. SPD shall be installed at additional specific locations as shown on drawings or indicated on the panelboard schedules.
B. SPD shall provide 50kA 8/20µs surge rating per phase.
C. SPD shall be capable of withstanding multiple temporary over voltage per UL 1449 Ed 3 without failure or need to reset or replace modules/fuses.
D. Multiple MOVs per mode shall be used, each with individual thermal disconnect devices bonded directly to the MOV substrate for rapid and automatic disconnection of any MOV exhibiting excessive temperature. The following are not acceptable:
   1. SPD’s without thermal fuses/disconnects.
   2. SPD’s with shared thermal devices that disconnect more than one MOV.
E. SPD status for each phase shall be continuously monitored and displayed
F. The following clamping voltages (L-N) shall not be exceeded by the SPD:

<table>
<thead>
<tr>
<th>Impulse Standard (no AC applied)</th>
<th>120/240V &amp; 240V &amp; 277/480V &amp; 347/600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI/IEEE C62.41 Cat 560V</td>
<td>120/208V 920V 1200V 1420V</td>
</tr>
<tr>
<td>B3 3kA</td>
<td></td>
</tr>
<tr>
<td>ANSI/IEEE C62.41 Cat 770V</td>
<td>120/208V 920V 1200V 1420V</td>
</tr>
<tr>
<td>C3 10kA</td>
<td></td>
</tr>
</tbody>
</table>

G. At least 25db @100kHz EMI/RFI shall be provided L-N. To avoid unsafe ground leakage current, no filtering shall connect to ground.

H. Acceptable Manufacturers
   1. Erico TDX50
   2. Eaton equivalent
   3. Square D equivalent
   4. Siemens equivalent
   5. General Electric equivalent
   6. Or prior approved equivalent

PART 3  EXECUTION

3.01 INSTALLATION

A. Install SPD, surge arresters and surge capacitors as indicated on Drawings, and in full accordance with manufacturer’s written instructions and comply with all applicable codes.

B. Units shall be installed with minimal connection lead length.

END OF SECTION
SECTION 26 56 01
LUMINAIRES

PART 1  GENERAL

1.01  SUMMARY

A.  Section Includes:
   1. Furnish and install luminaires, ballasts, and lamps as shown on the Drawings.
   2. Related Work:
      a. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables
      b. Section 26 05 37 – Boxes
      c. Section 26 05 26 - Grounding and Bonding for Electrical Systems
      d. Section 26 27 26 - Wiring Devices

B.  QUALITY ASSURANCE
   1. U.L. listed, ETL certified.

C.  SHOP DRAWINGS AND PRODUCT DATA
   1. Submit in accordance with Specification Section 001300 - Submittals.
   2. Clearly indicate luminaire type, housing and door frame material, lens type, diffuser thickness and (for framed lens), weight per square foot, input voltage, quantity and type of lamps, volt-ampere and watt ratings.

D.  DELIVERY, STORAGE AND HANDLING
   1. Store in a dry area, protected from the weather. Maintain temperature above freezing.

E.  OPERATION AND MAINTENANCE DATA
   1. Submit manufacturer's data in accordance with Specification Section 001730 – Operation and Maintenance Data for cleaning, relamping, lamp type, ballast type and voltage.

PART 2  PRODUCTS

2.01  LUMINAIRES:

A.  Shall be in accordance with NFPA, UL, as shown on drawings, and as specified.

B.  Sheet Metal:
   1. Shall be formed to prevent warping and sagging. Housing, trim and lens frame shall be true, straight (unless intentionally curved), and parallel to each other as designed.
   2. Wireways and fittings shall be free of burrs and sharp edges, and shall accommodate internal and branch circuit wiring without damage to the wiring.
   3. When installed, any exposed fixture housing surface, trim frame, door frame, and lens frame shall be free of light leaks.
   4. Hinged door frames shall operate smoothly without binding. Latches shall function easily by finger action without the use of tools.
   5. Drivers and LED arrays shall be serviceable while the fixtures is in its normally installed position. Drivers shall not be mounted to removable reflectors or wireway covers unless so specified.
   6. Recessed luminaires mounted in an insulated ceiling shall be listed for use in insulated ceilings.
   7. Mechanical Safety: Luminaire closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, aircraft cable, captive hinges, or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.
   8. Metal Finishes
      a. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion-resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping or shearing processes shall be finished in a similar corrosion resistant
manner to match the adjacent surfaces(s). Luminaire finish shall be free of stains or
evidence of rusting, blistering, or flaking, and shall be applied after fabrication.

b. Interior light reflecting finishes shall be white with not less than 85% reflectances,
except where otherwise shown on the drawing.

c. Exterior finishes shall be as shown on the drawings.

9. Luminaires shall have a specific means for grounding metallic wireways and housings to
an equipment grounding conductor.

10. Luminaires in hazardous areas shall be suitable for installation in Class and Division areas
as defined in NFPA 70.

C. LED EXIT LIGHT LUMINAIREs

1. Exit light luminaires shall meet applicable requirements of NFPA and UL.

2. Housing and door shall be thermoplastic, unless otherwise noted.

3. General purpose exit light luminaires shall be hinged, with latch. Exit light luminaires in
classified spaces shall be listed for the Class and Division of each space.

4. No radioactive material shall be used in the luminaires.

5. Luminaires:

  a. Inscription panels shall be as specified a minimum of 2.25 mm (0.090 inch) thick,
stenciled with 150 mm (6 inch) high letters, baked with red color stable plastic or
fiberglass. Lamps shall be Luminous Light Emitting Diodes (LED) mounted on the
edges of the luminaire.

  b. Double-Faced Fixtures: Provide double-faced fixtures where required or as shown on
drawings.

  c. Directional Arrows: Provide directional arrows as part of the inscription panel where
required or as shown on drawings. Directional arrows shall be the "chevron-type" of
similar size and width as the letters and meet the requirements of NFPA 101.

D. INTERIOR LED LUMINAIREs:

1. General:

   a. LED luminaires shall be in accordance with IES, NFPA, UL, as shown on the
drawings, and as specified.

   b. LED luminaires shall be Reduction of Hazardous Substances (RoHS) compliant.

   c. LED drivers shall include the following features unless otherwise indicated:

      1) Minimum efficiency: 85% at full load

      2) Minimum Operating Ambient Temperature: -20° C (-4° F.)

      3) Input Voltage: 120 - 277 (±10%) at 60 Hz.

      4) Integral short circuit, open circuit, and overload protection.

      5) Power Factor: = 0.95.

      6) Total Harmonic Distortion: =20%


   d. LED modules shall include the following features unless otherwise indicated:

      1) Comply with IES LM-79 and LM-80 requirements.

      2) Minimum CRI 80 and color temperature 4000° K unless otherwise specified in
LUMINAIRE SCHEDULE.

       3) Minimum Rated Life: 50,000 hours per IES L70.

       4) Light output lumens as indicated in the LUMINAIRE SCHEDULE.

2. LED Downlights: Housing, LED driver, and LED module shall be products of the same
manufacturer.

3. LED Troffers:

   a. LED drivers, modules, and reflector shall be accessible, serviceable, and replaceable
from below the ceiling.

   b. Housing, LED driver, and LED module shall be products of the same manufacturer.

4. LED Exterior luminaires: Housing, LED driver, and LED module shall be products of the
same manufacturer.

5. LED High Bay luminaires: Housing, LED driver, and LED module shall be products of the
same manufacturer.
PART 3 EXECUTION

3.01 INSTALLATION

A. Securely support all luminaires with 1/4" stainless steel anchors to structural members.
B. All luminaires are to be installed where shown on the Drawings.
C. Before installing luminaires, coordinate ceiling construction, structural depths, interference with piping and ductwork, full height doors and upper cabinets with other trades to avoid installation conflict.
D. Surface Mounted Luminaires
   1. Install surface mounted luminaires parallel to or at right angles to building lines. Luminaire rows must be installed straight and level with ends securely fastened together.
   2. Attach all surface mounted luminaires to ceiling or wall surface with at least two attachment points. Provide mounting accessories to ensure that installation remains watertight.
   3. Exterior Luminaires
      a. Insure that all exterior luminaires are watertight after installation and all weep holes are open.
      b. All luminaires installed in exterior locations must be suitable for wet location.
E. ACCEPTANCE CHECKS AND TESTS
   1. Perform the following:
      a. Visual Inspection:
         1) Verify lighting controls operate properly per drawings and specifications.
         2) Visually inspect for damage to fixtures, lenses, reflectors, diffusers, and louvers. Clean fixtures, lenses, reflectors, diffusers, and louvers that have accumulated dust, dirt, or fingerprints during construction.
      b. Electrical Tests:
         1) Exercise dimming components of the lighting fixtures over full range of dimming capability by operating the lighting controls in the presence of the Engineer of Record. Observe for visually detectable flicker over full dimming range, and replace defective components at no cost to the Owner.
         2) Burn-in all lamps that require specific again period to operate properly, prior to occupancy. Burn-in period to be 40 hours minimum, unless specifically recommended otherwise by lamp manufacturer. Burn-in dimmed fluorescent lamps for at least 100 hours at full voltage, unless specifically recommended otherwise by lamp manufacturer. Replace any lamps and ballasts which fail during burn-in.
F. FOLLOW-UP VERIFICATION
   1. Upon completion of acceptance checks and tests, the Contractor shall demonstrate the lighting systems are in good operating condition and properly perform the intended function.

END OF SECTION
DIVISION 31
EARTHWORK
SECTION 31 05 13 – SOILS FOR EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Subsoil materials.
   2. Topsoil materials.

B. Related Sections include:
   1. Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to work of this section.
   2. Division 1 – General Requirements.
   3. Division 31 – Earthwork.

1.02 SUBMITTALS FOR REVIEW

A. See Section 01 33 00 – Submittal Procedures.

B. Samples: In accordance with Section 01 45 00 – Quality Control.

1.03 QUALITY ASSURANCE

A. Section 01 45 00 – Quality Control: Field Samples.

B. Material Source: Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

PART 2 PRODUCTS

2.01 SUBSOIL MATERIALS

A. Subsoil: Uncontaminated excavated on-site material or imported borrow material. Graded free of lumps larger than 3 inches, rocks larger than 2 inches, and debris; non-plastic and inorganic material.

   1. Type S1: Fine sand and gravel, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Conforming to ASTM D2487 Group Symbol GM, GC, SM, SC, SP, SW, or dual symbol groups.

   2. Type S2: Silt, silty-clay, inorganic clays, and silts of low to medium plasticity and a maximum liquid limit of 40. Conforming to ASTM D2487 Group Symbol CL, ML, or dual symbols thereof.

   3. Type S3: Plastic to highly plastic clays and clay-silt materials of medium to high plasticity Conforming to ASTM D2487 Group Symbol CH, and MH or dual symbols thereof.

   4. Unsuitable soils: All frozen material, vegetation, trash, rocks, and concrete and bituminous chunks having a dimension exceeding 3 inches and otherwise not meeting the specifications of soil materials.
2.02 TOPSOIL MATERIALS

A. Topsoil: Uncontaminated excavated on-site material or imported borrow material; Graded free of roots, rocks larger than ¾ inches, subsoil, debris, large weeds, and foreign matter.
   1. Type S4: Imported or Re-used; Friable loam. Acidity range (pH) of 5.5 to 7.5 containing a minimum of 4 percent and a maximum of 25 percent organic matter. Conforming to ASTM D2487 Group Symbol OL and OH.

2.03 SOURCE QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Testing and analysis of soil material.
C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D2487.
D. Provide materials of each type from same source throughout the Work.
E. Contractor to obtain and pay for services of soil classification technician from an independent geotechnical laboratory to monitor soils installed. Contractor is responsible for scheduling and complying with geotechnical requirements.

PART 3 EXECUTION

NOT USED.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Coarse and fine aggregate materials.

B. Related Sections include, but are not limited to:
   1. The General Conditions, Supplementary Conditions, and General
      Requirements apply to work of this section.
   2. Division 1 – General Requirements.
   3. Division 31 – Earthwork.
   5. Division 33 – Utilities.

1.02 SUBMITTALS FOR REVIEW

A. Section 01 33 00 - Submittals: Procedures for submittals.

B. Samples: Submit, in air-tight containers, 40 pound sample of each type of aggregate to testing laboratory. Submit Laboratory Results to Engineer.

1.03 QUALITY ASSURANCE

A. Section 01 45 00 - Quality Control: Field Samples.

B. Material Source: Submit name of imported material supplier(s). Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

PART 2 PRODUCTS

2.01 AGGREGATE MATERIALS

A. Coarse Aggregate (Concrete Mix and Type A1): Well graded crushed stone or gravel conforming to the requirements of ASTM C33, Gradation 67.

B. Coarse Aggregate (Surface Course and Type A2): Gravel; angular crushed, or natural stone; free of shale, clay, friable material and debris; graded in accordance with North Dakota Department of Transportation referenced specifications, Section 816, Class 13. For all aggregate surface areas.

C. Coarse Aggregate (Base Course and Type A3): Gravel; angular crushed, or natural stone; free of shale, clay, friable material and debris; graded in accordance with North Dakota Department of Transportation referenced specifications, Section 816, Class 5.
D. Fine Aggregate (Concrete Mix and Type A4): Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM C33.

2.02 SOURCE QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Source testing and analysis of aggregate material.


D. If tests indicate materials do not meet specified requirements, change material or material source and retest.

E. Provide materials of each type of aggregate from the same source throughout the Work.

PART 3 EXECUTION

3.01 STOCKPILING

A. Stockpile materials in accordance with Section 31 14 13.

3.02 STOCKPILE CLEANUP

A. Cleanup stockpiles in accordance with Section 31 14 13.

END OF SECTION
SECTION 31 14 13 – SOIL STRIPPING AND STOCKPILING

PART 1  GENERAL

1.01 SUMMARY

A. Section includes:
   1. Protection of features not designated for removal.
   2. Topsoil Removal.
   4. Stockpile Cleanup.

B. Related Sections include:
   1. Division 1 – General Requirement.
   2. Division 31 – Earthwork.
   3. Section 32 90 00 – Landscape Grading.
   4. Section 32 97 00 – Restoration of Disturbed Areas.

1.02 DESCRIPTION

A. Limits of construction are shown on the Drawings and do not extend beyond the property limits. Excavation shall not be allowed outside of the limits of construction where shown on the Drawings.

B. Materials may be temporarily stockpiled on the site within the limits of construction or where shown on the Drawings.

C. Protect benchmarks and existing structures that are to remain from damage or displacement.

1.03 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the Work are as indicated.

1.04 DEFINITIONS

A. Soil Testing Laboratory: Refers to a professional soils engineering firm with soil sampling and testing services that is independent from the Contractor.

B. Structures: Existing and new construction, including slabs, buildings, footings, tanks, and other structural elements.

1.05 SITE CONDITIONS

A. Soil borings for this project have not been completed.

B. Contractor shall determine to Contractor’s own satisfaction the nature and location of subsurface obstacles and the nature of soil and water conditions which will be encountered during the work.
C. Contractor may perform test borings or other exploratory operations at Contractor’s own expense. Contractor shall make arrangements for any soils investigation with Owner.

D. No claim for additional payment will be accepted due to the nature of subsurface conditions in which the work is to be performed.

E. Do not commence construction of structure foundation until soil test results are confirmed.

1.06 ADDITIONAL PAYMENT

A. All excavation, removal, and disposal of earth, peat, muck, and other materials; erosion control; sheeting, shoring, and bracing; fill and backfill, placement, compaction, grading, source quality testing; stockpiling; and all other work under this Section shall be considered incidental to the Project and no claim for additional compensation of extra work will be accepted.

B. No claim for additional payment will be accepted for excavation and fill for all or improvements required for removal of unsuitable material up to two (2) feet below bottom of proposed work.

C. No claim for additional payment will be accepted for repairs made to subgrade due to weather related items.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

3.01 INSPECTION

A. Contractor shall verify which native materials are suitable for reuse at the site. Provide testing data as required and keep materials separated.

B. Notify Engineer of any unsuitable materials.

3.02 PROTECTION OF FEATURES NOT DESIGNATED FOR REMOVAL

A. Protect all existing structures, trees, plantings, turf, and other facilities which are not scheduled for removal.

3.03 TOPSOIL REMOVAL

A. All topsoil shall be stripped to full depth and stockpiled separately to be placed on top of finished grading and all disturbed areas not covered by structures or pavement. Remove all heavy growths of grass prior to stripping topsoil.
B. Separate all debris, large roots, and rocks greater than one (1) inch from the
topsoil and remove from the site in accordance with all applicable Federal, State,
and Local regulations to Contractor furnished site.

C. Where trees are to be left standing, stop topsoil stripping a sufficient distance (at
least the drip line) from a tree to prevent damage to main root system.

3.04 STOCKPILING OF MATERIALS

A. Contractor may temporarily stockpile acceptable materials including topsoil,
excess excavated, and delivered materials within the limits of construction where
indicated by Engineer. Contractor shall obtain approval from Engineer before
stockpiling excess materials.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration
of materials.

E. Apply appropriate erosion control measures to stockpile areas.

F. Contractor shall remove all excess stockpiles from the site prior to substantial
completion of the project.

3.05 STOCKPILE CLEANUP

A. Remove stockpile; leave area in a clean and neat condition. Grade site surface to
prevent freestanding surface water.

B. If a borrow area is indicated, leave area in a clean and neat condition. Grade site
surface to prevent freestanding surface water.

C. Restore stockpile area in accordance with Section 32 97 00.

END OF SECTION
SECTION 31 23 13 – SUBGRADE PREPARATION

PART 1  GENERAL

1.01  SUMMARY

A.  Section Includes:
   1.  Scarifying, compacting, and shaping the earth subgrade below pavements and structures.
   2.  Perform subgrade preparation on all areas to receive structures (including foundation rock), concrete pavement, aggregate base course, and/or aggregate surface course.

B.  Related Sections:
   1.  Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to work of this section.
   2.  Division 1 – General Requirements.
   3.  Division 31 – Earthwork.

PART 2  PRODUCTS

2.01  OTHER MATERIALS

A.  Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to approval of the Engineer.

B.  Suitable Soil Materials: On-Site excavated material or imported material meeting subsoil classification S1, S2, or S3 as defined in Section 31 05 13, free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

PART 3  EXECUTION

3.01  GENERAL

A.  Subgrade Preparation shall consist of producing a firm and stable subgrade prior to placement of the surface or base course.

3.02  SUBGRADE PREPARATION

A.  The Contractor shall compact and shape the subgrade for its full width as may be necessary to produce, at the time the base course is placed, the required density in the upper 12-inches of the base and the required grade and cross-section.
B. The pavement subgrade shall be prepared by test-rolling the pavement subgrade soil and correcting any ruts deeper than 1 inch (25 mm), by removing and replacing the soils with suitable soil materials. All soil materials shall be compacted according to Section 01 45 00. Subgrade preparation shall extend deeper until the Engineer believes that additional subgrade preparation is necessary to support construction.

C. All subgrades below structures shall be cut to the final depth with a smooth-edged backhoe or other equipment that will minimize disturbance to the subgrades.

D. Subgrades below structures shall not be scarified or re-compacted. All disturbed clay soils must be removed and replaced with Type S1 soils.

E. If areas are encountered that cannot be compacted, sub-excavate unstable materials and replace with Type S1 or S2 soil materials.

F. Contractor shall be responsible for drying the subgrade soil or applying water as may be necessary to obtain the required density. Contractor shall also be responsible for grading the Work area and providing drainage so that accumulating water will drain away from the subgrade.

G. The finished subgrade surface shall be smooth and uniform and shall not rut, shove, flex, or displace when any construction equipment is placed on it.

H. The required grade and cross-section for subgrades shall consist of a smooth subgrade surface that conforms to the prescribed elevations for the particular subgrade being prepared, prior to constructing an additional course thereon. The required grade and cross-section for rough graded surfaces shall consist of a smooth graded surface that conforms to the prescribed elevations for that particular rough grade being prepared. The prescribed elevation for any point on the subgrade or rough graded surfaces shall be as determined from the grades staked by the Engineer.

I. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations, vehicular traffic, or weather conditions.

J. Surface or base course and embankment fill shall not be placed on subgrades until the subgrade has been tested and Contractor has proven that the requirements specified herein have been met. Upon completion of a successful test, Contractor shall maintain the subgrade and repair any damage prior to placing subsequent materials.

K. Subgrade preparation shall apply to all pipe trenches, concrete manholes, concrete slabs, pond areas, paved and graveled areas, including roads, driveways, parking areas, sidewalks, and ramps.
L. Testing requirements for subgrade preparation shall be as follows:
   1. Shall conform to requirements of Section 01 45 00.

3.03 TOLERANCES

A. Finish subgrade or rough graded surfaces shall not deviate by more than 1 inch from the required section and grade.

END OF SECTION
SECTION 31 23 16 – EXCAVATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Requirements for Excavation.
   2. Common Excavation.

B. Related Sections:
   1. The General Conditions, Supplementary Conditions, and General Requirements apply to work of this section.
   2. Division 1 – General Requirements.
   3. Division 31 – Earthwork.

1.02 REFERENCES


B. North Dakota Department of Transportation (NDDOT) Standard Specifications for Road and Bridge Construction, latest edition.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00:
   1. Test Results: Prior to start of work, submit written reports for each material sampled and tested. Include project identification, date of report, name of contractor, name of testing laboratory, source of material, manufacturer and brand name for manufactured products, specification requirements for each material, and corresponding test results.
      a. Tests must have been taken no more than 180 calendar days before Notice to Proceed.
   2. Product Data: Information on manufactured products indicating compliance with requirements of this Section.

1.04 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

B. Structures: Existing and new construction, including slabs, buildings, and structural elements and systems.

C. Acceptable Materials: Material that will provide for the indicated soil bearing capacity, soil densities, material requirements and that, in the opinion of soil testing laboratory, will not be subject to future decomposition, settlement, subsidence, expansion and are otherwise of the required soil type.
D. Unsuitable Materials: Material that will not provide for the indicated soil bearing capacity and soil densities and that in the opinion of the soil testing laboratory will be subject to future decomposition, settlement, subsidence, expansion, and are otherwise not of the required soil type.

E. Soil Testing Laboratory: Refers to professional soils engineering firm with soil sampling and testing services and that is independent from the Contractor. The soil testing laboratory’s engineer shall be licensed in the State of North Dakota.

F. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, topsoil removal, excavation to grade, and scarification and compaction of subgrade.

1.05 SITE CONDITIONS

A. Contractor shall determine to Contractor’s own satisfaction the nature and location of subsurface obstacles and the nature of soil and water conditions which will be encountered during the work.

B. Contractor may perform test borings or other exploratory operations at Contractor’s own expense. Contractor shall make arrangements for any soils investigation with Owner.

1.06 QUALITY ASSURANCE

A. Source Quality Control Testing: Retain the services of an independent soil testing laboratory for Source Quality Control sampling and testing.

B. Materials and installed work may require testing and retesting, as required by Engineer, at any time during progress of work.

C. Allow free access of testing laboratory to material stockpiles and facilities at all times.

D. Tests including retesting of rejected materials and installed work shall be at Contractor’s own expense unless otherwise indicated.

E. See Section 01 45 00 for additional requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Stockpile delivered materials and excavated materials at locations approved by Owner until required for backfill or fill. Place, grade, and shape stockpiles for drainage.

B. Store materials in manner that will not impose additional loading and soil pressure on excavation limits and structures.
1.08 PAYMENT

A. All earth rock, peat, muck and all other excavation, removal and disposal required; erosion control, sheeting, shoring and bracing; fill and backfill; placement compaction, grading, source quality control testing, and all other work required under this Section shall be considered incidental to the Project and no claim for compensation or extra work will be accepted.

B. No claim for additional payment will be accepted for excavation and fill for all structures required for removal of unsuitable material of up to two (2) feet below bottom of work.

C. No claim for additional payment will be accepted for repairs made to subgrade due to weather related problems.

1.09 FIELD MEASUREMENTS

A. Survey benchmarks, control points, and intended elevations for the Work are as shown on the Drawings or will be provided by the Engineer.

1.10 COORDINATION

A. Coordinate work under provisions of Section 01 31 13.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

C. Contractor shall excavate for structures, pipe, and utilities at grades shown on the Drawings. Careful consideration shall be given to whether elevations shown are invert elevations or centerline elevations, Contractor shall make appropriate adjustment depending on elevation shown.

PART 2 PRODUCTS

2.01 EXCAVATION MATERIALS

A. See Section 31 05 13 for materials specifications.

2.02 SOURCE QUALITY CONTROL

A. See Section 31 23 23 and Section 01 45 00 for material quality testing requirements.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine project site and conditions under which work of this Section is to be performed.
B. Contractor shall verify which native materials are suitable for reuse at the site. Provide testing data as required and keep materials separated.

C. Notify Engineer of any unsuitable materials.

D. Do not over excavate without authorization from Engineer.

3.02 PREPARATION

A. An OSHA approved competent person shall review the above mentioned soil classification in the field. Excavations shall comply with the requirements of OSHA 29 CFR, Part 2926, Subpart P, “Excavations and Trenches.” Excavation safety is the responsibility of the Contractor. All excavations greater than 20 feet in depth shall be designed by a registered Professional Engineer.

B. Dry subgrade: Add water, then mix to make moisture content uniform throughout.

C. Wet subgrade: Aerate material by blading, diskimg, harrowing, or other methods to hasten drying process.

3.03 PROTECTION

A. Locate existing utilities in areas of work. Protect utilities that are to remain.

B. Protect structures from damage and from damage caused by groundwater, surface water, flood or floatation forces, lateral movement, settlement, undermining, washout, and other undesirable conditions created by the work.
   1. Maintain drainage when drainage ways are obstructed by earthwork and related operations.

C. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when allowed by utility owner and then only after acceptable temporary utility services have been provided.
   1. Provide temporary services, complying with Federal, State and local laws and regulations, and as acceptable to Owner, during any interruptions.

D. Protect areas that have been finish graded from subsequent construction operations, traffic, and erosion.
   1. Install erosion control protection along perimeter of unfinished areas.

E. Maintain full access to structure exits and entrances, fire hydrants, street crossings, sidewalks, and other points designated by Owner to prevent significant interruption of accessibility.

F. Do not bring explosives on site or use in work.

G. Maintain excavations and stockpiles to prevent caving, heaving, slides, and increased soil pressures on adjacent and underlying structures.

H. Repair disturbed areas and compact to required density prior to further work.
I. Remove material contaminated by erosion and runoff, provide new material and compact.

3.04 COMMON EXCAVATION

A. Excavate designated areas to the proposed subgrade elevations indicated on the Drawings.

B. Contractor shall advise Engineer immediately if any unsuitable materials are encountered during excavation. Unsuitable materials shall be reasonably separated from unsuitable materials and shall be considered surplus material at no additional cost to the Owner.

C. If Contractor encounters excess excavation materials which meet the requirements of common fill as specified herein, Contractor may use those materials as common fill. Contractor shall verify with soils testing laboratory suitability of the use of on-site material.

D. Dewatering during excavating shall be done in accordance with Section 31 23 19.

END OF SECTION
SECTION 31 23 19 – DEWATERING

PART 1  GENERAL

1.01  SUMMARY

   A.  Section Includes:
       1.  Provision and maintenance of an adequate dewatering system to remove
           and dispose of all surface and groundwater entering the excavation,
           trenches, and other parts of the Work.

   B.  Related Sections:
       1.  The General Conditions, Supplementary Conditions, and General
           Requirements apply to work of this section.
       2.  Division 01 – General Requirements.
       3.  Division 31 – Earthwork.

1.02  PERMITS AND LICENSES

   A.  The Contractor shall be responsible for obtaining all necessary permits as related
       to dewatering and water discharge and to comply with all stipulations of such
       permits.

PART 2  PRODUCTS

   NOT USED

PART 3  EXECUTION

3.01  GENERAL

   A.  Each excavation shall be kept dry during the course of all work herein, including
       subgrade preparation, pipe installation, and backfilling, to the extent that no
       damage from hydrostatic pressure, flotation, or other damage results.  All
       excavations shall be dewatered to a depth of at least two (2) foot below the
       bottom of the exposed surface, the concrete base, or pipe to be installed herein.

   B.  The Contractor may use any method or combination of methods for dewatering,
       provided that those methods are consistent with all other provisions contained in
       the Specifications; however, all dewatering methods and equipment, which, in
       the opinion of the Engineer, are ineffective at either dewater the site or treating
       dewatering discharge, shall be abandoned, improved, replaced or otherwise
       altered to obtain effective dewatering.
C. The Contractor shall provide all power, pumps, materials, and equipment necessary, and shall be responsible for disposing of the water pumped from the excavation in a manner, which will not interfere with other Work within the area and will not damage public or private property. The Contractor will be held responsible for the condition of any pipe, conduit, ditch, channel or natural watercourse utilized for drainage purposes. All erosion, sediment or other adverse results of its use shall be repaired at Contractor’s expense.

D. Contractor shall provide suitable means of standby power to keep dewatering system fully operational.

E. All costs for dewatering shall be incidental to the Project and be borne by the Contractor.

3.02 CORRECTIVE ACTION

A. The Contractor shall be responsible for, and shall repair without cost to the Owner, any damage to work in place, other contractors’ equipment, and the excavation, including damage to the bottom due to heave and including removal of material and pumping out of the excavated area that may result from Contractor’s negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.

B. Contractor shall install appropriate best management erosion control measures and maintain them as required.

3.03 WATER QUALITY CONTROL

A. All points of concentrated dewatering discharge shall be visually inspected daily by the Contractor to determine that any sediment draining out of the construction site is consistent with all applicable permits and regulations.

3.04 REMOVAL

A. Prior to removal of the system, ensure compliance with regulatory permits.

B. All wells shall be plugged in accordance with all applicable regulations.

C. Shut off dewatering system at such a rate to prevent quick upsurge of water, which may weather underlying subgrade or surrounding soil.

END OF SECTION
SECTION 31 23 23 – FILL AND BACKFILL

PART 1   GENERAL

1.01 SUMMARY

A. Section includes general requirements and procedures for site grading including, but not limited to, the following:
   1. Filling, Backfilling, and Compacting.
   2. Related Sections include, but are not limited to:
      a. The General Conditions, Supplementary Conditions, and General Requirements apply to work of this section.
      b. Division 1 – General Requirements.
      c. Division 31 – Earthwork.

1.02 REFERENCES

A. North Dakota Department of Transportation Standard Specification for Road and Bridge Construction, latest edition

1.03 DESCRIPTION

A. Placement of fill shall not be allowed outside the boundary shown on the Drawings.

B. Materials may be temporarily stockpiled on the site within the limits of construction or where shown on the Drawings.

C. Excess materials shall be stockpiled on site at locations authorized by Owner.

D. Protect benchmarks and existing structures that are to remain from damage or displacement.

1.04 DEFINITIONS

A. Suitable Material: Material that will provide the indicated required soil bearing capacity, soil densities, material requirements or, in the opinion of the soils testing laboratory, will not be subject to future decomposition, subsidence, settlement, or expansion.

B. Structures: Existing and new construction, including slabs, buildings, footings, tanks, and other structural elements.

C. Relative Compaction:
   1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D698.
2. **Optimum Moisture Content:**
   a. Determined in accordance with ASTM standard specified to determine maximum dry density for relative compaction.
   b. Determine field moisture content on basis of fraction passing ¾-inch sieve.
3. **Complete Course:** A course or layer that is ready for next layer or next phase of Work.
4. **Lift:** Loose (uncompacted) layer of material.
5. **Well-Graded:**
   a. A mixture of particle sizes with not specific concentration or lack thereof of one or more sizes.
   b. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
   c. Use to define material type that, when compacted, produces a strong and relative incompressible soil mass free of detrimental voids.
6. **Influence Area:** Are within planes sloped downward and outward at 60-degree angle from horizontal measured from:
   a. 1 foot outside outermost edge at base of foundations or slabs.
   b. 1 foot outside outermost edge at surface of roadways or shoulder.
   c. 0.5 foot outside exterior of spring line of pipes.
7. **Borrow material:** Material from required excavations or from Contractor furnished borrow areas.
8. **Select Backfill Material:** Contractor furnished materials suitable for intended use.
9. **Imported Material:** Materials obtained and paid for by Contractor from sources offsite, suitable for specified use.

### 1.05 SITE CONDITIONS

A. Contractor shall determine to Contractor’s own satisfaction the nature and location of subsurface obstacles and the nature of soil and water conditions which will be encountered during the work.

B. Contractor may perform test borings or other exploratory operations at Contractor’s own expense. Contractor shall make arrangements for any soils investigation with Owner.

### 1.06 SEQUENCING AND SCHEDULING

A. Backfill against concrete structures only after concrete has attained required compressive strength. Obtain Engineer’s acceptance of concrete work and attained strength prior to placing backfill.

### 1.07 FIELD MEASUREMENTS

A. Verify that survey benchmark, control point, and intended elevations for the Work are as shown on Drawings or will be provided by the Engineer.
1.08 FIELD QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Field inspection and testing.

B. Compaction testing will be performed in accordance with ASTM D698 and ASTM D6938.

C. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest at no additional cost to Owner.

1.09 COORDINATION

A. Coordinate work under provisions of Section 01 31 13.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

C. Contractor shall excavate for piping and utilities at grades shown on the Drawings. Careful consideration shall be given to whether elevations shown are invert elevations or centerline elevations, Contractor shall make appropriate adjustment depending on elevation shown.

PART 2 PRODUCTS

2.01 MATERIALS

A. Backfill around Structures: Backfill shall be as indicated on the Construction Drawings. Structures shall utilize Type S1 materials as specified in Section 31 05 13 within and under all structures unless otherwise indicated as granular materials which are specified in Section 31 05 16.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Notify utility company to locate utilities.

C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities that are to remain.

F. Contractor shall verify which native materials are suitable for reuse as backfill material at the site. Provide testing data as required and keep materials separated.
G. Notify Engineer of any unsuitable materials or poor subgrade conditions.

H. Dewater excavations during backfilling.

I. Dewater and dry saturated materials suitable for backfill.

J. Compact subgrade to density requirements for subsequent backfill materials.

K. Cut out soft areas of subgrade not capable of compaction in-place. Backfill with Type S1 fill and compact to density equal to or greater than requirements for subsequent fill material.

L. Identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.02 STOCKPILING OF MATERIALS

A. Stockpile according to Section 31 14 13.

3.03 FILLING, BACKFILLING, AND COMPACTING

A. Prepare subgrades according to specification 31 23 13 prior to installing fill material.

B. Backfill areas to contours and elevations with unfrozen materials.

C. Proof roll subgrade areas below pavements, or where specifically noted with, as a minimum, a tandem axle dump truck loaded to at least 25 ton weight. Loose or soft soils shall be defined as soils exhibiting "excessive rutting" from the truck tires (approximately one (1) inch wheel rut depth.

D. Systematically backfill to allow maximum time for natural settlement. Do not place material on loose, wet, muddy, spongy or frozen ground or on materials containing frost or ice.

E. Slope grade away from structures minimum 2 inches in 10 feet, unless noted otherwise.

F. Do not proceed with backfilling of excavations until completion of the following:

1. Observation, testing, approval, and recording of locations of underground utilities.

2. Removal of unsuitable materials, construction related debris, and excess materials.

3. Placement and Compaction
   a. Place materials in compacted layers of thickness required to obtain specified soil densities. Layers shall not exceed 9 inches in loose depth for cohesive and cohesionless soil material compacted by heavy compaction equipment and not more than 6 inches in loose depth for cohesive and cohesionless soil materials.
compacted by hand operated tampers.

b. Place material in lifts uniformly to the same approximate elevation, not exceeding the final grade height, in manner required to prevent creation of unbalanced soil lateral pressures, wedging action of materials and soil pressures that exceed the design lateral soil conditions and to prevent damage to the structure.

c. Moisten or aerate each layer to the extent required to obtain the moisture content required for the indicated compaction density. Prevent free water from appearing on surface during or subsequent to compaction operations.

d. Remove and replace with acceptable material, or scarify and air dry otherwise acceptable soil material that is too wet to obtain specified soil density. Assist drying by diskng, harrowing, or pulverizing, until moisture content is reduced to value required for compaction.

e. Compact each layer to the required density specified for each area classification. Hand tamp or utilize hand operated vibratory equipment when required to compact material placed in confined areas.

f. Do not place additional layers until density of each layer in place complies with compaction requirements. Perform corrective work as required to obtain required density.

3.04 COMPACTION REQUIREMENTS

A. Compact materials as required in Section 01 45 00 and shown in Schedule below.

B. Recompact and retest all areas represented by failed density tests at Contractor expense.

3.05 TOLERANCES

A. Finished Grade:

1. Plus or minus 3 inches, upon completion of settlement in cultivated areas, but not to exceed 6 inches above finished grade prior to settlement.

2. Plus or minus 1 inch, upon completion of settlement in ditches, berms, and lawn areas, but not to exceed 3 inches above finished grade prior to settlement.

3. Plus or minus 1 inch upon completion of settlement in roadways and driveways, but not to exceed 3 inches above finished grade prior to settlement.

4. All areas that receive fill or backfill shall be kept within settlement tolerances through the warranty period.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 50 00.
B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.07 SETTLEMENT

A. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from the Engineer or Owner, or sooner if required by Engineer or Owner, depending on the critical nature of the settlement.

3.08 SCHEDULE

A. Utility Bedding in Areas of Over Excavation or Trench Bottom is in Bedrock, Hardpan, or Boulders:
   1. Bed with Fill Type S1, S2, or A3, to required thickness to obtain specified utility cover compacted to 95 percent minimum. Specified backfill tolerances shall be maintained.

B. Utility Bedding in High Ground Water Table or Flowing Water:
   1. Bed with Fill Type A1, 6 inches thick, compacted to 95 percent.

C. Final Backfill:
   1. Cultivated Areas; Fill Type S1 or S2, from bedding to subgrade, compacted to 85 percent.
   2. Ditches, Berms and Lawn Areas; Fill Type S1 or S2, from bedding to subgrade, compacted to 93 percent.
   3. Roadways and Driveways; Fill Type S1 or S2, from bedding to subgrade, compacted to 95 percent.

D. Fill Under Cast-In-Place Structures, Floors, and Manholes:
   1. Fill Type A3, to 12 inches, compacted to 95 percent.

E. Topsoil Fill:
   1. See Section 31 05 13.

END OF SECTION
SECTION 31 23 33 – TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Excavating trenches for utilities.
   2. Compacted bedding and fill of utilities to subgrade elevations.
   3. Backfilling and compaction requirements for trenches.

B. Related Sections include, but are not limited to:
   1. Section 01 45 00 – Quality Control.
   2. Section 01 50 00 – Temporary Facilities and Controls.
   3. Section 31 05 13 – Soil for Earthwork.
   4. Section 31 05 16 – Aggregates for Earthwork.
   5. Section 32 90 00 – Landscape Grading.
   6. Section 33 10 00 – Water Utilities.

1.02 REFERENCES

A. Reference Standards include:
   3. ASTM D6938 – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.03 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.04 FIELD MEASUREMENTS

A. Verify that survey benchmark, control point, and intended elevations for the Work are as shown on Drawings.

1.05 COORDINATION

A. Coordinate work under provisions of Section 01 31 13.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Subsoil Fill: As specified in Section 31 05 13.
B. Aggregate Fill: As specified in Section 31 05 16.

PART 3  EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Notify utility company to locate utilities.

C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities that are to remain.

F. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Subsoil Type S1 or S2 and compact to density equal to or greater than requirements for subsequent backfill material.

3.02 EXCAVATING

A. Excavate topsoil in accordance with Section 31 14 13.

B. Excavate subsoil required for installation of utilities to required depths in accordance with Section 31 23 13.

C. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

D. Do not interfere with 45 degree bearing splay of foundations. Underpin adjacent structures, as necessary, to prevent damage by excavation Work.

E. Hand trim for bell and spigot pipe joints. Remove loose matter.

F. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard, measured by volume.

G. Stockpile excavated material in an orderly manner, at sufficient distance from the trench to avoid overloading, to prevent slides and cave-ins. Remove excess material not being used from site.

H. In the event of shrinkage of excavated soils, resulting in a shrinkage of backfill along trenches, Contractor shall provide, haul, place, and compact suitable Subsoil Type S1 or S2 from an acceptable source at no cost to Owner.

I. Provide drainage surrounding trench continually. Water shall not be permitted to accumulate in the excavation.
J. Shore as required to protect workmen, banks, adjacent structures, and facilities.
K. Provide uniform bearing support for each pipe section along its entire length.
L. Excavate all unsuitable material from trench.
M. Excavate to an over-depth of a minimum of 6 inches below pipe in areas of bedrock or other extensive rock formations by jack hammer, blasting, or other approved method. Trench width shall be 1.25 times the outside diameter of the pipe.

3.03 BACKFILLING
A. Backfill trenches to contours and elevations with unfrozen fill materials.
B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
C. Aggregate Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
D. Soil Fill: Place and compact material in equal continuous layers not exceeding 12 inches compacted depth.
E. Employ a placement method that does not disturb or damage utilities in trench. Prevent floatation of pipe.
F. Maintain optimum moisture content of fill materials to attain required compaction density. Use vibratory or special compaction equipment when required.
G. Remove surplus fill materials from site.
H. Leave fill material stockpile areas completely free of excess fill materials. Contractor shall have the responsibility to load, haul, and spread all excess fill off-site.

3.04 TOLERANCES
A. As specified in Section 31 23 23 – Fill and Backfill.

3.05 FIELD QUALITY CONTROL
A. Section 01 45 00 - Quality Control: Field inspection and testing.
B. Compaction testing will be performed in accordance with ASTM D698 and ASTM D6938.
C. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest at no additional cost to Owner.
D. Frequency of Tests: Testing shall only be required if tolerances are not being met.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 50 00.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.07 SCHEDULE

A. As specified in Section 31 23 23 – Fill and Backfill.

END OF SECTION
SECTION 31 25 00 – EROSION AND SEDIMENTATION CONTROL

PART 1  GENERAL

1.01 SUMMARY

A. Prevention of erosion and sedimentation due to construction activities.

B. Restoration of areas eroded due to insufficient preventative measures.

C. Related Sections include, but are not limited to:
   1. Division 31 – Earthwork
   2. Division 32 – Exterior Improvements
   3. Division 33 – Utilities

1.02 REFERENCES

7. General Permit Authorization to Discharge Storm Water Associated with Construction Activity under the National Pollutant Discharge Elimination System/State Disposal System Permit Program.

1.03 SUBMITTALS

A. Provide product specification sheets for the following erosion control materials to demonstrate that the Contractor’s proposed products meet the Contract Document requirements:
   1. Fabric proposed for silt fence
   2. Fabric proposed for inlet protection
   3. Inlet protection products, such as storm inlet sediment filters
   4. Erosion Control Blanket
   5. Gradation tests for Construction Entrance stone material
1.04 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of the North Dakota Department of Health & Environmental Division of Water Quality for erosion and sediment control.

B. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained.

C. Timing: Put preventative measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

D. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

E. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside of the site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

F. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventative measures, pump dry and remove deposited sediment after each storm.

G. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

H. Open Water: Prevent standing water that could become stagnant.

I. Maintenance: Maintain temporary preventive measures until permanent measures have been established.
PART 2  PRODUCTS

2.01  SILT FENCE

A. Geotextile Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
   1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested with ASTM D 4751.
   2. Permittivity: 0.05 sec⁻¹, minimum when tested in accordance with ASTM 4491.
   3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D 4355 after 500 hours exposure.
   4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D 4632.
   5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D 4632.
   6. Tear Strength: 55 lb-f., minimum when tested in accordance with ASTM D 4533.
   7. Color: Manufacturer’s standard.

B. Posts: 5 feet long:
   1. Steel T-section, with minimum mass of 1.26 lb per linear foot.

2.02  STORM SEDIMENT FILTER

A. Shall be one of the following.
   1. Sandbags.
      b. Overall sandbag size shall be at least 12 x 24 inches.
      c. Bags shall be filled ½ full with sand.
   2. Drop-in Sediment Trap.
      a. Geotextile Fabric unit that inserts into the inlet.
      b. Shall be:
         1) Dandy Sack by Dandy Products, Inc.
         2) Siltsack by ACF Environmental.
         3) Or equal.

2.03  CONSTRUCTION ENTRANCE

A. Materials As Shown on Drawings.

B. 3-6 inch Stone
   1. Stone shall be angular and shall be comprised of hard, durable mineral materials that have been mechanically processed.
2. Stone gradation shall conform to the following:

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<thead>
<tr>
<th>SIEVE</th>
<th>PERCENT PASSING (by weight)</th>
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</thead>
<tbody>
<tr>
<td>6-inch</td>
<td>100</td>
</tr>
<tr>
<td>3 1/2-inch</td>
<td>50 - 100</td>
</tr>
<tr>
<td>3-inch</td>
<td>10 - 75</td>
</tr>
<tr>
<td>2-inch</td>
<td>0 - 10</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>

2.04 SLOPE EROSION PROTECTION SHALL BE ONE OF THE FOLLOWING

A. Erosion Control Blanket.
   1. Shall consist of a uniform web of interlocking fibers sandwiched between an attached top and bottom layer of net backing meeting the requirements of Section 856.01 of the North Dakota Department of Transportation Standard Specifications for Construction, latest edition.
   2. The netting shall be biodegradable containing sufficient UV stabilization for breakdown to occur within a normal growing season.
   3. Staples used to anchor the blankets shall be U-shaped, 11 gauge or heavier steel wire having a span width of 1 inch and a length of 8 inches or more from top to bottom after bending.
   4. The erosion control blankets acceptable for use on this project include:
      a. Propex, LLC. – Landlok S2.
      b. North-American Green – SC150BN.
      c. Or equal.

B. Bonded Fiber Matrix. (BFM)
   1. The fibers shall be composed of 100% wood or wood by-products. A minimum of 25% of the fibers shall average 10.16 mm (0.4 inches) in length and 50% or more shall be retained on a Clark Fiber Classifier 24 mesh screen. Fibers shall be colored with a water soluble, non-toxic dye, to aid in uniform application over the site.
   2. The binder shall be a hydro colloid based (guar gum) with added slow-release and agricultural based fertilizers. The binder shall not dissolve or disperse upon rewetting.
   3. The BFM slurry shall dry to form a crust approximately 3-6 mm (1/8 to ¼ inches) thick adhering to the soil surface.
   4. The moisture content of the matrix shall be 12% +/- 3% by weight.
   5. The matrix shall consist of materials that are 100% biodegradable and 100% beneficial to plant life.
   6. The installation rate of the BFM shall be 3,500 lbs per acre, minimum.
   7. The matrix shall provide 100% continuous coverage and shall have no holes greater than 1 mm in size.
   8. The hydrated matrix density shall be approximated by a slump test prior to application.
   9. The BFM mulch: water ratio shall be as per the manufacturer recommendations. The minimum BFM mulch to water ratio is 50 lbs. BFM
mulch and 100 gallons water. The water rate will vary between 100 gallons and 125 gallons per 50 lbs., depending on which of the products is used.

10. The Bonded Fiber Matrix mulch products acceptable for use on this project include:
   a. HydraCM – Manufactured by Tensar North American Green
   b. EcoAegis – Manufactured by CANFOR.
   c. Soil Guard – Manufactured by Mat, Inc.
   d. ConWed 3000 – Manufactured by ConWed Fibers, Inc.

C. Fiber Roll
   1. Fiber rolls shall consist of hay or straw free of noxious weeds, or wood excelsior that has been compressed and stuffed into degradable netting.
   2. The roll diameter shall be a minimum of six inches.
   3. All weighted fiber rolls shall contain a weighted core with a minimum weight of eight pounds per foot.

PART 3  EXECUTION

3.01 EXAMINATION

   A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

   A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

   B. The Contractor shall follow all requirements of the current North Dakota Department of Health & Environmental Division of Water Quality regulations.

   C. The Contractor shall develop a Storm Water Pollution Prevention Plan as required by the North Dakota Department of Health & Environmental Division of Water Quality.

   D. The Contractor shall complete and sign the Notice of Intent and submit to the North Dakota Department of Health & Environmental Division of Water Quality.

3.03 SCOPE OF PREVENTATIVE MEASURES

   A. Vehicle Tracking Pad at Construction Entrances: Traffic-bearing aggregate surface and metal grate, as shown on Construction Details.
      1. Width: As required; 24 feet, minimum.
      2. Length: 30 feet, minimum.
      3. Provide at each construction entrance from public right-of-way.
      4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
B. Natural vegetation shall be retained whenever feasible.

C. Land grading and excavating shall be kept at a minimum to reduce the possibility of creating runoff and erosion problems which require extensive control measures.

D. Land exposure shall be minimized in terms of area and time.

E. Silt Fence.
   1. Provide along the perimeter edge of soil stockpiles located on the Owner's property.

F. Storm Sediment Filters.
   1. Place immediately after new storm sewer inlets are installed and immediately before land is disturbed adjacent to existing storm sewer inlets.

G. Slope Erosion Protection.
   1. Where required or as indicated on the Drawings.

H. Fiber Roll
   1. Where required or as indicated on the Drawings.

3.04 INSTALLATION

A. Vehicle Tracking Pad.
   1. The rock area shall be a minimum of 6 inches deep, extend the full width of the ingress/egress area and be at least 30 ft long; however, longer entrances may be required to adequately clean tires.
   2. Geotextile fabric may be used to prevent migration of mud from the underlying soil into the rock.

B. Storm Sediment Filters.
   1. Sandbags.
      a. Place around inlet providing a minimum of 12 inch horizontal clearance.
      b. Place a minimum of 3 bags in height with staggered joints.
   2. Drop-in Sediment Trap.
      a. Place as recommended by the manufacturer.

C. Slope Erosion Protection.
      a. The Contractor shall install the BFM as per the manufacturer’s instructions with the following minimum guidelines:
         1) The BFM shall be applied with hydraulic spray equipment by a manufacturer’s certified applicator.
         2) Application shall be done at least 24 hours in advance of projected rainfall to allow the BFM mulch adequate time to dry.
3) The BFM mulch shall be applied into two stages (one-half rate) with ample time to dewater the first application.

4) The BFM mulch shall be applied from at least two alternate directions, preferably 90 degrees apart if possible, to ensure all soil faces are covered.

5) The installation rate of the BFM mulch shall be 3500 lbs per acre, minimum and 100% continuous coverage.

6) After the BFM mulch is applied and dried for 24 to 48 hours, the Owner’s Representative will sample and quantify a portion of the installation to ensure the minimum 3500 lbs per acre has been applied. If it is found that the desired 3500 lbs per acre has not been achieved, the Contractor shall apply an additional amount to equal the desired 3500 lbs per acre within 48 hours of receiving the test results. The Contractor will not be paid extra mobilization costs for spraying additional material.

2. Erosion Control Blanket.
   a. The Contractor shall install the blanket as per the manufacturer's instructions with the following minimum guidelines:
      1) The Contractor shall roll out or lay the blankets parallel to the direction of water flow.
      2) The blankets shall be spread evenly without stretching and so the fibers are in direct contact with the soil over the entire area.
      3) Adjacent strip edges shall overlap each other at least 4 inches.
      4) Strip ends shall overlap each other at least 7 inches.
      5) All overlaps shall be made with the upgrade strip placed over the down grade strip intervals.
      6) The Contractor shall bury the upgrade end of each blanket strip at least 6 inches in a vertical slot in the soil with the soil being pressed firmly against the embedded blanket.
      7) All joints and outer edges of the blanket shall be stapled at 3 foot intervals or less.
      8) Staples placed at junctures and strip ends shall have a maximum spacing of 16 inches.
      9) Staples shall be placed throughout the blanket at a maximum spacing of 3 feet.
     10) All staples shall be inserted flush with the ground surface.

D. Silt Fences:
   1. Store and handle fabric in accordance with ASTM D 4873.
   2. Install with top of fabric at nominal height and embedment indicated on drawings.
   3. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
E. Fiber Roll:
1. Each fiber roll shall be overlapped by 1 foot minimum and tied tightly together, to prevent flow between the fiber roll ends.
2. Fiber rolls shall be trenched and staked according to manufacturer’s specifications.
3. Six inch fiber rolls shall be used for sheet flow protection on backslopes and foreslopes.
4. Twelve to twenty inch fiber rolls shall be used in ditch bottoms and in areas where shallow concentrated flow is present.

3.05 MAINTENANCE

A. Inspect preventative measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
   1. All inspections and maintenance conducted during construction shall be recorded in writing and retained in accordance with the storm water permit.

B. All removed tree material shall become the property of the Contractor and shall be disposed of off-site in Contractor furnished disposal area.

C. All stumps and roots shall be removed to a minimum of 3 feet below grade.

D. Backfill excavation with suitable on-site soil materials or engineered fill compacted to a minimum of 95% of Standard Proctor Density, ASTM D698.

E. Silt Fences:
   1. Promptly replace fabric that deteriorates unless need for fence has passed.
   2. Remove silt deposits that exceed one-third of the height of the fence.
   3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff of other causes.

F. Fiber Rolls:
   1. Sediment deposits shall be removed when the deposit reaches half the height of the fiber roll or when directed by the Engineer.
   2. Fiber rolls shall remain in place until the vegetative cover is restored to 70 percent of the preexisting vegetation.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.

B. Where removal of temporary measures would have exposed soil, shape surface to an acceptance grade and finish to match adjacent ground surfaces.

END OF SECTION
DIVISION 32
EXTERIOR
IMPROVEMENTS
SECTION 32 90 00 – LANDSCAPE GRADING

PART 1  GENERAL

1.01  SUMMARY

A.  Section includes
1.  Final grade topsoil for finish landscaping.

B.  Related Sections
1.  Division 01 – General Requirements.
2.  Division 31 – Earthwork.

PART 2  PRODUCTS

2.01  MATERIAL

A.  Topsoil: Fill Type S4 as specified in Section 31 05 13.

PART 3  EXECUTION

3.01  EXAMINATION

A.  Verify structure and trench backfilling have been inspected.

B.  Verify substrate base has been contoured and compacted.

3.02  SUBSTRATE PREPARATION

A.  Eliminate uneven areas and low spots.

B.  Remove debris, roots, branches, and stones in excess of 2 inches in size. Remove subsoil contaminated with petroleum products.

C.  Scarify surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.03  PLACING TOPSOIL

A.  Place topsoil in areas where seeding and restoration is required to a nominal depth of 4 inches. Place topsoil during dry weather.

B.  Use imported topsoil in urban areas as a supplement to excavated topsoil only when a 4 inch depth is unable to be maintained.

C.  Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.

D.  Remove roots, weeks, rocks, and foreign material while spreading.
E. Manually spread topsoil close to plant life and buildings to prevent damage.

F. Lightly compact placed topsoil.

G. Remove surplus subsoil and topsoil from site. Contractor shall pay for loading, hauling, and spreading of all excess topsoil materials removed from the site or placed and spread on-site by direction of Owner or Engineer.

H. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.04 TOLERANCES
A. Top of Topsoil: Plus or minus 1 inch.

3.05 PROTECTION
A. Protect landscaping and other features remaining as final Work.

B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

END OF SECTION
SECTION 32 92 19 – SEEDING

PART 1 GENERAL

1.01 SUMMARY
A. Section includes:
   1. Seeding of all areas disturbed during construction.

B. Related Section include:
   1. Division 01 – General Requirements.
   2. Division 31 – Earthwork.

1.02 DEFINITIONS

1.03 QUALITY ASSURANCE
A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.04 REGULATORY REQUIREMENTS
A. Comply with regulatory agencies for herbicide composition.
B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Deliver grass seed mixture in sealed containers, open or damaged packaging is not acceptable.

1.06 COORDINATION
A. Coordinate work under provisions of Section 01 31 13.

PART 2 PRODUCTS

2.01 MATERIALS
A. Seed shall be furnished in labeled, standard containers. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. All seed shall be
endophyte enhanced unless noted. The pure live grass seed mixture to be used shall be as follows:

- Type I - used for residential yards
- Type II - used for commercial green spaces  
  (Type II for Water Tower Site)
- Type III - used for ditches/legal drains
- Type IV - used for CRP areas
- Type V – used as noted on plans

### Types in pounds of live seed per acre

<table>
<thead>
<tr>
<th>Seed Type</th>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
<th>Type IV</th>
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</tr>
<tr>
<td>Park Kentucky Bluegrass</td>
<td>50</td>
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<tr>
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<td>Tall Wheatgrass</td>
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<tr>
<td>Intermediate Wheatgrass</td>
<td></td>
<td></td>
<td>12.5</td>
<td>5</td>
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<tr>
<td>Bromegrass (Lincoln)</td>
<td></td>
<td></td>
<td></td>
<td>27.5</td>
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<tr>
<td>Alfalfa</td>
<td></td>
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<td>2</td>
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<tr>
<td>Sweet Clover</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Legendary Variety by Cenex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oats (temp)</td>
<td></td>
<td></td>
<td></td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Total lbs.</strong></td>
<td>130</td>
<td>135</td>
<td>50.0*</td>
<td>18</td>
</tr>
<tr>
<td><strong>Fertilizer Type</strong></td>
<td>5-10-5</td>
<td>5-10-5</td>
<td>20-20-20</td>
<td>20-20-2</td>
</tr>
<tr>
<td><strong>Fertilizer Application Rate</strong></td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>**</td>
</tr>
</tbody>
</table>

* Additional 2 lbs per acre of Canary Reed shall be used if the bottom of the channel shall be seeded.
** Apply moisture, fertilizer, and mulch, at the Contractor’s discretion, to provide the proper environment for seed germination and sustained growth.

B. Seed tags shall be provided with each bag of seed used on the project and shall be given to the engineer. Certifications shall be provided with each bag of seed used on the project. Certifications shall be provided upon request. Labels (seed tags) for seed shall contain the following:

1. Name and address of supplier
2. Lot Number
3. Origin for each kind of seed
4. Purity percentage and germination for each kind of seed
5. Date of last test
6. Pounds of bulk seed and pure live seed for each type of seed and for total mix in each bag.

C. Fertilizer – Fertilizer shall be a commercial product; partly derived from organic sources and a nitrogen-phosphorous-potassium combination as shown in the schedule above. Fertilizer shall be free flowing and suitable for application with mechanical equipment, delivered in sealed containers, each fully used and bearing the name, trade-name or trademark and warranty of producer.

D. Vegetative Mulch (Type A) - Vegetative mulch shall be composed of straw only. Straw shall be harvested stalks of oats, wheat, barley, or rye. 50% of which shall be 10 inches long or longer. Material shall be sufficiently moist to prevent anchoring without breaking. Mulch shall be applied at a rate of 2 tons per acre.
E. Hydro-Mulch (Type B) - The mulch shall be uniformly applied at a rate of one ton per acre and shall cover the entire seedbed area up to 95%. The mulch shall permit the percolation of water to the underlying soil. The mulching shall consist of a wood cellulose fiber (strands) that has not been treated with any germination or growth inhibitive substances. The mulch shall be treated with a tackifier to enhance mulch placement and adherence to the soil. The mulch shall contain no foreign matter or noxious substances or seeds that would be detrimental to seed growth. No sawdust byproduct mulch will be allowed.

F. Topsoil – If new topsoil is specified, it shall be essentially free of subsoil, organic debris, objects larger than two (2) inches in diameter, substances harmful to plant growth and any other material detrimental to grading, seeding or sodding, and maintenance operations. It shall be of the sandy loam type unless otherwise specified.

PART 3  EXECUTION

3.01 INSTALLATION

A. Preparation of Seedbed - All debris, vegetation, and stones larger than 2 inches in diameter shall be removed from the site. Ground surfaces shall conform to plan grades. The ground shall then be tilled to a depth of 4 inches, the surface after which shall be free from lumps and irregularities. If perennial weeds of any kind are present before tilling, they shall be controlled by the application of a pre-emergence herbicide at least 2 weeks before seeding. Two applications shall be required. This shall not be allowed, however, within 200 feet of streams, rivers, legal drains, or wetlands.

B. Planting Seed - Seedbed preparation and seeding shall be done between the dates of April 15th and July 1st or August 15th and September 15th. Any planting done between the dates of July 1st and August 15th shall be done so with permission in writing only and then only by the addition of 10 pounds of oats per acre to the specified amount of seed. The addition of oats shall be at the contractor's expense. Dormant fall seeding will be allowed with approval from the Engineer. Typical times of dormant seeding are from late October to early November with the soil in a cool condition. Regardless of method of application, the contractor shall reseed any areas on which growth does not occur the following year. In addition, no seed shall be sown on frozen ground. Seed shall be sown by uniformly drilling with a brillion-type seeder. No press disc drill-type seeders will be allowed. In adverse sloped areas, as determined by the engineer, broadcast seeding shall be allowed at a 20% increase in application rate. The area shall be raked or dragged after seed placement to the satisfaction of the engineer before mulch placement. It shall be the contractor's responsibility to insure that the seed grows adequately (which is defined as 50% established ground coverage the following season except for residential in which 75% coverage must be attained). No seed shall be sown during winds that are strong enough (as determined by the engineer – usually above 15 mph) to prevent it from being properly embedded in the surface.
C. Straw Mulching – The mulch shall be placed within 24 hours after the seeding has been completed. This operation shall not be done in high winds that prevent the mulch from being properly placed. Mulch that contains excessive moisture shall not be used if it prevents uniform feeding through machine. Bales shall be broken up and loosened as they are fed into blower to avoid placement of matted or unbroken lumps. The mulch shall be machine blown and shall be uniformly spread over seeded areas. Excessive cover shall be avoided. Punching or asphalt shall anchor mulch.

1. Punching – Mulch shall be punched immediately after application into soil using a mulch tiller consisting of a series of dull, flat disks with notched or cutout edges. The disks shall be approximately 20 inches in diameter, ¼ inch thick, spaced approximately 8 inches apart, and shall be fitted with scrapers. The tiller shall be operated on contour, except on slopes steeper than 3:1 where diagonal operations are required using a tractor with dual drive wheels or crawler tread on the tractor to minimize sideslip and rutting slopes. Tiller members shall be able to push the mulch into the soil 3 inches with ends of the mulch exposed above the soil surface.

2. Asphalt – Emulsion shall be applied with mulch or by spraying surface immediately after mulching. Emulsion shall be applied at a rate between 225 and 275 gallons per acre. All structures and miscellaneous items shall be protected from being marked or splattered.

D. Reseeding and Repair - Any area in which the seed does not take, or in which erosion has occurred shall be repaired and reseeded until the desired result is obtained.

E. Water - Water for seed is not available on site. The contractor shall water areas seeded as necessary to achieve the required growth. This shall be considered incidental to this item. Watering the seed shall be done by the contractor for a period of 8 weeks after seed has been sown.

F. Fertilizer - Fertilizer placement shall be done prior to seeding. For any seeding type specified, the fertilized area shall be thoroughly watered 24-48 hours after fertilizing.

G. Topsoil - Salvaging and reusing existing topsoil will be required unless a separate bid item is included in the bid schedule or other items are stipulated in the plans or Measurement & Payment section of the specifications. Topsoil shall be spread on all areas to be seeded.

END OF SECTION
SECTION 32 97 00 – RESTORATION OF DISTURBED AREAS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Restoration of all areas disturbed during construction.
   2. Restoration of all items not specifically identified for restoration, but damaged through construction.

B. Related Sections include, but are not limited to:
   1. Division 01 – General Requirements.
   2. Division 31 – Earthwork.
   4. Division 33 – Utilities.

PART 2 PRODUCTS

2.01 MATERIALS

A. Material Sections include:
   1. Topsoil and Subsoil: Per Section 31 05 13.
   2. Aggregate Materials: Per Section 31 05 16.

PART 3 EXECUTION

3.01 EXECUTION

A. Observe all surface features requiring protection, removal and replacement, and/or restoration prior to construction.

B. The Contractor shall be responsible for the preservation of all public and private property and shall protect carefully from disturbance or damage all land monuments and property marks until the Engineer has witnessed or otherwise referenced their location and shall not move them until directed.

C. The Contractor shall be responsible for all damage or injury to property of any character during the prosecution of the Work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the Work, or at any time due to defective Work or materials, and said responsibility will not be released until the Project shall have been completed and accepted.

When any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to the condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding,
or otherwise restoring as may be directed or he shall make good such damage or injury in an acceptable manner.

3.02 RESTORATION

A. Restore all areas disturbed by construction to a condition equal to or better than existed prior to construction.

B. Replace, restore, repair, or otherwise make good any damage done to any tree, bush, or shrub that is not specifically designated for removal.

C. Restore items such as culverts, road signs, power poles, sodding, fences, driveways, mailboxes, and like, whether or not specifically identified on the drawings, to a condition equal to or better than existed before construction.

D. Replace or repair all concrete or asphalt driveways, concrete sidewalks, and curb and gutter removed or damaged during construction with equal or better materials. Replace or repair to match existing conditions.

E. Stabilize subgrade sufficiently to prevent mixing of granular material with subgrade prior to application of base material.

F. Place topsoil per Section 31 05 13 and seed areas disturbed by construction in grassed areas per Section 32 92 19.

G. Prior to re-opening any section to full public access, all sidewalks, driveways, curb ramps, and curb and gutter shall be installed.

H. All damage to streets, driveways, berms, etc. due to the Contractor’s construction techniques and equipment shall be repaired at the Contractor’s expense prior to final payment.

I. Remove all excess dirt, concrete, and other debris from project site immediately upon completion of Work. Contractor shall be required to clean site to the condition prior to the start of construction before final payment will be made.

END OF SECTION
DIVISION 33
UTILITIES
SECTION 33 01 10 – DISINFECTION OF WATER UTILITY PIPING SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Disinfection of water system.
   2. Testing and reporting results.

B. Related Sections:
   1. Section 01 33 00 – Submittals Procedures.
   2. Section 01 61 00 – Common Product Requirements.
   3. Section 01 77 00 – Closeout Procedures.
   4. Section 33 10 00 – Water Utilities.

1.02 REFERENCES

A. AWWA B300 - Standard for Hypochlorites.
B. AWWA B301 - Standard for Liquid Chlorine.
C. AWWA C651 - Standards for Disinfecting Water Mains.
D. Federal Specifications BB-C-12a, O-C-114a, and O-S-602b.

1.03 DEFINITIONS

A. Disinfectant Residual means the quantity of disinfectant in treated water.
B. PPM means parts per million.

1.04 SUBMITTALS FOR INFORMATION

A. Section 01 33 00 - Submittals Procedures: Procedures for submittals.
B. Test Reports: Indicate results comparative to specified requirements.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01 33 00 and Section 01 77 00.
B. Disinfection Report:
   1. Date issued.
   2. Project name and location.
   3. Contractor’s name, address, and phone number.
   4. Type and form of disinfectant used.
   5. Date and time of disinfectant injection start and time of completion.
   6. Test locations.
7. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
8. Date and time of flushing start and completion.
9. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:
1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.

1.06 QUALITY ASSURANCE
A. Regulatory Agency Requirements: Comply with North Dakota Department of Health requirements.
B. Testing Firm: Company specializing in testing potable water systems, approved by the North Dakota Department of Health.
C. Submit bacteriologist's signature and authority associated with testing.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Protect against damage and contamination.
B. Maintain caution labels on hazardous materials.
C. Maintain storage room dry and with temperatures as uniform as possible between 60 and 80 degrees F.
D. Provide necessary signs, barricades, and notices to prevent any person from accidentally consuming water or disturbing system being treated.

PART 2 PRODUCTS
2.01 DISINFECTION CHEMICALS
A. AWWA B300, Hypochlorite: Shall conform to Federal Specification O-C-114a, Type II, Grade B, or Federal Specification O-C-602b.
PART 3 EXECUTION

3.01 PREPARATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Notify General Contractor about defects needing correction.

C. Do not start Work until conditions are satisfactory.

D. Select one form of chlorine for use in disinfection.

E. Flush mains thoroughly before introduction of chlorinating material. Maintain flushing velocity in main of not less than 2.5 feet per second unless the Engineer determines that conditions do not permit the required flow to be discharged to waste.

3.02 DISINFECTION OF INTERIOR POTABLE WATER PROCESS PIPING

A. Piping, Valves, and Fittings to be Disinfected Include:
   1. All interior process piping and connections.

B. Use of calcium hypochlorite granules for use on solvent welded plastic or on screwed joint steel pipe is prohibited because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

C. Perform disinfecting in accordance with AWWA C651 prior to start-up. Coordinate with other Contractors, Engineer, and Owner.

D. Inject treatment disinfectant into piping system to obtain 50 to 80 ppm residual.

E. Provide and attach required equipment to perform the work of this Section. Disinfectant material shall be introduced into the water system in a manner approved by the Engineer.

F. Maintain disinfectant in system for 24 hours. If disinfectant residual is less than 25 ppm, repeat system treatment.

G. All valves in the mains being disinfected shall be opened and closed several times during the contact period.

H. All water supply and distribution mains shall be disinfected with chlorine prior to acceptance by the Owner.

I. Drain and flush using fresh water pumped through the system.

J. Flush heavily chlorinated water from main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system.

K. Dispose of heavily chlorinated water properly.
L. Submit test report to Engineer.

M. Contractor shall pay all testing costs.

3.03 BACTERIOLOGICAL TESTING

A. Samples for bacteriological analysis shall be collected in sterile bottles obtained from the testing laboratory and submitted for testing.

B. Two or more successive test samples indicating bacteriological satisfactory water shall be obtained before facility is placed into operation.

C. If contamination is shown to be still present in the water supply, the disinfection procedure shall be repeated until satisfactory results are obtained.

D. Contractor shall pay all testing costs.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Ductile pipe and fittings.

B. Related Sections include, but are not limited to:
   1. Section 01 33 00 – Submittals Procedures.
   2. Section 01 45 00 – Quality Control.
   3. Section 01 61 00 – Common Product Requirements.
   4. Section 01 77 00 – Closeout Procedures.
   5. Section 31 23 23 – Fill and Backfill.
   7. Section 33 01 10 – Disinfection of Water Utility Piping System.

1.02 REFERENCES

A. Reference Standards include:
   1. ASTM A536 – Ductile Iron Castings.
   3. ASTM D2513 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.
   4. ASTM D3035 – Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
   5. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
   7. ASTM F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   8. AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
   9. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, 1/2 inch through 3 inch, for Water.
   10. AWWA C906 – Polyethylene (PE) Pressure Pipe and Fittings, 4 in. through 63 in., for Water Distribution.
   11. NSF Standard No. 60 and 61 – National Sanitation Foundation.

1.03 SUBMITTALS FOR REVIEW

A. Section 01 33 00 – Submittals Procedures: Procedures for submittals.

B. Before any materials or equipment are purchased, the Contractor shall submit a complete list of materials and equipment to the Engineer for approval. This information shall include the manufacturer’s name and the type, size, rating and catalog number for each of the following items:
   1. Gate valves and boxes.
   2. Pipe and fittings.
C. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories.

1.04 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01 77 00 – Closeout Procedures: Procedures for submittals.

B. Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with Section 01 45 00.

B. Valves: Manufacturer’s name and pressure rating marked on valve body.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01 61 00 – Common Product Requirements.

B. Deliver and store valves in shipping containers with labeling in place.

1.07 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

PART 2 PRODUCTS

2.01 DUCTILE IRON PIPE (DIP)

A. Approved Manufacturers
   1. American Cast Iron Pipe Company
   2. McWane Ductile
   3. U.S. Pipe
   4. Approved Equivalent.

B. Pipe
   1. Pipe shall be in accordance with AWWA/ANSI C111/A21.11, AWWA/ANSI C150/A21.15, and AWWA/ANSI C151/A21.51.
   2. All Pipe shall meet requirements of NSF 61.
   3. Pipe shall have a lay length of 18 feet or 20 feet except for special fittings or closure pieces and necessary to comply with the drawings.
   4. Polyethylene encase (wrap) all buried pipe and fittings.
5. As a minimum the following pressure classes apply. The drawings may specify a higher pressure class or the pressure and deflection design criteria may also require a higher pressure class, but in no case should they be less than the following:

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<thead>
<tr>
<th>Pipe Diameter (inches)</th>
<th>Minimum Pressure Class (psi)</th>
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<tbody>
<tr>
<td>3 – 12</td>
<td>350</td>
</tr>
<tr>
<td>14 – 20</td>
<td>250</td>
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<tr>
<td>24</td>
<td>200</td>
</tr>
<tr>
<td>30 – 64</td>
<td>150</td>
</tr>
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</table>

6. Pipe markings shall meet the minimum requirements of AWWA/ANSI C151/A21.51. Minimum pipe markings shall be as follows:
   a. “DI” or “Ductile” shall be clearly labeled on each pipe
   b. Weight, pressure class and nominal thickness of each pipe
   c. Year and country pipe was cast
   d. Manufacturer’s mark

7. Pressure and Deflection Design
   a. Pipe design shall be based on trench conditions and design pressure specified in the drawings.
   b. Pipe shall be designed according to AWWA/ANSI C150/A21.5, AWWA/ANSI C151/A21.51, and AWWA M41 for trench construction, using the following parameters:
      1) Unit weight of fill (w) = 130 pcf
      2) Live Load = AASHTO HS 20
      3) Trench Depth = as indicated on drawings
      4) Bedding Conditions = Type 4
      5) Working Pressure (Pw) = 150 psi
      6) Surge Allowance (Ps) = 100 psi
      7) Design Internal Pressure (Pi) = Pw + Ps or 2:1 safety factor of the actual working pressure plus the actual surge pressure, whichever is greater.
      8) Maximum calculated deflection (Dx) = 3 percent
      9) Restrained Joint Safety Factor = 15 percent
   c. Trench Depths shall be verified after existing utilities are located.
      1) Vertical alignment changes required because of existing utility or other conflicts shall be accommodated by an appropriate change in pipe design depth.
      2) In no case shall the pipe be installed deeper than it allows.

8. Provisions for Thrust Restraint
   a. Thrust at bends, tees, plugs or other fittings shall be mechanically restrained joints when required by drawings.
   b. Thrust at bends adjacent to casing pipe shall be restrained by mechanical means through casing and for a sufficient length each side of casing.
   c. No thrust restraint contribution shall be allowed for the restrained length of pipe within the casing.
d. Restrained joints, when required, shall be used for a sufficient distance from each side of the bend, tee, plug, valve or other fitting to resist thrust which will be developed at the design pressure of the pipe. For the purpose of thrust the following shall apply:

1) Valves shall be calculated as dead ends
2) Design pressure shall be greater than the working pressure of the pipe or the internal pressure (Pi) whichever is greater.
3) Restrained joints shall consist of approved mechanical restrained or push-on restrained joints.

e. The pipe manufacturer shall verify the length of pipe with restrained joints to resist thrust in accordance with drawings, AWWA M41, and the following:

1) The weight of earth (We) shall be calculated as the weight of the projected soil prism above the pipe for unsaturated soil conditions.
2) Soil density = 130 pcf (maximum value to be used for unsaturated soil conditions.
3) If indicated on the drawings and the geotechnical borings that ground water is expected, account for reduced soil density.

9. Joints
   a. General – Comply with AWWA/ANSI C111/A21.11
   b. Push-On Joints
      1) Fastite Joint Pipe
      2) Tyton Joint Pipe
   c. Mechanical Joints
   d. Restrained Joints
      1) Flex-Ring Joint Pipe
      2) Lok-Ring Joint Pipe
      3) TR Flex Joint Pipe
      4) HP Lok Joint Pipe
   e. Flanged Joints – AWWA/ANSI C115-A21.15, ASME B16.1, Class 125
      1) Flanged bolt circles and bolt holes shall match those of ASME B16.1, Class 125.
      a) Field Fabricated flanges are prohibited.

10. Gaskets
   a. All rubber joint gaskets utilized on Ductile Iron Pipe shall be in conformance with AWWA/ANSI C111/A21.11
   b. Flanged Gaskets
      1) Full Face
      2) Manufactured true to shape from minimum 80 durometer SBR rubber stock of a thickness not less than 1/8 inch
      3) Virgin Stock
      4) Conforming to the physical and test requirements specified in AWWA C111/A21.11
5) Finished Gaskets shall have holes punched by the manufacturer and shall match the flange pattern in every respect.

6) Frayed cut edges resulting from job site gasket fabrication are not acceptable.

c. Furnish hydrocarbon resistant gaskets, when required.

11. Bolts and Nuts
   a. See accessories section in this specification.

12. Ductile Iron Pipe Exterior Coatings
   a. All ductile iron pipe shall have an asphaltic coating, minimum 1 mil thick, on the pipe exterior, unless otherwise specified on the drawings.

13. Ductile Iron Pipe Interior Lining
   a. Cement Mortar Lining
      1) Ductile Iron Pipe for potable water shall have a cement mortar lining in accordance with AWWA/ANSI C104/A21.04 and be acceptable according to NSF 61.
   b. Ceramic Epoxy or Epoxy Linings
      1) Ductile Iron Pipe for use in wastewater applications shall be lined with a Ceramic Epoxy or Epoxy Lining Protecto 401 Ceramic Epoxy Lining
      2) Apply lining at a minimum of 40 mils DFT
      3) Due to the tolerances involved, the gasket area and spigot end up to 6 inches back from the end of the spigot end must be coated with 6 mils nominal, 10 mils maximum using a joint compound as supplied by the manufacturer. Apply the compound by brush ensuring a smooth finish without excess buildup in the gasket seat or on the spigot ends.
      4) Coat the gasket seat and spigot ends after the application of the lining.
      5) Surface preparation shall be in accordance with the manufactures recommendations.
      6) Check thickness using a magnetic film thickness gauge in accordance with method outline in SSPC PA 2. Test the interior lining of all pipe barrels for pinholes with a non-destructive 2,500 volt test. Repair any defects prior to shipment.
      7) Mark each fitting with the date of application of the lining system along with its numerical sequence of application on the date and records maintained by the applicator of his work.
      8) For all ductile iron pipe in wastewater service where the pipe has been cut, coat the exposed surface with the touch-up material as recommended by the manufacturer.
2.02 DUCTILE IRON FITTINGS

A. Approved Manufacturers
1. American Cast Iron Pipe Company
2. McWane/Tyler Ductile
3. U.S. Pipe
4. Sigma Corporation
5. Star Pipe Products
6. EBAA Iron, Inc.
8. Approved Equivalent

B. Fittings
1. Fittings shall be in accordance with AWWA/ANSI C110/A21.10, AWWA/ANSI C153/A21.53.
2. Fittings for potable water service shall meet requirements of NSF 61.
3. Fittings at a minimum shall meet or exceed the pressure classes of the pipe which the fitting is connected, unless specifically indicated on the drawings.
4. Polyethylene encase (wrap) all buried pipe and fittings.
5. Fittings Markings
   a. Meet the minimum requirements of AWWA/ANSI C151/A21.51
   b. Minimum Markings shall include:
      1) "DI" or "Ductile" cast or metal stamped on each fitting
      2) Applicable AWWA/ANSI standard for that fitting
      3) Pressure rating
      4) Number of degrees for all bends
      5) Nominal diameter of the openings
      6) Year and country fitting was cast
      7) Manufacturers mark

6. Joints
   a. Push-On Joints
      1) Comply with AWWA/ANSI C111/A21.11
   b. Mechanical Joints
      1) Comply with AWWA/ANSI C111/A21.11
   c. Mechanical Joints with mechanical restraint.
      1) Restraint devices shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110-A21.10.
      2) The devices shall have the following working pressure ratings based on size and type of pipe:
         a) Ductile Iron Pipe
            a. 3" – 16”, 350 psi
            b. 18” – 48”, 250 psi
            c. 54”, 200 psi
         b) PVC C900 and C905
            a. 3” – 16”, 235 psi
      3) Ratings are for water pressure and must include a minimum safety factor of 2:1 in all sizes.
4) Restraint devices shall have specific designs for ductile iron and PVC and should be easily differentiate between the two.

5) Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536

6) Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

7) Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

d. Push-On Restrained Joints
1) Restraining Push-On Joints by means of a special gasket.
2) Pressure rating shall exceed the working and test pressure of the pipeline.
3) Approved Manufacturers Products:
   a) Flex-Ring Joint Pipe
   b) Lok-Ring Joint Pipe
   c) TR Flex Joint Pipe
   d) HP Lok Joint Pipe

e. Push-On Restrained Joint bell and spigot
1) Pressure rating shall exceed the working and test pressure of the pipeline.

f. Flanged Joints
1) AWWA/ANSI C115/A21.15, ASME B16.1, Class 125
2) Flange bolt circles and bolt holes shall match those of ASME B16.1, Class 125
   a) Field fabricated flanges are prohibited

7. Gaskets
   a. See Ductile Iron Pipe

8. Bolt and Nuts
   a. See accessories section in this specification.

9. Ductile Iron Fittings Exterior Coatings
   a. See Ductile Iron Pipe

10. Ductile Iron Fittings Interior Lining
    a. See Ductile Iron Pipe

11. Ductile Iron Fittings Polyethylene Encasement
    a. Polyethylene encase (wrap) all buried pipe and fittings.

2.03 BEDDING AND BACKFILL MATERIALS

A. Bedding: Fill Type S1 and Type S2, as specified in Section 31 05 13.

B. Backfill: Fill Type S1 and Type S2, as specified in Section 31 05 13.

2.04 ACCESSORIES

A. Concrete for Thrust Restraints and Splash Pads: Premixed bagged concrete consisting of aggregate and Type I Portland cement.
B. Bolts: Stainless steel underground bolts, including all bolts on fittings, valves, hydrants, and transition couplers. Properly lubricated bolts to prevent seizing.

PART 3  EXECUTION

3.01 EXAMINATION

A. Verify existing conditions under provisions of Section 01 31 19.

3.02 PREPARATION AND STORAGE

A. Store pipe on-site on flat surface so barrel is evenly supported. Do not stack higher than 6 feet. Cover pipe with opaque material for extended storage.

B. Remove scale and dirt on inside and outside before assembly. Inspect for damage to pipe and other materials before installation.

C. Store all valves and appurtenances according to manufacturer’s recommendations.

3.03 INSTALLATION - PIPE AND APPURTENANCES

A. Install all pipe and appurtenances in strict accordance with manufacturer's recommendations.

B. Install water pipe at a minimum cover depth of 90 inches below finished grade to top of pipe. In areas of graveled or compacted driveways and parking lots, pipe depths shall be increased to a minimum cover of 96 inches. Construct to lines, grade, and dimensions as detailed on construction Drawings.

C. Take up and relay any pipe disturbed from its required grade or alignment.

D. Keep trenches free from water until pipe jointing is complete.

E. Securely close open ends of pipe and fittings when work is not in progress.

F. Cut pipe in a neat and workmanlike manner by an approved mechanical cutting machine.

G. Install pipe to allow for expansion and contraction without stressing pipe or joints.

H. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main per drawing details.

I. Grade water main to avoid high spots and air pockets.

J. Install water main and appurtenances so as to avoid existing utilities.

K. Install pipe such that maximum deflections from straight line or grade do not exceed manufactures specifications. Install bend fittings where maximum deflections are exceeded.
L. Provide adequate adapters and couplers for connections of different pipe types and sizes.

M. Excavate and backfill trench in accordance with Section 31 23 33.

3.04 DISINFECTION OF SYSTEM WATER LINES

A. Flush and disinfect water system in accordance with relevant specification sections.

3.05 FIELD QUALITY CONTROL

A. Section 01 45 00 - Quality Control.

3.06 HYDROSTATIC TESTING

A. Subject newly laid pipe to a leakage and hydrostatic pressure test for a period of two hours at a minimum pressure of 1.5 times or 50 psi greater than the normal working pressure of the installed line, whichever is greater, but not greater than the pressure rating of the pipe.

B. Fill water main with water a minimum of 24 hours before the test and expel all air from the main.

C. Locate and repair any defective areas if test fails.

D. Retest after completion of repairs.

E. Repeat procedure until tests pass.

3.07 DATA FOR AS-BUILT RECORDS

A. Record stationing of all fittings, valves, and other underground appurtenances installed on sheets provided for such purposes by the Engineer.

END OF SECTION
DIVISION 40
PROCESS
INTEGRATION
PART 1  GENERAL

1.01  SUMMARY

A. Section includes furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:
1. Pipe, fittings, wall pipes, and connections associated with interior Work.

B. Related sections include:
1. Section 01 11 00 – Summary of Work.
2. Section 01 33 00 – Submittal Procedures.
3. Section 01 45 00 – Quality Control.
4. Section 01 61 00 – Common Product Requirements.
5. Section 01 77 00 – Closeout Procedures
6. Section 01 78 23 – Operations and Maintenance Data
7. Section 09 96 00 – Protective Coating Systems.
8. Section 40 27 20 – Process Valves.
10. Section 40 27 89 – Process Pipe Specialties.

1.02  REFERENCES

A. Reference Standards include:
1. American National Standards Institute (ANSI)
2. American Society of Mechanical Engineers (ASME)
3. American Society for Testing Materials (ASTM)
4. American Water Works Association (AWWA)
5. American Welding Society (AWS)
6. National Sanitation Foundation (NSF)
7. ANSI B18.22.1: Plain Washers.
8. ANSI/ASME B1.20.1: Pipe Threads, General Purpose (inch).
12. ANSI/AWWA C110/A21.10: Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm through 1,219 mm), for Water.
16. ANSI/AWWA C151/A21.51: Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds for water or other liquids.
17. AWWA C600: Installation of Ductile-Iron Water Mains and Their Appurtenances.
18. AWWA C606: Grooved and shouldered type joints.
20. AWWA C653: Disinfection of Water Treatment Plants.
21. NSF Standards No. 60 and 61 – National Sanitation Foundation.

1.03 QUALITY ASSURANCE


B. Employ certified welders.

C. Piping modifications subject to Engineer’s review. No additional compensation allowed for modifications required to suit equipment furnished by Contractor.

1.04 SUBMITTALS

A. Submit Shop Drawings in accordance with Section 01 33 00 – Submittal Procedures for all pipe and fittings indicating: Name of Manufacturer, Materials, Standard Dimensions, References, and Joint Data.

B. Submit Affidavit of Compliance for ductile iron pipe and fittings.

C. Submit design calculations for structural design of pipe thickness where pipe class or thickness is not specifically called out.

D. Submit detailed piping layout drawings showing piping and connections to equipment and appurtenances.

1.05 PAINTING AND IDENTIFICATION SYSTEMS

A. All material and equipment in this section shall be factory primed. Primer shall be compatible with finish coats of paint provided under Section 09 96 00 – Protective Coating Systems.

B. The Contractor shall refinish and restore to the original appearance all equipment that has sustained damage to the manufacturer's finish or prime coats of paint or enamel.

C. Finish painting of all materials and equipment in this Section shall be the responsibility of the Contractor, and shall be as described in Section 09 96 00 – Protective Coating Systems, unless otherwise specifically indicated.

1.06 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a Public Water System shall meet ANSI/NSF International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.
2.01 PIPE SCHEDULE

A. Process Piping:
   1. Ductile Iron Pipe.

2.02 DUCTILE IRON PIPE AND FITTINGS

A. Approved Manufacturer:
   1. American Ductile Iron Pipe Company
   2. Approved Equivalent.

B. General
   1. Minimum Pressure Class (Pounds per Square Inch – PSI):
      a. Interior and exterior, flanged:
         1) 12-inch diameter and smaller: 350 PSI.
         2) 14-inch diameter and larger: 250 PSI.
      b. Buried, mechanical, and push-on joints:
         1) 12-inch diameter and smaller: 350 PSI.
         2) 14-inch diameter and larger: 250 PSI.
   2. On-site inspection of all materials by Contractor.
   3. Pipe coating:
      a. Buried and submerged: bituminous coating (asphalt coating).
      b. Interior and exposed: prime coat.
   4. Bolts and nuts:
   6. Submit design calculation for structural design of pipe thickness where pipe thickness or class is not specifically called out.
   7. Mechanical joint glands: ductile iron retainer type.
   8. Polyethylene encase (wrap) all buried pipe and fittings.
   9. Pipe and fittings to match face and drill of valves.
   10. All flanges shall be full-faced flanges.
   11. All materials to be new and unused.
   12. Pipe and fitting material: ductile iron.


   1. Minimum Class: Class 53.

E. Fittings:
   1. Flanged fittings:
      b. Full face gaskets, bolts, and nuts: AWWA C110, Appendix A.
      c. Material: ductile iron.
   2. Reducers: all reducers shall be concentric pattern unless noted otherwise on the Project Drawings.
F. Coatings and Linings:
4. Prime coat: per Section 09 96 10 - Protective Coating Systems.

G. Joints - Pipe and Fittings:
3. Mechanical joints with tie rods:
   c. Threaded connections
      1) ANSI/ASME B1.20.1, NPT
   d. See details on Project Drawings.
5. Provide type of joint as indicated on Project Drawings.
6. Use of grooved and shouldered joints is acceptable where approved by Engineer.
   a. Conform to AWWA C606.
7. The Engineer will only accept Uni-Flanges or approved equivalent at locations that receive prior approval.

H. Wall sleeves: wall sleeve shall be provided where ductile iron pipe passes through concrete walls unless a wall pipe is used.

2.03 FLANGE INSULATING GASKET KITS

A. Approved Manufacturer:
1. Advance Products & Systems.
2. Approved Equivalent.

B. Size: per diameter of flange.

C. Pressure rating: meet minimum pressure rating of attached piping.

D. Provide to meet either full-faced or raised faced portion of flange.
1. Full-Faced Gasket
   a. Type E gaskets.
   b. Precision cut bolt holes.
   c. Material: plain face or Neoprene face phenolic.
2. Raised Face Portion
   a. Type F gaskets.
   b. Inside diameter of the bolt hole circle should be slightly smaller than the outside diameter of the gasket, assuring an exact, automatic positioning of the gasket.
   c. Material: plain face or Neoprene face phenolic.
E. Provide insulating sleeve and washer with the single insulation sets.
   1. Material: high density polyethylene (HDPE), phenolic, and Mylar.
   2. Provide with each set a 1/8” thick S.A.E. electro-plated steel washer.

PART 3  EXECUTION

3.01 PREPARATION

A. Make necessary field measurements to determine pipe laying lengths; fabricate pipe; deliver pipe to site; store pipe with ends capped to prevent contamination and damage to interior; prepare pipe for installation; work pipe into place without forcing or springing.

B. Do not store or ship small diameter pipe inside larger diameter pipe.

C. Ream pipe and tube ends. Remove burrs. Repair lining at pipe cuts.

D. Remove scale and dirt, inside and outside, before assembly.

E. Remove welding slag or foreign material from pipe and fitting materials.

F. Remove temporary preservative coatings from valves, fittings, and appurtenances prior to installation.

G. Clean, repair, or replace equipment malfunctioning due to presence of foreign material left in piping during installation or entering piping after installation due to Contractor's work at no cost to Owner.

3.02 DUCTILE IRON PIPE AND FITTINGS

A. Joints:
   1. Buried: push-on or mechanical.
   2. Interior submerged: flanged.
   3. Interior exposed: flanged or grooved and shouldered, except where indicated otherwise on the Project Drawings.

B. Mechanical Joints:
   1. Carefully assemble in accordance with the manufacturer’s recommendation.
   2. Bolts shall be uniformly tightened to the torque values listed in Appendix A of ANSI/AWWA C111/A21.11. Overtightening of bolts to compensate for poor installation practice will not be permitted.
   3. The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods.

C. Flanged Joints:
   1. Pipe shall extend completely through screwed-on flanges. The pipe end and flange face shall be finish machined in a single operation. Flange faces shall be flat and perpendicular to the pipe centerline.
2. Care shall be taken to avoid restraint on the opposite end of the pipe or fitting which would prevent uniform gasket compression or would cause unnecessary stress in the flanges when bolting flanged joints.

3. One flange shall be free to move in any direction while the flange bolts are being tightened. Bolts shall be gradually tightened and at a uniform rate, to ensure uniform compression of the gasket.

4. Special care shall be taken when connecting piping to pumping equipment to ensure that piping stresses are not transmitted to the pump flanges. All connecting piping shall be permanently supported so that accurate matching of bolt holes and uniform contact over the entire surface of the flanges is obtained before any bolts are installed in the flanges.

D. Penetrations:
   1. Install pipe straight through concrete walls or floors.
   2. Provide wall sleeves where ductile iron pipe passes through concrete walls and floors, unless specified otherwise on Project Drawings.
   3. Extend pipe such that the end extends 4" beyond the face of the wall unless specified otherwise on Project Drawings.
   4. Install embedded wall flange in center of wall or floor and grout in place when embedded wall pipe flange shown on Project Drawings.
   5. Fabricate wall pipes to dimensions required.

E. Support pipe at fittings with rods; anchor and support in accordance with Section 40 27 87 – Process Pipe Supports, Anchors, and Sleeves.

F. Pipe and fittings to match face and drill of valves and appurtenances.

3.03 THREADED JOINTS

A. Pipe threads shall conform to ANSI/ASME B1.20.1, NPT, and shall be fully and cleanly cut with sharp dies. Not more than three threads at each pipe connection shall remain exposed after installation. Ends of pipe shall be reamed after threading and before assembly to remove all burrs.

B. Threaded joints in plastic piping shall be made with Teflon thread tape applied to all male threads. At the option of the Contractor, threaded joints in other piping may be made up with Teflon thread tape, thread sealer, or a suitable joint compound. Thread tape and joint compound or sealers shall not be used in threaded joints that are to be seal welded.

3.04 DISSIMILAR PIPE CONNECTIONS

A. Provide non-conducting connections or flange insulating gasket kits wherever jointing dissimilar metals in open systems.
3.05 TESTING

A. Hydrostatically test each entire line in accordance with AWWA C600-99.

B. All joints shall be watertight and free from leaks. All leaks shall be repaired by and at the expense of the Contractor.

C. All pipe, fittings, valves, pipe joints, and other materials which are found to be defective shall be removed and replaced with new and acceptable materials, and the affected portion of the piping retested by and at the expense of the Contractor.

END OF SECTION
SECTION 40 27 20 – PROCESS VALVES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Furnishing and installation of the following, in accordance with the provisions of the Contract Documents.
      a. Swing Check Valves.
      b. Eccentric Plug Valves.
      c. Resilient Seated Gate Valves.
      d. Electric Valve Actuators.

B. Related Sections include:
   1. Section 01 11 00 – Summary of Work.
   2. Section 01 33 00 – Submittal Procedures
   3. Section 01 45 00 – Quality Control.
   4. Section 01 61 00 – Common Product Requirements.
   5. Section 01 77 00 – Closeout Procedures
   6. Section 01 78 23 – Operations and Maintenance Data
   7. Section 09 96 00 – Protective Coating Systems.
  10. Section 40 27 89 – Process Pipe Specialties.

1.02 REFERENCES

A. Reference Standards include:
   1. AWWA C509: Resilient-Seated Gate Valves for Waterworks Service, 2 inches through 24 inches NPS.
   5. AWWA C800: Underground Service Line Valves and Fittings.

1.03 SUBMITTALS

A. Shop Drawings and Product Data: Submit in accordance with Section 01 33 00, detailed specifications, drawings, and data covering all materials, parts, devices, equipment, and other accessories forming part of equipment for the complete operational system. Include name of Manufacturer, references, and any additional relevant information.
B. Operations and Maintenance Data: Submit in accordance with Section 01 78 23 on all parts, devices, equipment and other accessories forming each complete operational system. Include a complete write-up of how the system is to operate and how to make adjustments.

1.04 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.

B. Unless otherwise indicated, use valves suitable for 150 psi minimum working pressure.

2.02 VALVE CONNECTIONS

A. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use full-port size valves unless otherwise specified.

B. Thread pipe sizes 1-1/2 inches and smaller unless indicated otherwise.

C. Flange pipe sizes 2 inches and larger unless indicated otherwise.

2.03 SWING CHECK VALVES

A. Swing type with spring and lever, non-slamming design.

1. Approved Manufacturer and Type:
   a. APCO Model CVS-250A Series Swing Check Valve.
   b. Crispin SWC Series Swing Check Valve.
   c. Clow Horizontal Swing Check Valve.
   d. Pratt Series 9001 Swing Check Valve.
   e. Val-Matic.
   f. Approved Equivalent.

2. Design:
   a. Lever and spring design.
   b. Body and Cover: Ductile Iron, ASTM A536, Grade 65-45-12; or Cast Iron ASTM A126 Class B.
   c. Disc and Disc Arm: Ductile Iron A536; Cast Iron ASTM A126 Class B.
e. Disc Seat: Buna-N.
f. Internal Components: Stainless Steel.
g. Flow area through body: equal to or greater than area of equivalent size pipe.
h. End Connections: Flanged ends.
i. 150 psi rating.
j. NSF/ANSI 61 Certified.

2.04 ECCENTRIC PLUG VALVES

A. Approved Manufacturers:
   2. Clow.
   3. Crispin Series 800.
   4. Pratt.
   5. DeZurik.
   6. Approved Equivalent.

B. Design:
      b. Interior Coating: Epoxy suitable for potable water service or fully neoprene rubber lined.
   4. Stem Seal Packing: Nitrile-butadiene (Buna) filled PTFE U-ring seal or meet AWWA C504.
   6. Valve operator:
      a. Type: Electric Motor Actuator, as specified below.
      b. NSF/ANSI 61 Certified.

2.05 RESILIENT SEATED GATE VALVES

A. Design
   1. Minimum working pressure of 200 psi for 4-inch to 12-inch valves and 250 psi for valves larger than 12-inch.
   2. Valve body and rubber-encapsulated wedge constructed of ductile iron or cast iron.
   3. Resilient seat gate, bubbletight closure design.
   4. Meet or exceed the ANSI/AWWA C509 standards.
   5. Bronze stem and stem.
   7. Equipped with non-rising stem with handwheel, open left (counter clockwise) rotation.
   8. Flanged joints as shown on the plans.
10. NSF/ANSI 61 Certified.

B. Approved manufacturers:
   1. American Flow Control
   2. Mueller Company
   3. Waterous Valve Company
   4. A.P. Smith Valve Company
   5. American-Darling Valve
   6. Approved Equivalent

2.06 ELECTRIC VALVE ACTUATORS

A. Reference Standards:
   1. Electric motor actuators shall conform to applicable requirements of ANSI/AWWA C542.

B. Typical Valve Actuator:
   1. Modulating Valves
      a. All Sizes:
         1) Standard Electric Actuator shall be provided.
         2) Provide with limit switches for end of travel, position signal (4-20 mA) to indicate percent open, and mechanical means to actuate valve.

C. Standard Electric Actuators:
   1. Approved Manufacturers:
      a. Rotork Actuation, IQT Series.
      b. Auma, SAR/SQR Series.
      c. Approved Equivalent.
   2. Complete with motor, gearing, integral reversing starters, local control facilities, local position indicator, NEMA 6 enclosure, and a separately sealed terminal compartment with terminals for remote control and indication connections.
   3. Provide externally adjustable mechanical stops to prevent over travel.
   4. Motor actuators are to be powered from a nominal 120 volt, single phase, and 60 Hertz power supply.
   5. Designed to automatically actuate plug valve requiring between fully opened and fully closed positions.
   6. Designed for modulated position operation.
   7. Designed with torque limiting feature that prevents valve or actuator damage, if any obstruction interferes with normal valve rotation, in either direction.
   8. Provide padlockable manual override to enable the valve to be manually operated. The override shall have clutch to disengage the motor before manual operator can be engaged. Motor operation shall automatically disengage manual drive.
   9. Equip with limit switches to indicate open and closed positions.
   10. The actuator shall have an internal 24 VDC power supply for remote control functions. The internal supplies shall be protected against
overcurrent and short circuit faults. Terminals shall be included to connect the electronic controls package.

11. Valve position shall be displayed on the actuator enclosure as a percent of open, 0-100 percent.

12. Motors shall be capable of 1200 cycles per hour without overload or damage.

13. Equip with solid state starter.

14. Provide with automatic phase correction, single phase protection, instant motor reversal protection, torque switch hammer protection, and voltage spike protection.

15. Furnish and Install manufactured base plate for each actuator.

16. Controller.
   a. Each valve shall be furnished with a circuit breaker disconnect and a reversing controller located either inside the actuator housing or mounted on the housing in a NEMA Type 4 enclosure. The controller shall be equipped with:
      1) A motor overload protective device in each phase, and a normally open overload contact.
      2) A terminal block with connectors for all external controls. All leads from the actuator motor and limit switch assembly shall be routed to terminal connections in the controller for external connections to all other control devices.
   b. Reversing controllers shall be both mechanically and electrically interlocked and provided with the necessary direct-operated auxiliary contacts for required interlocking and control.
   c. “Open-Stop-Close” push buttons or switch and a “Local-Off-Remote” selector switch and red and green indicating lights shall be furnished as a part of the enclosure.
   d. Valve controllers shall be expressly selected for long life and reliable, maintenance-free service under rugged service conditions.

PART 3  EXECUTION

3.01 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted (does not apply to plug valves).

B. Install valves in the locations and configurations shown on Drawings.

C. Provide adequate structural support of installed valves as required.

D. Install valves per manufacturer's recommendations.

3.02 STARTING AND ADJUSTING

A. Furnish Owner and Engineer with a written report prepared by equipment supplier certifying that equipment:
   1. Has been properly installed.
2. Is in accurate alignment.
3. Is free from an undue stress imposed by connecting piping, anchor bolts, etc.
4. Has been operated through at least two complete open/close cycles.
5. Checked for leakage

3.03 CLASSROOM AND DEMONSTRATION TRAINING

A. Provide minimum four (4) hours classroom and demonstration training on the proper operation and maintenance of equipment. Training to be completed after completion of starting and adjusting.

3.04 PAINTING

A. All material and equipment in this section shall be factory primed. Primer shall be compatible with finish coats of paint provided under Section 09 90 02 – High Performance Painting and Coating.

B. Finish painting of all materials and equipment in this Section that are not concealed shall be the responsibility of the General Contractor, and shall be as described in Section 09 90 02 – High Performance Painting and Coating, unless otherwise specifically indicated. The Contractor shall, however, refinish and restore to the original appearance, all equipment that has sustained damage to the manufacturer's finish or prime coats of paint or enamel.

END OF SECTION
SECTION 40 27 87 – PROCESS PIPE SUPPORTS, ANCHORS, AND SLEEVES

PART 1  GENERAL

1.01  SUMMARY

A. Section includes:
   1. Pipe and equipment hangers, supports, and associated anchors.
   2. Sleeves and seals.

B. Related Sections include:
   1. Section 01 33 00 – Submittal Procedures.
   2. Section 05 50 00 – Metal Fabrications.
   3. Section 09 96 00 – Protective Coating Systems.
   5. Section 40 27 89 – Process Pipe Specialties.

1.02  REFERENCES

A. Reference Standards include:
   1. ANSI B 31.10: Pipe Supports.
   2. ASTM A36: Structural Steel.
   3. ASTM A325: High Strength Bolts for Structural Steel Joints.

1.03  SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

PART 2  PRODUCTS

2.01  PIPE HANGER SUPPORTS

A. In certain locations, pipe supports, anchors and expansion joints have been indicated on the Drawings, but no attempt has been made to indicate every restraint, anchor, and expansion joint. It shall be the Contractor’s responsibility to provide a complete system of pipe supports, to provide expansion joints, and to anchor all piping in accordance with the requirements set forth herein. Additional pipe supports may be required adjacent to expansion joints, couplings, or valves.

B. Concrete and fabricated steel supports shall be as indicated on the Drawings, as specified in other Sections, or, in the absence of such requirements, as permitted by the Engineer.

C. All piping shall be rigidly supported and anchored so that there is no movement or visible sagging between supports.

D. Materials
   1. Unless otherwise specified, all pipe supports shall comply with ANSI/MSS SP-58 and MSS SP-69. Materials of construction for fabricated steel supports are covered in the structural and miscellaneous metals section.
All pipe support materials shall be packaged as necessary to ensure delivery in satisfactory condition.

2. Unless otherwise specified or indicated on the Drawings, pipe supports shall be fabricated of manufacturer’s standard materials and provided with galvanized finish or be fabricated of stainless steel.

3. Design loads for inserts, brackets, clamps, and other support items shall not exceed the manufacturer’s recommended loads.

4. Pipe supports shall be manufactured for the sizes and types of pipe to which they are applied. Strap hangers will not be acceptable. Threaded rods shall have sufficient threading to permit the maximum adjustment available in the support item.

5. Unless otherwise acceptable to the Engineer, the use of supports that rely on stressed thermoplastic components to support the pipe will not be acceptable.

6. Contact between dissimilar metals, including contact between stainless steel and carbon steel, shall be prevented. Supports for brass or copper pipe or tubing shall be copper plated. Portions of pipe supports which come into contact with other metals that are dissimilar shall be rubber or vinyl coated.

7. Concrete inserts or L-shaped anchor bolts shall be used to support piping from new cast-in-place concrete. Expansion anchors shall be used to fasten supports to existing concrete and masonry.

8. Anchorage shall be provided to resist thrust due to temperature changes, changes in diameter or direction, or dead-ending. Anchors shall be located as required to force expansion and contraction movement to occur at expansion joints, loops, or elbows, and as required to prevent excessive bending stresses and opening of mechanical couplings.

Anchorage for temperature changes shall be centered between elbows and mechanical joints used as expansion joints.

E. Manufacturer and Type:
1. Anvil International, Catalog PH-5.10, or prior approved equivalent.
   a. Light welded steel bracket: Figure 194.
   b. Medium welded steel bracket: Figure 195
   c. Heavy welded steel bracket: Figure 199
   d. Concrete Inserts: Figure 281.
   e. Offset Pipe Clamp: Figure 103.
   f. Adjustable Clevis Hanger: Figure 260.
   g. Stainless Steel Hanger Rods.

2.02 FLOOR PIPE SUPPORTS

A. Approved Manufacturer and Type:
1. Anvil International, adjustable pipe saddle support: Figure 264.
3. Approved Equivalent.

B. Minimum vertical adjustment: 4½ inch.

C. Provide complete with riser pipe and flange bolts for floor mounting.
D. Provide precast concrete or grout base a minimum of 1” above floor.

E. Provide as per recommended spacing, at minimum. Contractor shall install a minimum of one floor pipe support per pump discharge piping prior to the header piping.

F. Contractor may also be required to construct concrete saddle pipe supports for floor piping as indicated on the Drawings. Contractor to provide all materials, formwork, and labor to construct as detailed on Drawings.

2.03 SLEEVES AND SEALS

A. Approved Manufacturers:
   1. Sleeves for pipes through walls and floors:
      a. Ductile Iron Water-Stop wall pipe.
      b. Approved Equivalent.
   2. Bolted rubber annular seal:
      a. Link Seal manufactured by Thunderline Corp.
      b. Innerlynx manufactured by Advance Products & Systems, Inc.
      c. Approved Equivalent.

2.04 FABRICATION

A. Size sleeves large enough to allow for installation of annular seal.

B. Design hangers to support piping without disconnection of pipe.

2.05 FINISH

A. Factory coat steel hangers and supports as specified in Section 09 96 00.

B. Touch up finish on exposed steel hangers and supports in accordance with Section 09 96 00.

PART 3 EXECUTION

3.01 INSERTS

A. Provide and install inserts for placement in concrete formwork.

B. Provide and install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams and walls.

C. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.
3.02 PIPE HANGERS AND SUPPORTS

A. Support horizontal piping as follows:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Max Hanger / Support Spacing</th>
<th>Min Hanger / Support Rod Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 to 1-1/4 inch</td>
<td>6'-6&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>1-1/2 to 2 inch</td>
<td>10'-0&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>2-1/2 to 3 inch</td>
<td>10'-0&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>4 to 6 inch</td>
<td>10'-0&quot;</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>8 to 12 inch</td>
<td>10'-0&quot;</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>14 to 18 inch</td>
<td>10'-0&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>20 to 30 inch</td>
<td>10'-0&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>PVC (all sizes)</td>
<td>5'-0&quot;</td>
<td>1/2&quot;</td>
</tr>
</tbody>
</table>

B. Install supports free standing or suspended to provide minimum ½ inch space between support and adjacent Work.

C. Place a hanger/support within 12 inches of each horizontal fitting and on each side of valves.

D. Use hangers with 1½-inch minimum vertical adjustment.

E. Support riser piping independently of connected horizontal piping.

3.03 SLEEVES

A. Set sleeves in position in formwork. Provide reinforcing around sleeves.

B. Extend sleeves through floor two inches above finished floor level.

C. Where piping penetrates floor, ceiling, or wall, close off space between pipe and sleeve with link seal.

3.04 PAINTING

A. Prime coat non-galvanized steel or non-stainless steel hangers and supports.

B. Finish coat all hangers and supports, except galvanized and stainless steel hangers and supports, under provisions of Section 09 96 00.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:
      a. Flanged Coupling Adapters.
      b. Mechanical Joint Restraint Gland.
      c. Filler Flanges.
      d. Hydrostatic Link Seal.

B. Related Sections include:
   1. Section 01 11 00 – Summary of Work.
   2. Section 01 33 00 – Submittal Procedures
   3. Section 01 45 00 – Quality Control.
   4. Section 01 61 00 – Common Product Requirements.
   5. Section 01 77 00 – Closeout Procedures
   6. Section 01 78 23 – Operations and Maintenance Data
   7. Section 09 96 00 – Protective Coating Systems.

1.02 SUBMITTALS

A. Shop Drawings and Product Data: Submit, Under Provisions of Section 01 33 00, on all materials and products specified in this Section.

B. Provide a list of materials and corresponding suppliers.

C. Submit Affidavit of Compliance certifying that materials furnished have been tested and are in compliance with specification requirements.

PART 2 PRODUCTS

2.01 SPECIALTIES CONNECTIONS

A. Provide pipe specialties suitable to connect to adjoining pipes as specified for pipe fittings. Diameter to match adjacent and adjoining piping.

2.02 WORKING PRESSURE

A. Working pressure of pipe specialties to be equal to working pressure of connecting pipes, unless specified otherwise.
2.03 APPROVED MANUFACTURERS

A. Flanged Coupling Adapters
   1. Manufacturer and type:
      a. MegaFlange Series 2100 by EBAA Iron, Inc.
      b. Smith Blair 912.
      c. Approved Equivalent.

B. Mechanical Joint Restraint Gland
   1. Ductile Iron Restraint
      a. 16 inches and smaller
         1) 350 psi.
      b. 18 inches and larger
         1) 250 psi.
      c. Type and Manufacturer:
         1) Series 1100 Megalug by Ebba Iron, Inc.
         2) Approved Equivalent.

C. Hydrostatic Link Seal
   1. Link-Seal Modular Seals Model C by GPT Industries.
   2. Approved Equivalent.

PART 3 EXECUTION

3.01 INSTALLATION

   A. Install in accordance with manufacturer’s recommendations.
   B. Install equipment in locations shown on the Drawings.

3.02 MECHANICAL JOINT RESTRAINT GLAND

   A. Install per AWWA C600 and manufacturer’s recommended installation procedures.

3.03 FILLER FLANGES

   A. Ductile iron conforming to the requirements of AWWA C115, maximum 250 psi working pressure.
   B. Match filler flange to adjoining pipe working pressure class.

END OF SECTION
SECTION 40 42 80 – PROCESS PIPING LEAKAGE TESTING

PART 1  GENERAL

1.01  SUMMARY

A.  Section Includes:
   1.  Performing of the following, as indicated, in accordance with the provision of the Contract Documents:
      a.  Leakage testing of process piping.

B.  Related Sections include:
   1.  Section 01 11 00 – Summary of Work.
   2.  Section 01 33 00 – Submittal Procedures
   3.  Section 01 45 00 – Quality Control.
   4.  Section 01 61 00 – Common Product Requirements.
   5.  Section 01 77 00 – Closeout Procedures
   6.  Section 01 78 23 – Operations and Maintenance Data
   7.  Section 09 96 00 – Protective Coating Systems.

1.02  SUBMITTALS

A.  Informational Submittals:
   1.  Testing Plan: Submit prior to testing and include at least the information that follows.
      a.  Testing dates.
      b.  Piping systems and section(s) to be tested.
      c.  Test type.
      d.  Method of isolation.
      e.  Calculation of maximum allowable leakage for piping section(s) to be tested.
   3.  Certified test report.

1.03  REFERENCES

A.  The following is a list of standards which may be referenced in this section:
   2.  AWWA C600-99.

PART 2  PRODUCTS

NOT USED
PART 3 EXECUTION

3.01 PREPARATION

A. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.

B. Hydrostatically test in accordance with AWWA C600-99 and AWWA C605.

C. Pressure Piping:
   1. Includes gravity piping pressurized due to system hydraulics.
   2. Install temporary thrust blocking or other restraint as necessary to protect adjacent piping or equipment and make taps in piping prior to testing.
   3. Wait 5 days minimum after concrete thrust blocking is installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.
   4. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
   5. New Piping Connected to Existing Piping:
      a. Isolate new piping with grooved-end pipe caps, spectacle blinds, blind flanges, or as acceptable to Engineer.
      b. Test joint between new piping and existing piping by methods that do not place entire existing system under test load, as approved by Engineer.
   6. Items that do not require testing include: Piping between wet wells and wet well isolation valves, Equipment seal drains, tank overflows to atmospheric vented drains and tank atmospheric vents.
   7. Test Pressure: As specified in specifications or as specified by equipment manufacturer.

D. Test section may be filled with water and allowed to stand under low pressure prior to testing.

E. Gravity Piping:
   1. Perform testing after service connections, manholes, and backfilling have been completed between stations to be tested.
   2. Determine groundwater level at time of testing by exploratory holes or other method acceptable to Engineer.
   3. Pipe 42 Inches Diameter and Larger: Joint testing device may be used to isolate and test individual joints.

3.02 HYDROSTATIC TEST FOR PRESSURE PIPING

A. Fluid: Clean water of such quality to prevent corrosion of materials in piping system.

B. Exposed Piping:
   1. Perform testing on installed piping prior to application of insulation.
   2. Maximum Filling Velocity: 0.25 foot per second, applied over full area of pipe.
3. Vent piping during filling. Open vents at high points of piping system or loosen flanges, using at least four bolts, or use equipment vents to purge air pockets.
4. Maintain hydrostatic test pressure continuously for two (2) hours, minimum, and for such additional time as necessary to conduct examinations for leakage.
5. Examine joints and connections for leakage.
6. Correct visible leakage and retest as specified.
7. Empty pipe of water prior to final cleaning or disinfection.
8. Pressure testing shall be at 100 psig or 40 psig greater than maximum pressure for force mains and 25 psig greater than maximum pressure imposed through hydraulic elevations.

3.03 HYDROSTATIC TEST FOR GRAVITY PIPING

A. Testing Equipment Accuracy: Plus or minus 1/2 -gallon water leakage under specified conditions.

B. Maximum Allowable Leakage: 0.16 gallons per hour per inch diameter per 100 feet. Include service connection footage in test section, subjected to minimum head specified.

C. Gravity Sanitary and Roof Drain Piping: Test with 15 feet of water to include highest horizontal vent in filled piping. Where vertical drain and vent systems exceed 15 feet in height, test systems in 15-foot vertical sections as piping is installed.

D. Exfiltration Test:
   1. Hydrostatic Head:
      a. At least 6 feet above maximum estimated groundwater level in section being tested.
      b. No less than 6 feet above inside top of highest section of pipe in test section, including service connections.
   2. Length of Pipe Tested: Limit length such that pressure on invert of lower end of section does not exceed 30 feet of water column.

E. Infiltration Test:
   1. Groundwater Level: At least 6 feet above inside top of highest section of pipe in test section, including service connections.

F. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if pipe previously passed a pressure test.

G. Defective Piping Sections: Replace or test and seal individual joints, and retest as specified.
3.04 PNEUMATIC TEST FOR PRESSURE PIPING

A. Do not perform on:
   1. PVC or CPVC pipe.
   2. Piping larger than 18 inches.
   3. Buried and other non-exposed piping.

B. Fluid: Oil-free, dry air.

C. Procedure:
   1. Apply preliminary pneumatic test pressure of 25 psig maximum to piping system prior to final leak testing, to locate visible leaks. Apply soap bubble mixture to joints and connections; examine for leakage.
   2. Correct visible leaks and repeat preliminary test until visible leaks are corrected.
   3. Gradually increase pressure in system to half of specified test pressure. Thereafter, increase pressure in steps of approximately one-tenth of specified test pressure until required test pressure is reached.
   4. Maintain pneumatic test pressure continuously for minimum of 10 minutes and for such additional time as necessary to conduct soap bubble examination for leakage.
   5. Correct visible leakage and retest as specified.

D. Allowable Leakage: Piping system, exclusive of possible localized instances at pump or valve packing, shall show no visual evidence of leakage.

E. After testing and final cleaning, purge with nitrogen those lines that will carry flammable gases to assure no explosive mixtures will be present in system during filling process.

3.05 PNEUMATIC TEST FOR GRAVITY PIPING

A. Equipment:
   1. Calibrate gauges with standardized test gauge provided by Contractor at start of each testing day. Engineer will witness calibration.
   2. Install gauges, air piping manifolds, and valves at ground surface.
   3. Provide pressure release device, such as rupture disc or pressure relief valve, to relieve pressure at 6 psi or less.
   4. Restrain plugs used to close sewer lines to prevent blowoff.

B. Procedure:
   1. Require that no person enter manhole where pipe is under pressure.
   2. Slowly introduce air into pipe section until internal air pressure reaches 4 psi greater than average back pressure of groundwater submerging pipe.
   3. Allow 2 minutes minimum for air temperature to stabilize.
C. Allowable Leakage: Test section will be considered defective when time required for pressure to decrease from 3.5 to 2.5 psi greater than average back pressure of groundwater submerging pipe is less than that computed utilizing values from following table:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Diameter (Inches)</td>
<td>Time per Foot up to Length in Col C (Seconds)</td>
<td>Test Length (Feet)</td>
<td>Test Time for any Length Between Col C &amp; E (Min:Sec)</td>
<td>Length at Which Time in Col F Applies (Feet)</td>
<td>Time per Foot for Total Length (Seconds)</td>
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<td>106</td>
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<td>3.67</td>
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</tbody>
</table>

EXAMPLE: 15-inch diameter pipe:
For 150 feet, T = 2.50 sec (Col B) x 150 ft = 375 sec = 6:15
For 250 feet, T = 7:05 (Col D)
For 500 feet, T = 1.42 sec (Col F) x 500 ft = 710 sec = 11:50

*Based on 0.003 cfm per square foot with a minimum significant loss of 2 cfm and a maximum loss of 3.5 cfm.

D. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if pipe previously passed a pressure test.

E. Defective Piping Sections: Replace or test and seal individual joints, and retest as specified.

3.06 FIELD QUALITY CONTROL

A. Test Report Documentation:
1. Test date.
2. Description and identification of piping tested.
3. Test fluid.
4. Test pressure.
5. Remarks, including:
   a. Leaks (type, location).
   b. Repair/replacement performed to remedy excessive leakage.
6. Signed by Contractor and Owner’s Representative to represent that test has been satisfactorily completed.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Terminal Block Enclosures and Junction Boxes.
   2. Float Switches.
   3. Temperature Switch.

B. Related Sections Include, but are not limited to:

C. Related sections include, but are not limited to:
   1. Section 01 33 00 - Submittal Procedures
   2. Section 01 45 00 - Quality Control
   3. Section 01 75 00 - Starting and Adjusting
   4. Section 01 77 00 - Closeout Procedures
   5. Section 01 78 23 - Operations and Maintenance Data
   6. Section 26 00 01 - Electrical General Conditions
   7. Section 26 05 19 - Power and Instrumentation Cable - Less Than 600V
   8. Section 26 05 53 - Identification for Electrical Systems

1.02 REFERENCES

A. Reference Standards:
   2. National Electrical Manufacturers Association (NEMA)
      a. NEMA ICS-2 - Industrial Control Devices, Controllers and Assemblies.
      b. NEMA 250 - Enclosures for Electrical Equipment.
   3. Underwriters Laboratories (UL) - 508 Industrial Control Equipment.

1.03 SCOPE

A. It is the intent of the Contract Documents that all equipment specified in this Section of the specification be supplied by the same single-source supplier (“Electrical Contractor”) specified in Section 40 95 13. The supplier shall assume full responsibility along with the Contractor for furnishing, installing and start-up procedures so as to make the system operate per the intent of the Contract Documents.

B. The Work specified in this Section includes furnishing, installing, start-up, testing and adjusting of all required equipment, including instruments, equipment, hardware, software, wiring, accessory equipment, and training to provide a completely operational process instrumentation and control system.

C. It shall be the responsibility of the Contractor to furnish a complete and fully operating system. The Contractor shall be responsible for all details that may be necessary to properly install, adjust and place in operation the complete installation. The Contractor shall assume full responsibility for additional costs that may result from unauthorized deviations from the Contract Documents.

D. It shall be the responsibility of the Contractor and supplier to examine all new equipment that is transmitting a signal to, or receiving a signal from, equipment specified in this Section. The Contractor shall be responsible for providing signal converters, buffer amplifiers, and isolation devices to make signal levels, reference to ground, etc. compatible between devices specified in this Section and existing equipment.

1.04 SUBMITTALS

A. Technical data in conformance with Section 26 09 15 and including:
   1. All equipment and components indicated on the Drawings and specified in Part 2 of this Section.
   2. Junction Box Enclosures.
B. Shop Drawings in conformance with Section 26 09 15 and including:
   1. Control panel and junction box drawings including system schematic drawings, terminal
      numbering, component schematic drawings, dimension drawings, layout drawing and
      nameplate schedule. Where panels, junction boxes and new Owner-furnished equipment
      is being utilized, the submittal shall include complete schematics showing all proposed
      equipment, terminals, terminal numbering, wiring, elevations, and details. It shall be the
      supplier's responsibility to visit the Site and inspect existing and Owner-furnished
      equipment to prepare complete system drawings for the Project.
   2. Overall system diagram showing all components, converters, cables, and connectors.
C. Manufacturer’s Instructions: Furnish under provisions of Section 26 09 15.
D. Manufacturer’s Field Service Reports: Furnish under provisions of Section 01 45 00. Reports
   should cover start up, demonstration and operational instructions, minimum.
E. Operation and Maintenance data in conformance with Section 40 91 00 and including:
   1. Panel equipment, junction boxes, field devices and instruments, including "as-built"
      system schematics. All items requested under Item 1.04-B.1 above, should be included in
      their "as-built" form.
F. Spare Equipment Lists - Provide a list of recommended spare parts and equipment that is
   considered essential to the operation of the system. Include list of current prices for each item.
   These lists may be included with the Operation and Maintenance data submittals.
G. All submittals shall be bound in 3-ring binders with labeled tabs separating sections. Reference
   Section 40 91 00.

1.05 TESTING AGENCY CERTIFICATION
A. All new panels and control system junction boxes furnished under this Section shall be
   constructed in accordance with Underwriter's Laboratories (UL) Standard 508 - "Industrial
   Control Equipment" or Underwriter's Laboratories (UL) Standard 698 - "Industrial Control
   Equipment for Use in Hazardous (Classified) Locations".
B. Each panel shall be shop-inspected by UL or constructed in a UL-recognized facility. Each
   completed panel shall bear a serialized UL label indicating acceptance under Standard 508 or
   698.
C. General
   1. Each power, control, and signal conductor shall be identified by plastic tags permanently
      attached to the cable. The tags shall be attached to each cable at each termination and
      wherever the cable is accessible in junction or pull boxes. Tags shall be marked with
      printing showing:
         a. The circuit number from the cable and conduit schedules, and
         b. The terminal number as assigned by the equipment manufacturer.
   2. The cable marking system shall use transparent tape with a white area where the
      numbering shall be typed using a typewriter or computer, as manufactured by:
         a. Raychem.
         b. Thomas & Betts.
         c. Brady.
   3. Contractor supplied “as-built” schematics and wiring diagrams should reflect this
      described wire identification.

1.06 REGULATORY REQUIREMENTS
A. All Products that may come into contact with water intended for use in a public water system
   shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF)
   International Standards 60 and 61, as appropriate. A Product will be considered as meeting
   these standards if so certified by NSF, the Underwriters Laboratories, or other organization
   accredited by ANSI to test and certify each Product.
PART 2   PRODUCTS

2.01 TERMINAL BLOCK ENCLOSURES AND JUNCTION BOXES

A. Enclosures for control panels shall meet the following minimum requirements:
   1. Steel or Stainless steel and NEMA Ratings as noted on drawings.
   2. Minimum dimensions as indicated on the Drawings. Increase the size of each panel or
      junction box to fit equipment as required at no additional cost. Confirm size of each panel
      and junction box with the submittals.
   3. Panels and junction boxes shall be flanged, corners welded and ground smooth.
   4. All inside and exterior surfaces treated to prevent oxidation and painted. White on interior,
      manufacturer’s standard color on exterior.

B. All junction boxes labeled as shown on drawings.
   1. Engraved labels attached with screws or rivets.

C. Terminal Blocks
   1. DIN rail mounted, touch safe, modular type.
   2. 600V RMS, 30 amps minimum or higher amp rating as required for application.
   3. Connector metal body material: Copper alloy, min 85% copper with nickel or tin
      plating.
   4. Terminal screw material: Bronze with tin plating.
   5. Terminal block shall have the following characteristics:
      a. It shall terminate wires without additional preparation: i.e. tinning of wire
         ends, application of ferrules, etc.
      b. The insulation housing shall have primary entry funnels to facilitate insertion
         of wires.
      c. The insulation housing shall prevent stray strands from shorting to adjacent
         terminal blocks.
      d. The termination shall be gastight to prevent corrosion due to corrosive
         atmospheres.
      e. Terminal screws shall be captive in the metal body or via the insulation
         housing.
      f. Once tightened the terminal screws shall be locked in place to prevent
         loosening due to shock and vibration.
      g. The terminal block shall be useable with accessories such as center or
         insertion bridges; test sockets; separating plates; and end covers, etc. The
         accessories used shall also be touch safe.
      h. For wire identification, the terminal block shall provide space for marking
         with premarked or handwritten labels.
   6. Manufacturer/Model:
      a. Phoenix Contact Series UK 5N (minimum) through UK 35 as required for
         the application.
      b. Allen Bradley
      c. Prior approved equal.

D. Terminal block enclosures and junction boxes shall be furnished and installed for the following
   application(s):
   1. WT6-JBOX-01
   2. WT6-JBOX-02
   3. WT6-JBOX-03

2.02 GENERAL PURPOSE BUILDING SENSORS

A. FLOOD FLOAT SWITCHES
   1. General Specifications:
      a. Two wire operation, Normally-Closed in a non-flooded state.
      b. Contact rating: 20VA.

Water Towers No. 4 & 9 – Valve Vault Improvements
City of Fargo, North Dakota

40 91 00 - 3
d. Extra flexible manufacturer-supplied cord of sufficient length to reach junction box as indicated on plans with waterproof connection to sensor.

2. Schedule:
   a. Flood Float Switches shall be furnished and installed for the following application(s):
      1) WT6-FS-501

3. Manufacturer/Model:
   b. Prior Approved Equal.

B. MAGNETIC DOOR “INTRUSION” SWITCHES
1. General Specifications:
   a. Corrosion resistant hermetically sealed reed switch encapsulated in polyurethane.
   b. 100 Vamp, 0.5A contact rating.
   c. 2.5 inch minimum sensing range, as measured on a non-ferrous surface.
   d. Switch shall be factory equipped with a 3-foot stainless steel length of armored cable.

2. Schedule:
   a. Magnetic Door "Intrusion" Switches shall be furnished and installed for the following application(s):
      1) WT6-DS-901

3. Manufacturer/Model:
   a. Sentrol Industrial 151 GuardSwitch.
   b. Prior Approved Equal.

C. AMBIENT AIR TEMPERATURE SENSOR/TRANSMITTERS
1. Continuous averaging, 1000 ohm, suitable for wall mounting platinum RTD type temperature sensor.
2. Provide a transmitter by the same manufacturer designed and calibrated for use with the supplied RTD sensor. The transmitter must be capable of producing a 4-20mA signal calibrated for the operating range.
3. Operating Range: 0 to 150°F.
4. General Specifications:
   a. Tolerance: ± 0.1% at 32°F
   b. Stability: < 0.05% drift per year
   c. Repeatability: ± 0.1°F
   d. Averaging Sensors: ± 1°F at 70°F
   e. Temperature coefficient: 0.00385 ohm/ohm/degree C
   f. Selfheating coefficient: < 5mW / degree C
   g. Reference Resistance: 1000 ohm at 32°F
   h. Response time in air 1 m/s (90% response): 25 sec
   i. Interchangeability: ± 0.3°F at 32°F
   j. Conformance: IEC 751
   k. Electrical: 5 mA maximum; 1 mA recommended
5. Schedule:
   a. Ambient Air Temperature Sensor/Transmitters shall be furnished and installed for the following application(s):
      1) WT6-TS-501

6. Manufacturer/Model:
   a. TCS/Basys Controls – TS1000
   b. TCS/Basys Controls – TX1505
   c. Prior Approved Equal.

2.03 TEMPERATURE SWITCH (STANDARD OR DIFFERENTIAL)
A. Transmitter General Specifications
1. Type: Ambient Compensated w/ Integral Sensor and Thermowell.
2. Setpoint Adjustment: Field Adjustable
3. Deadband Adjustment: Field Adjustable
4. Contact Rating: General Purpose DPDT, 2.5A at 24VDC.
6. Temperature Range: As needed individually for each individual application.
8. Sensor/Immersion Length: As need for each individual application
9. Conduit Connection: 3/4” NPT
10. Process Connection: 1/2” NPT

B. Schedule
1. See instrumentation schedule on the "I" drawings.

C. Manufacturer/Model:
1. Ashcroft
2. Prior approved equal.

2.04 GAS DETECTION EQUIPMENT

PART 3 EXECUTION

3.01 LABELING

A. Label all field mounted control devices, instrumentation, switches, etc., with tag number (if applicable) and item description.
B. Labels shall be engraved laminated plastic with 1/4” high lettering. Labels shall be attached with stainless steel screws to the device or nearby wall.

3.02 CALIBRATION, ADJUSTING AND TESTING

A. Devices requiring field calibration shall be calibrated in the presence of the Engineer's representative and documented.

3.03 PROJECT MANAGEMENT

A. Supplier shall provide engineering and administrative services necessary to fulfill the requirements of this Specification.
B. Supplier shall provide the services of an experienced project manager as the overall coordinator during the course of the project.

3.04 FIELD QUALITY CONTROL - INSTALL, START-UP AND WITNESS TESTING

A. Contractor shall furnish and install raceway and wiring systems for the instrumentation and control system in accordance with manufacturer's requirements and in accordance with Sections 26 00 01. All instrumentation and control system raceways shall be galvanized rigid steel conduit unless specifically indicated otherwise.
B. Supplier shall provide a skilled programmer/instrumentation engineer or technician who shall complete troubleshooting and start-up to place the entire system into satisfactory operation. The engineer or technician shall make the necessary inspection of the completed installation, make the necessary final field adjustments, and make program revisions as required for start-up.
C. Coordinate installation, start-up and testing scheduling with Owner and Engineer.
D. Instruct Owner's personnel at the Site on the operation and maintenance of equipment furnished in this Section.
E. Reference Sections 01 45 00 and 26 35 14.
F. Furnish Owner and Engineer with a written report prepared by Supplier certifying that equipment:
   1. Has been properly installed.
   2. Is in accurate alignment and calibration and is free from undue stress imposed by interconnecting cable/conduit, etc.
   3. Has been operated and witness demonstrated to the Owner under expected conditions and that it operates satisfactorily.

END OF SECTION