

**PROJECT MANUAL**  
**VOLUME I OF II**  
**CITICO PUMP RELIABILITY IMPROVEMENTS**  
**CONTRACT NO. W-16-013-201**



**MAYOR AND CITY COUNCIL**

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**CITY OF  
CHATTANOOGA, TENNESSEE**

**APRIL 2017  
ISSUED FOR CONSTRUCTION**

**BURNS  MCDONNELL**



# **CITICO PUMP RELIABILITY IMPROVEMENTS**

**CITY OF  
CHATTANOOGA, TENNESSEE**





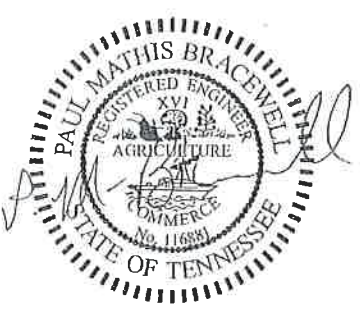



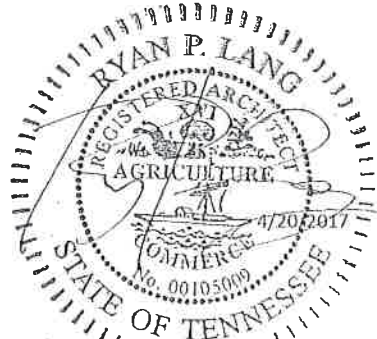
CITY OF CHATTANOOGA  
PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION

CERTIFICATION AND SEAL


I hereby certify that the Project Drawings and the Contract Documents and Specifications for the following contract were prepared by me or under my direct supervision, and I am a duly registered engineer or architect under the laws of the state in which these projects are located:

CITICO PUMP RELIABILITY IMPROVEMENTS

CONTRACT NO. W-16-013-201

 <p>Civil Engineer</p>	 <p>Electrical Engineer</p>	 <p>Structural Engineer</p>
 <p>Mechanical Engineer</p>	 <p>Architect</p>	

APPROVED FOR RELEASE

  
\_\_\_\_\_  
William C. Payne, P.E.  
City Engineer



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**CITICO PUMP RELIABILITY IMPROVEMENTS  
CONTRACT NUMBER W-16-013-201**

**CITY OF CHATTANOOGA, TENNESSEE**

Sealed Bids for furnishing all materials, labor, tools, equipment and appurtenances necessary for the construction of the Citico Pump Reliability Improvements will be received at the City of Chattanooga at City Hall, Purchasing Department, Suite G13, 101 East 11th Street, Chattanooga, TN 37402, until 2:00 p.m., local time, on June 22, 2017, and then at said office publicly opened and read aloud.

A Pre-Bid Conference is scheduled for June 1, 2017, at 10:00 A.M. local time, in the City of Chattanooga Purchasing Department, Suite G13, 101 East 11th Street, Suite G13, Chattanooga, TN 37402. Bidder attendance is encouraged but not mandatory.

The Project, located at the existing Citico Pump Station in Chattanooga, Tennessee, consists of a new 45 MGD wastewater pump station with grinders and submersible pumps, a new odor control system and HVAC system replacement, a permanent backup generator, electrical switchboard, switchgear, and other electrical equipment upgrades. The Project also includes condition assessment of two existing wastewater force mains originating at the site.

The Instructions to Bidders, Bid, Contract Agreement, Drawings, Specifications and forms of Bid Bond, Performance Bond, Payment Bond and other Contract Documents may be examined at the following:

City of Chattanooga  
Purchasing Department  
101 E. 11th Street, Suite G13  
Chattanooga, TN 37402  
(423) 643-7230

Burns & McDonnell Engineering Company, Inc.  
3650 Mansell Road, Suite 300  
Alpharetta, GA 30022  
(770) 510-4562

Ms. Marilyn Robinson, Executive Director  
Nashville Minority Business Office  
1919 Charlotte Avenue, Suite 310  
Nashville, TN 37203  
(615) 255-0432

AGC of East Tennessee  
101 West 21<sup>st</sup> Street  
Chattanooga, TN 37408  
(423) 267-1111

Copies of Contract Documents may be purchased from 8:00 am to 4:30 pm, Monday through Friday, at the office of the City of Chattanooga Purchasing Department, 101 East 11th Street, Suite G13, Chattanooga, TN 37402, phone (423) 643-7230, Fax (423) 643-7244. Cost of Contract Documents is \$100.00 per set. No part of the purchase price will be refunded.

Each Bid must be accompanied by a Bid Bond, prepared on the form of Bid Bond attached to the Contract Documents or a Surety Company's Standard Bid Bond, duly executed by the Bidder as

principal and having as surety thereon a surety company licensed to do business in the State of Tennessee and listed as a certified company in the latest issue of U.S. Treasury Circular 570, in the amount of five percent of the Bid.

The allotted time for construction is 365 calendar days.

No bid may be withdrawn within 120 calendar days after the scheduled time for receipt of bids.

All bidders must be licensed and shall comply with all requirements of the State of Tennessee Contractor's Licensing Act.

Visit City website at: [www.chattanooga.gov/general-services/purchasing/bidssolicitations](http://www.chattanooga.gov/general-services/purchasing/bidssolicitations) for specific contract information.

The City of Chattanooga is an Equal Opportunity Employer.

Any contract or contracts awarded under this Advertisement for Bids are expected to be funded with local funds in addition to funds indicated elsewhere.

The Owner will in no way be liable for any costs incurred by any bidder in the preparation of its Bid in response to this Invitation to Bid.

The successful Bidder for this Contract will be required to furnish a satisfactory Performance Bond and Payment Bond each in the amount of 100 percent of the Bid.

The Owner reserves the right to reject any or all Bids, to waive informalities and to re-advertise.

CITY OF CHATTANOOGA, TENNESSEE

RECOMMENDED FOR APPROVAL:



William C. Payne, P.E.  
City Engineer  
Department of Public Works

APPROVED:



Justin C. Holland  
Administrator  
Department of Public Works

END OF SECTION



**ARTICLE 1 – DEFINED TERMS**

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office* – The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered. The issuing office for this Project is City of Chattanooga Purchasing Department, 101 East 11th Street, Suite G13, Chattanooga, TN 37402.

**ARTICLE 2 – COPIES OF BIDDING DOCUMENTS**

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

**ARTICLE 3 – QUALIFICATIONS OF BIDDERS**

- 3.01 The minimum qualifications of a responsible Bidder includes the following requirements:
- A. The Bidder shall maintain a permanent place of business. This requirement applies to the Bidder where the Bidder is a division of a corporation, or where the Bidder is 50 percent or more owned by a person, corporation or firm.
- B. The Bidder is licensed by the State of Tennessee to perform the work under this contract.
- C. The Bidder shall demonstrate adequate construction experience and sufficient equipment resources to properly perform the work under and in conformance with the Contract Documents. This evaluation will be based upon a list of completed or active projects and a list of construction equipment available to the Bidder to perform the work. The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may reasonably request. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the Project contemplated therein.
- D. The Bidder shall demonstrate financial resources of sufficient strength to meet the obligations incident to the performance of the work covered by these Contract

- Documents. The ability to obtain the required Performance and Payment Bonds will not alone demonstrate adequate financial capability.
- E. The Bidder shall demonstrate that he is familiar with the work covered by these Contract Documents.
- 3.02 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with the Bid written evidence such as previous experience, present commitments, and such other data as may be called for below.
- A. Completion of Statement of Bidder's Qualifications, as included elsewhere in this Project Manual.
- B. Bidder's Tennessee contractor license number and classification.
- 3.03 To demonstrate Bidder's qualifications to perform the Work, within three days of Owner's request, Bidder shall submit written evidence such as financial data and such other data as may be requested by Owner.
- 3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.
- 3.05 A Bidder may be deemed as not responsible if:
- A. Bidder fails to furnish adequate information for the Owner to determine if the Bidder is qualified.
- B. Bidder fails to furnish information, evidence, and statements of the principal owner when the Bidder is owned 50 percent or more by another firm, corporation, or person.
- C. Bidder is in arrears on any existing contracts, interested in any litigation against the City or having defaulted on a previous contract.
- D. Bidder fails to have access to adequate equipment.
- E. Bidder has uncompleted work which in the judgment of the City will hinder or prevent prompt completion of additional work, if awarded.

#### **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 known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site.
  2. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

- 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 any reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site.
- B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

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

- 4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

- 4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.
- 4.07 It is the responsibility of each Bidder before submitting a Bid to:
- A. examine and carefully study the Bidding Documents, 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, and performance of the Work;
  - D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Paragraph 4.06 of the Supplementary Conditions as containing reliable "technical data";
  - E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs;
  - F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, 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. 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
  - I. 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 be held if so indicated in the Advertisement for Bids. Oral statements may not be relied upon and will not be binding or legally effective.

#### **ARTICLE 6 – SITE AND OTHER AREAS**

- 6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

#### **ARTICLE 7 – INTERPRETATIONS AND ADDENDA**

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Owner in writing. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Owner as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. 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.
- 7.03 Questions and other inquiries shall be submitted to the City of Chattanooga Purchasing Department, 101 East 11th Street, Suite G13, Chattanooga, TN 37402 and shall utilize the Request for Bidder Information which follows this section.

#### **ARTICLE 8 – BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of Bidder's maximum Bid price and in the form of a certified check or cashier's check, a Bid bond (on the form attached or on a surety company's standard bid bond form) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

- 8.02 If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within ten days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.
- 8.03 Attorneys-in-Fact of other officers who sign bid bonds for a surety company must file with such bonds a certified copy of his or her power of attorney authorizing him or her to sign said bonds.

#### **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 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.

#### **ARTICLE 11 – SUBSTITUTE AND “OR-EQUAL” ITEMS**

- 11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or those substitute or “or-equal” materials and equipment approved by Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or “or-equal” item. No item of material or equipment will be considered by Engineer as a substitute or “or-equal” unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each such request shall conform to the requirements of Paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon 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.

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**ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS**

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

**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 in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item and alternate item listed therein. In the case of optional alternatives the words “No Bid,” “No Change,” or “Not Applicable” may be entered.
- 13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.
- 13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.
- 13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

- 13.06 A Bid by an individual shall show the Bidder's name and official address.
- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.08 All names shall be printed in ink below the signatures.
- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.10 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

#### **ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS**

##### **14.01 *Lump Sum and Unit Prices***

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

##### **14.02 *Allowances***

- A. For cash allowances the various other Bid prices shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 11.02.B of the General Conditions.

#### **ARTICLE 15 – SUBMITTAL OF BID**

- 15.01 With each set of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, Bid Bond Form and the required documents listed below. The unbound copy of the Bid Form is to be completed and submitted with the Bid security along with the documents listed below. The Bidder shall submit one original of all documents in the envelope.
- A. Statement of Bidders Qualifications
- B. Affidavit of No Collusion by Prime Bidder
- C. Drug-Free Workplace Affidavit



- D. Attestation Regarding Personnel Used in Contract Performance
  - E. Certification By Proposed Prime or Subcontractor Regarding Equal Employment Opportunity
  - F. Certification Regarding Debarment, Suspension and Other Responsibility Matters
  - G. Iran Divestment Act Compliance Certification
- 15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in a sealed envelope with the "Contractor's Identification" form securely attached thereto and shall contain the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to the place indicated in the Advertisement for Bids.
- 15.03 The Bidder shall comply with Tennessee Code Annotated (TCA) Chapter 6 of Title 62, hereby incorporated by reference. Except for bids in an amount less than twenty five thousand dollars, the Bidder shall provide the name, license number, expiration date thereof, and license classification of the contractors applying to the bid for the prime contract and for the masonry contract where the total cost of the masonry portion of the construction project exceeds one hundred thousand dollars, materials and labor, electrical, plumbing, heating, ventilation and air conditioning contracts on the outside of the envelope containing the Bid. Only one contractor in such classification may be listed. Prime contractor bidders who are to perform the masonry portion of the construction project which exceeds one hundred thousand dollars, materials and labor, the electrical, plumbing, heating, ventilation and air conditioning shall be so designated upon the outside of the envelope. When the bid is less than twenty five thousand dollars, the name of the contractor only shall appear on the outside of the envelope containing the bid. Failure of any bidder to comply therewith shall void such bid and such bid shall not be considered.

## **ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID**

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

- 16.03 A bid may be withdrawn after the time period stated in the Advertisement for Bids after the date of the opening of the bids, provided that the Bidder has not been notified within said time period that his bid has been accepted.

#### **ARTICLE 17 – OPENING OF BIDS**

- 17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.
- 17.02 The officer whose duty is to open them will decide when the specified time has arrived, and no bids received thereafter will be considered. No responsibility will be attached to any officer for the premature opening of a bid not properly addressed and identified. Bidders or their authorized agents are invited to be present.
- 17.03 Filing of Proposal
- A. No proposals will be considered by the City unless they are filed in sealed envelopes with the City within the time limit for receiving proposals as stated in the advertisement and shall be made on proposal forms attached to Specifications, together with the Contract Documents, Bid Bond, and Statement of Compliance with General Contractors Licensing Law and other required miscellaneous forms, all of which are to be sealed in an envelope addressed to the City of Chattanooga, Tennessee, with the completed "Contractor's Identification" form securely attached thereto.
- B. Each proposal must contain the full name and address of each person, firm or corporation interested therein. In case of a partnership, the name and address of each partner must be stated. The firm, corporation or individual name of the bidder must be signed in the space provided for the signature on the proposal blank. In case of a corporation, the title of the officer signing must be stated, and the person signing shall also state under the laws of what State the corporation was chartered and the names and titles of the officers having authority, under the by-laws, to sign contracts. The proposal shall also be attested by its Secretary. In case of a partnership or firm, the signature of at least one of the partners must follow the firm name.
- 17.04 Opening of Proposals. The proposals filed with the City will be opened at the time stated in the advertisement. Bidders are invited to attend the meeting at the time set for opening of proposals, at which time they should make any protests as to procedure followed in inviting 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 Advertisement for Bids, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

#### **ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves

the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner 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 not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder. Nothing herein shall be deemed to limit the discretion of the City to determine whether or not a bidder not hereby disqualified is the lowest responsible bidder.

- 19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 19.03 In evaluating Bids, Owner will consider whether 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 A bid may be declared by the Owner to be non-responsive for, but not limited to, any of the following reasons:
- A. Bid contains blanks, Proposal is not complete or required accompanying documents, certifications, and statements are not included.
  - B. Bid contains modifications or alterations of the Bid Form or other Contract Documents.
  - C. Bid is a qualified or conditional bid.
  - D. Bid contains unrealistic data, erroneous data, inaccurate data, or data that cannot be documented or substantiated.
- 19.05 Bidders debarred or suspended under Chattanooga City Code, Part II, Chapter 2 (Ordinance No. 8259), or who are debarred or suspended by operation of any other applicable state or federal law or regulation, are not eligible to be contractors or subcontractors to this contract.
- 19.06 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.
- 19.07 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 proposed for those portions of the Work in accordance with the Contract Documents.
- 19.08 All Bidders are required to execute a notarized Affidavit of No Collusion by Prime Bidder, and a Bidder who fails to do so will be disqualified.

- 19.09 The Contracts will be awarded to the responsive, responsible Bidders submitting the lowest Bid complying with the conditions of the Contract Documents. Award will be made on the basis of the prices given in the Bid.
- 19.10 Conditions Precedent to Award of Contracts. The following stipulations shall all and severally be conditions precedent to the award by the City of Chattanooga of all contracts for construction, to-wit:
- A. No member of the City Council nor any officer, director or other person whose duty it is to vote for, let out, overlook or in any manner superintend this contract and who is related to said member within the third degree by either consanguinity or affinity, nor any other official who may be directly interested in this contract or work of any kind whatsoever under its direction. "Directly interested" means any contract with the official himself or with any business in which the official is the sole proprietor, a partner, or the person having the controlling interest. "Controlling interest" shall include the individual with the ownership or control of the largest number of outstanding shares owned by any single individual or corporation.
  - B. It shall not be lawful for any officer, director, or other person whose duty it is to vote for, let out, overlook, or in any manner to superintend any work or any contract in which the City shall or may be interested, to be indirectly interested in any such contract unless the officer publicly acknowledges his interest and rescues himself from any of his duties which include the consideration of, voting on, letting out, overseeing, or superintending the work or contract giving rise to the conflict. "Indirectly interested" means any contract in which the officer is interested but not directly so, but includes contracts where the officer is directly interested but is the sole supplier of goods or services in a municipality or county. (See T.C.A. Section 12-4-101, et seq.)
  - C. The essence of all the contracts shall be excellence of quality, integrity and durability of the completed product as specified; and the contractor hereunder shall be held responsible therefor.
  - D. The contractor shall maintain and guarantee the integrity of the completed work for a full period of one year after the completion as set forth more fully in Section 4 of these General Provisions.
  - E. The decisions of the Engineer, as to quality, integrity and durability of the work shall be final and conclusive as to all parties to said contract, whether it be directly by and between the contractor and said City or by and between him and another party; and said Engineer shall have full authority to condemn by written notice to contractor, or his agent or foreman on job, and shall order the removal, reconstruction and restoration of all work that in his opinion, is in any respect inferior, defective or faulty, or that shows signs of disintegration and failure, at any time before final estimate is issued and payment made therefor, or within a period of one year after the completion and acceptance thereof in writing by the City.
  - F. Contractor shall remove, reconstruct and restore all such condemned work in full conformance with the specifications, and in complete compliance with the requirements of the official notice, in writing, of said Engineer relating thereto, and within the period of time designated in the notice.

- G. Should the contractor neglect, refuse, or fail to remove, reconstruct and restore all of the defective work so condemned and rejected, within the period of time, as required by said official notice, then and in event of such failure on contractor's part, whether said work was executed by contract directly with the City or by private contract directly with other parties, the City of Chattanooga will look to and require, respectively, the surety on the Performance Bond, executed by the contractor under contract directly with said City, to make good and have all such defective and condemned work removed, reconstructed and restored in complete compliance with the requirements of the official notice of said Engineer to that effect; and likewise, in the event that such work was done under private contract, as aforesaid, the City of Chattanooga will look to and require the surety on the Performance Bond executed by said contractor to make good and have all such defective and condemned work removed, reconstructed and restored in complete compliance with the requirements of the official notice of said Engineer to that effect, in each instance as the case may be.
- H. The unit price bid by the contractor for any and all work and the compensation to be paid therefore shall cover and include the cost of all materials, forms, supports, labor, work and things necessary for a complete workmanlike job, and shall also include the cost of all services, duties and obligations of said contractor and of the corresponding surety on the Performance Bond collateral therewith as stipulated in subsections above set out, to the satisfaction and approval of the Engineer.

#### 19.11 Award of Contract.

- A. The City acting by and through the City Council will either award the contract or reject all proposals received thereon after the formal opening of proposals and evaluation of the bids.
- B. The award of the contract, if it is awarded, will be to the lowest responsible bidder whose proposal complies with the requirements of the City.
- C. Projects will be awarded only to responsible bidders, and an award will not be made in any case, until all necessary investigations have been made into the responsibility of the low bidder.
- D. If the project is funded in part by a state or federal grant, then the award may be subject to the concurrence of the granting contract agency.
- E. All references to contract include each to be awarded where multiple awards are made.

### **ARTICLE 20 – CONTRACT SECURITY AND INSURANCE**

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

**ARTICLE 21 – SIGNING OF AGREEMENT**

- 21.01 When Owner issues a Notice of Award to the Successful Bidder, Owner shall notify the Successful Bidder that the required number of unsigned counterparts of the Agreement along with the other Contract Documents will be available to be picked up, which are identified in the Agreement as attached thereto. Within ten days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.
- 21.02 Upon failure of the bidder to execute the required bonds or to sign the required contract within ten days after the contract is awarded, he will be considered to have abandoned his proposal and the City may annul the award. By reason of the uncertainty of market prices of materials and labor, and it being impracticable and extremely difficult to fix the amount of damages to which the City would be put by reason of said bidder's failure to execute said bonds and contract within ten days, the proposal guaranty accompanying the proposal shall be the agreed amount of damages which the City will suffer by reason of such failure on the part of the bidder and shall thereupon immediately be forfeited to the City. The filing of a proposal will be considered as an acceptance of this provision.

**ARTICLE 22 – RETAINAGE**

- 22.01 Provisions concerning Contractor's rights to deposit securities in lieu of retainage are set forth in the Agreement.

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1420 King Street, Alexandria, VA 22314-2794  
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[www.nspe.org](http://www.nspe.org)

American Council of Engineering Companies  
1015 15th Street N.W., Washington, DC 20005  
(202) 347-7474  
[www.acec.org](http://www.acec.org)

American Society of Civil Engineers  
1801 Alexander Bell Drive, Reston, VA 20191-4400  
(800) 548-2723  
[www.asce.org](http://www.asce.org)

Associated General Contractors of America  
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(703) 548-3118  
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Request for Bidder Information

Questions regarding the project or the Bid Documents must be in writing as required by the Instruction to Bidders. Questions must be written on this form and sent by email, fax or mail to the email, fax number or address listed below. Upon timely receipt, if appropriate, an Addendum will then be issued to all persons who have received Bid Documents from the Owner.

City of Chattanooga  
Purchasing Department  
101 E. 11th Street, Suite G13  
Chattanooga, TN 37402  
purchasing@chattanooga.gov  
Phone Number: (423) 757-7230  
Fax Number: (423) 643-7244

Contract: **CITICO PUMP RELIABILITY IMPROVEMENTS**

Contract Number: **W-16-013-201**

From: \_\_\_\_\_

Company: \_\_\_\_\_

Date: \_\_\_\_\_

CLARIFICATION IS NEEDED FOR THE FOLLOWING ITEMS:  
(List Specification Section, Paragraph, Drawing Number and/or Detail Number)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

END OF DOCUMENT





that have been identified in SC-4.02 as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in SC-4.06 as containing reliable "technical data."

- E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) 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; and (3) Bidder's safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that 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 required, 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 given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- J. Where this Bid Form contains the provision for a bid based on a lump sum price, the Bidder shall be responsible for having prepared its own estimate of the quantities necessary for the satisfactory completion of the Work specified in these Contract Documents and for having based the lump sum price bid on its estimate of quantities.

#### **ARTICLE 4 – BIDDER'S CERTIFICATION**

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

**ARTICLE 5 – BASIS OF BID**

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

Item No.	Description	Estimated Qty.	Unit	Unit Price	Total Price
1.	Furnishing all products, materials and equipment and performing all labor necessary to complete and put into operation the Citico Pump Reliability Improvements Project, including all work shown on the Drawings and/or specified and not included in Items 2 through 4 below, the total amount of:		Lump Sum		\$
2.	Condition Assessment of Two Force Mains		Lump Sum		\$
3.	Cash Allowances				
a.	Soils and Concrete Testing		ALLOWANCE		\$ 15,000.00
b.	Utility Conflict Resolution		ALLOWANCE		\$ 10,000.00
c.	Construction Verification Surveying		ALLOWANCE		\$ 5,000.00
<b>*** Additional Work If Ordered By The Engineer ***</b>					
4.	Removal of Unsuitable Material and Replacement with				
a.	Crushed Stone	500	CY	\$	\$
b.	Suitable Earth Material	500	CY	\$	\$

BID TOTAL, ITEMS 1 THROUGH 4, INCLUSIVE, THE AMOUNT OF \_\_\_\_\_

\_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_).

A. SUPPLIERS/MANUFACTURERS: This bid is based upon furnishing and installing major items of Equipment by the following Suppliers/manufacturers:

No.	Item	Supplier/Manufacturer
1	Submersible Pumps	_____
2	Grinders	_____
3	Sump Pump	_____
4	Variable Frequency Drives	_____
5	PLCs, Instrumentation, Controls	_____
6	Electrical Equipment and Components	_____
7	Level Transmitters	_____
8	Combination Air Valves	_____
9	Plug and Check Valves	_____
10	Slide Gates	_____
11	Motor Actuator	_____
12	Louvers, Fans, and HVAC Equipment	_____
13	Hatches	_____

B. SUBCONTRACTORS: This Bid is based upon use of the following Subcontractors (please indicate if work is to be self-performed):

No.	Trade	Subcontractor
1	Pump Installations	_____
2	Instrumentation and Controls	_____
3	Electrical Improvements	_____
4	Concrete Work	_____
5	Site Work and Grading	_____
6	Dewatering	_____
7	Temporary Bypass Pumping	_____
8	Force Main Condition Assessment	_____

## **ARTICLE 6 – TIME OF COMPLETION**

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

## **ARTICLE 7 – ATTACHMENTS TO THIS BID**

- 7.01 The following documents are submitted with and made a condition of this Bid:
- A. Statement of Bidders Qualifications
  - B. Bid Bond
  - C. Affidavit of No Collusion by Prime Bidder
  - D. Drug-Free Workplace Affidavit
  - E. Iran Divestment Act Compliance Certification
  - F. Attestation Regarding Personnel Used in Contract Performance
  - G. Certification By Proposed Prime or Subcontractor Regarding Equal Employment Opportunity
  - H. Certification Regarding Debarment, Suspension and Other Responsibility Matters

## **ARTICLE 8 – DEFINED TERMS**

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



**ARTICLE 9 – BID SUBMITTAL**

9.01 This Bid submitted by:

An Individual

Name (typed or printed): \_\_\_\_\_

By: \_\_\_\_\_ (SEAL)  
*(Individual's signature)*

Doing business as: \_\_\_\_\_

Attest: \_\_\_\_\_  
(Notary)

Name (typed or printed): \_\_\_\_\_

A Partnership

Partnership Name: \_\_\_\_\_ (SEAL)

By: \_\_\_\_\_  
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): \_\_\_\_\_

Attest: \_\_\_\_\_  
(Signature of another Partner)

Name (typed or printed): \_\_\_\_\_

A Corporation

Corporation Name: \_\_\_\_\_ (SEAL)

State of Incorporation: \_\_\_\_\_

Type (General Business, Professional, Service, Limited Liability): \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_ (CORPORATE SEAL)

Attest: \_\_\_\_\_  
(Signature of Corporate Secretary)

Name (typed or printed): \_\_\_\_\_

Date of Qualification to do business in Tennessee is \_\_\_\_\_

A Joint Venture

Name of Joint Venturer: \_\_\_\_\_

First Joint Venturer Name: \_\_\_\_\_ (SEAL)

By: \_\_\_\_\_  
(Signature of first joint venture partner)

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_

Second Joint Venturer Name: \_\_\_\_\_ (SEAL)

By: \_\_\_\_\_  
(Signature of second joint venture partner)

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_

(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.)

**All Bidders shall complete the following:**

Bidder's Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ Facsimile: \_\_\_\_\_

Primary Contact: \_\_\_\_\_

E-mail: \_\_\_\_\_

Submitted on \_\_\_\_\_, 201\_\_.

State Contractor License No. \_\_\_\_\_.

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American Council of Engineering Companies  
1015 15th Street N.W., Washington, DC 20005  
(202) 347-7474  
[www.acec.org](http://www.acec.org)

American Society of Civil Engineers  
1801 Alexander Bell Drive, Reston, VA 20191-4400  
(800) 548-2723  
[www.asce.org](http://www.asce.org)

Associated General Contractors of America  
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308  
(703) 548-3118  
[www.agc.org](http://www.agc.org)

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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):

City of Chattanooga, Tennessee  
101 East 11th Street  
Chattanooga, Tennessee 37402

BID

Bid Due Date:  
Description (Project Name): CITICO PUMP RELIABILITY IMPROVEMENTS  
Contract # W-16-013-201

BOND

Bond Number:  
Date (Not earlier than Bid due 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**

\_\_\_\_\_  
Bidder's Name and Corporate Seal (Seal) Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature (Attach Power of Attorney)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Note: Above 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 Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable

requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.





Statement of Bidder's Qualifications

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information desired. Attach all additional sheets to this statement. (Sample "Project Information Form" contained at the end of this Section.)

1. Name of Bidder: \_\_\_\_\_

2. Permanent main office address and phone number: \_\_\_\_\_

\_\_\_\_\_

3. When organized: \_\_\_\_\_

4. If a Corporation, where incorporated: \_\_\_\_\_

5. How many years have you been engaged in the contracting business under your present firm or trade name? \_\_\_\_\_

6. Contracts on hand. (Complete a "Project Information Form", for each Contract on hand.)

7. General description of type of work performed by your company: \_\_\_\_\_

\_\_\_\_\_

8. Have you ever failed to complete any work awarded to you? If so, where and why? \_\_\_\_\_

\_\_\_\_\_

9. Have you ever defaulted on a contract? If so, where and why? \_\_\_\_\_

\_\_\_\_\_

10. Attach a list of the most important projects recently completed by your company which are similar in scope to this Project. (Complete a "Project Information Form", for each Project listed.)

11. Names, background and experience of the principal members of your organization, including officers:

Name	Position	Years Experience
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Statement of Bidder's Qualifications

12. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Owner in verification of the recitals comprising this Statement of Bidder's Qualifications.

I, \_\_\_\_\_, certify that I am \_\_\_\_\_ of the Bidder, and that the answers to the foregoing questions and statements contained therein are true and correct.

BIDDER: \_\_\_\_\_

By: \_\_\_\_\_  
*(name signed)*

\_\_\_\_\_  
*(name printed or typed)*

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Subscribed and sworn to me this \_\_\_ day of \_\_\_\_\_, 20\_\_.

NOTARY PUBLIC: \_\_\_\_\_  
*(name signed)*

\_\_\_\_\_  
*(name printed or typed)*

Commission Expires: \_\_\_\_\_  
*(Date)*

(SEAL)

Project Information Form

Project Title: \_\_\_\_\_

Project Description: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Major Subcontractors: \_\_\_\_\_  
\_\_\_\_\_

Major Suppliers: \_\_\_\_\_  
\_\_\_\_\_

Project Owner:

- Owner Name: \_\_\_\_\_
- Contact Person: \_\_\_\_\_
- Phone Number: \_\_\_\_\_

Engineer/Construction Manager:

- Company Name: \_\_\_\_\_
- Contact Person: \_\_\_\_\_
- Phone Number: \_\_\_\_\_

Contract Amount:

- Initial: \_\_\_\_\_
- Final: \_\_\_\_\_

Contract Time

- Initial: \_\_\_\_\_
- Final: \_\_\_\_\_
- Completion Date: \_\_\_\_\_

END OF SECTION



Affidavit of No Collusion By Prime Bidder

CONTRACT NUMBER W-16-013-201
FOR THE CITY OF CHATTANOOGA

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

The undersigned, \_\_\_\_\_, having been duly sworn, deposes and states as follows:

1. I am the \_\_\_\_\_ of \_\_\_\_\_
(sole owner, a partner, president, secretary, etc.) (Name of Corporation/Partnership/Limited Partnership/Joint Venture)

which is a \_\_\_\_\_ in good standing,
(Corporation) (Proprietorship) (Partnership) (Limited Partnership) (Joint Venture)

formed under the laws of \_\_\_\_\_, hereinafter referred to as "Bidder."
(State of incorporation or formation)

2. I am authorized to make this affidavit on behalf of said Bidder, and I have personal knowledge of the matters set forth herein.

3. On \_\_\_\_\_, 201\_\_, said bidder is submitting a bid to the City of Chattanooga for the above captioned contract. This bid was prepared under my personal supervision and direction. During the preparation of the bid, I have taken affirmative steps to inquire about the circumstances of the bid preparation in general and about any contacts between or among this bidder and any other bidders or prospective bidders in particular.

4. I am aware of the Federal and State laws including without limitation, the Sherman Act (15 U.S.C. 1) and the Tennessee antitrust laws (T.C.A. 47-25-101, et seq.), which make it illegal to agree to fix or rig bids or otherwise agree to restrain competition in bidding for contracts with the City of Chattanooga. I am aware in particular that violations of the Sherman Act are federal crimes punishable by a fine of up to \$1.0 million for a corporation, and a fine of up to \$100,000 for an individual or by imprisonment not exceeding three years, or both.

5. I hereby certify and attest that the bid identified in paragraph 3 is based solely upon the independent knowledge, expertise and business judgment of the bidder acting through its officers and agents and is not the product of, nor was it prepared in connection with, any contract, combination, conspiracy, understanding or collusion between or among any other bidder or prospective bidder on said contract.

\_\_\_\_\_  
Signature

Subscribed and sworn to me this \_\_\_ day of \_\_\_\_\_, 20\_\_.

NOTARY PUBLIC: \_\_\_\_\_

(name signed)

(name printed or typed)

Commission Expires: \_\_\_\_\_

(Date)

(SEAL)



---

Iran Divestment Act Compliance Certification

In accordance with Tennessee Code Annotated (TCA) § 12-12-101 *et. seq.*, by submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to TCA § 12-12-106.

SIGNATURE: \_\_\_\_\_

NAME PRINTED: \_\_\_\_\_

COMPANY: \_\_\_\_\_

DATE: \_\_\_\_\_





Drug Free Workplace Affidavit of Prime Bidder

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Comes the affiant after having first been duly sworn and testifies as follows:

1. My name is \_\_\_\_\_ I hold the principal office of \_\_\_\_\_ for \_\_\_\_\_.  
(Name of Principal Office) (Name of Bidding Entity)

2. \_\_\_\_\_ has submitted a bid to the \_\_\_\_\_  
(Name of Bidding Entity)  
City of Chattanooga for the construction of  
**Contract W-16-013-201**  
**CITICO PUMP RELIABILITY IMPROVEMENTS.**

3. \_\_\_\_\_ employs more than five (5) employees.  
(Name of Bidding Entity)

4. In accordance with Tenn. Code Ann. §50-9-113, this is to certify that  
\_\_\_\_\_ has in effect at the time of its submission of  
(Name of Bidding Entity)  
a bid to perform the construction of the City of Chattanooga project identified above, a drug-free workplace program that complies with Title 50, Chapter 9 of the Tennessee Code.

5. This affidavit is made on personal knowledge.

\_\_\_\_\_  
Signature

Subscribed and sworn to me this \_\_\_ day of \_\_\_\_\_, 20\_\_\_.

NOTARY PUBLIC: \_\_\_\_\_  
(name signed)

\_\_\_\_\_  
(name printed or typed)

Commission Expires: \_\_\_\_\_  
(Date)

(SEAL)



---

Attestation Regarding Personnel Used in Contract Performance

Project Name: CITICO PUMP RELIABILITY IMPROVEMENTS

The Bidder/Contractor, identified below, does hereby attest, certify, warrant, and assure that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant in the performance of this Contract.

BIDDER/CONTRACTOR: \_\_\_\_\_

By: \_\_\_\_\_

*(name signed)*

\_\_\_\_\_

*(name printed or typed)*

Title: \_\_\_\_\_

Date: \_\_\_\_\_

NOTICE: This attestation MUST be signed by an individual empowered to contractually bind the Contractor. If said individual is not the chief executive or president, this document shall attach evidence showing the individual's authority to contractually bind the Contractor.

END OF SECTION



Contractor's Identification

(ALL BLANKS MUST BE FILLED. USE N/A AS NECESSARY)

This form shall be attached to the sealed envelope containing the Bid. All prime contractors and contractors for electrical, plumbing, and heating, ventilation, and air conditioning contracts for bids of \$25,000 or more and/or masonry items for \$100,000 or more are required to complete this form pursuant to TCA-62-6-119. Failure to provide all of this information on the sealed envelope shall be considered a non-responsive Bid and shall not be opened or shall automatically disqualify such bid.

BIDDER:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

If TaxID Number (TIN) issued, list below. Otherwise, list Owner's Social Security Number (SSN).

TaxID Number: \_\_\_\_\_

Tennessee License No.: \_\_\_\_\_

License Registration Date: \_\_\_\_\_

License Expiration Date: \_\_\_\_\_

Monetary Limit: \_\_\_\_\_

\_\_\_\_\_ (\$ \_\_\_\_\_)

Classification: \_\_\_\_\_

\_\_\_\_\_

Complete the following for all applicable Electrical, Plumbing, Masonry and Heating, Ventilation and Air Conditioning Subcontractors: Prime Contractor must fill in space below when performing Electrical, Plumbing, or Heating, Ventilation and Air Conditioning Sub-Contractor work for any bids of \$25,000 or more; and for Masonry for any bids of \$100,000 or more:

Electrical Subcontractor

Tennessee License No.: \_\_\_\_\_

License Expiration Date: \_\_\_\_\_

License Classification: \_\_\_\_\_

Plumbing Subcontractor

Tennessee License No.: \_\_\_\_\_

License Expiration Date: \_\_\_\_\_

License Classification: \_\_\_\_\_

Heating, Ventilation and Air Conditioning Subcontractor

Tennessee License No.: \_\_\_\_\_

License Expiration Date: \_\_\_\_\_

License Classification: \_\_\_\_\_

Masonry Subcontractor

Tennessee License No.: \_\_\_\_\_

License Expiration Date: \_\_\_\_\_

License Classification: \_\_\_\_\_

CITY OF CHATTANOOGA  
Purchasing Department  
101 E. 11<sup>th</sup> Street, Suite G13  
Chattanooga, Tennessee 37402

LOCATION: City Hall, Purchasing Department  
101 E. 11<sup>th</sup> Street  
Suite G13  
Chattanooga, Tennessee 37402

SEALED BID PROPOSAL FOR:  
**CITICO PUMP RELIABILITY IMPROVEMENTS**  
Contract Number: W-16-013-201

DATE OF BID OPENING: Thursday, June 22, 2017  
TIME: 2:00 p.m.



---

THIS AGREEMENT is by and between City of Chattanooga, Tennessee ("Owner") and \_\_\_\_\_  
\_\_\_\_\_ ("Contractor")

Owner and Contractor 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:

CITICO PUMP RELIABILITY IMPROVEMENTS  
Contract # W-16-013-201

**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:

2.02 The Project consists of the addition of an emergency backup pump station to operate in the event of an emergency at Citico Pump Station, a permanent backup generator for onsite power redundancy, preparations for a second electric utility service to the site to serve as an alternate source in the future, electrical equipment upgrades to eliminate single points of failure, and a new odor control system.

**ARTICLE 3 – ENGINEER**

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

**ARTICLE 4 – CONTRACT TIMES**

4.01 *Time of the Essence*

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

4.02 *Days to Achieve Substantial Completion and Final Payment*

A. The Work will be substantially completed within 330 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 365 days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above 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 \$1,000 for each day that expires after the time specified in Paragraph 4.02 above 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 \$1,000 for each day that expires after the time specified in Paragraph 4.02 above 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. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

**ARTICLE 6 – PAYMENT PROCEDURES**

6.01 *Submittal and Processing of Payments*

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

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25<sup>th</sup> day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.

- a. 95 percent of Work completed (with the balance being retainage); and



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

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 one half 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 relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph SC-4.06 of the Supplementary Conditions as containing reliable "technical data."
- E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor’s safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that 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 given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## ARTICLE 9 – CONTRACT DOCUMENTS

### 9.01 Contents

- A. The Contract Documents consist of the following:
  - 1. This Agreement (pages 1 to \_\_, inclusive).
  - 2. Performance bond (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 3. Payment bond (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 4. General Conditions (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 5. Supplementary Conditions (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 6. Specifications as listed in the table of contents of the Project Manual.
  - 7. Drawings as listed on the Drawing Cover Sheet, with each sheet bearing the following general title: CITICO PUMP RELIABILITY IMPROVEMENTS.
  - 8. Addenda (numbers \_\_\_\_ to \_\_\_\_, inclusive), incorporated herein.
  - 9. Exhibits to this Agreement (enumerated as follows):
    - a. Contractor's Bid (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 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. Work Change Directives.
    - c. Change Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

## **ARTICLE 10 – MISCELLANEOUS**

### 10.01 *Terms*

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

### 10.02 *Assignment of Contract*

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

### 10.03 *Successors and Assigns*

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

### 10.04 *Severability*

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

### 10.05 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
  - 1. “corrupt practice” means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  - 2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of

Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_, (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR

**City of Chattanooga, Tennessee**

\_\_\_\_\_

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: Public Works Administrator

Title: \_\_\_\_\_

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

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

Title: City Finance Officer

Title: \_\_\_\_\_

Address for giving notices:

Address for giving notices:

City Hall

\_\_\_\_\_

101 East 11<sup>th</sup> Street

\_\_\_\_\_

Chattanooga, Tennessee 37402

\_\_\_\_\_

**CITY FINANCE OFFICER'S CERTIFICATE**

I do hereby certify that the funds required to be paid by the City under this contract have been appropriated or a loan authorized and have been encumbered and will be available as needed for payment.

This \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
City Finance Officer

**CITY ATTORNEY'S APPROVAL**

This contract approved as to form and legality this the \_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
City Attorney

This document was prepared in part from material (EJCDC C-520 Suggested Form of Agreement Between Owner and Contractor for Construction Contract (Stipulated Price)) which is copyrighted as indicated below:

Copyright © 2007 National Society of Professional Engineers  
1420 King Street, Alexandria, VA 22314-2794  
(703) 684-2882  
[www.nspe.org](http://www.nspe.org)

American Council of Engineering Companies  
1015 15th Street N.W., Washington, DC 20005  
(202) 347-7474  
[www.acec.org](http://www.acec.org)

American Society of Civil Engineers  
1801 Alexander Bell Drive, Reston, VA 20191-4400  
(800) 548-2723  
[www.asce.org](http://www.asce.org)

Associated General Contractors of America  
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308  
(703) 548-3118  
[www.agc.org](http://www.agc.org)

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CONTRACTOR (name and address):

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

OWNER (name and address):

City of Chattanooga, Tennessee  
101 East 11<sup>th</sup> Street  
Chattanooga, Tennessee 37402

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description (name and location): CITICO PUMP RELIABILITY IMPROVEMENTS  
Contract # W-16-013-201

BOND

Bond Number:

Date (not earlier than the Effective Date of the Agreement of the Construction Contract):

Amount:

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

SURETY

\_\_\_\_\_ (seal)

Contractor's Name and Corporate Seal

\_\_\_\_\_ (seal)

Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature (attach power of attorney)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
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.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after Owner terminates for cause in accordance with General Conditions Paragraph 15.02.

4. Failure on the part of the Owner to comply with the notice requirement in General Conditions Paragraph 15.02 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 the following action:

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

5.1.1 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

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

6. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

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

6.2 additional legal, design professional, and delay costs resulting from the Contractor's Default; and

6.3 liquidated damages caused by delayed performance or non-performance of the Contractor.

7. The Surety's liability is limited to the amount of this Bond.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. Definitions

13.1 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.

13.2 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.

13.3 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.

13.4 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.

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



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CONTRACTOR *(name and address):*

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

OWNER *(name and address):* City of Chattanooga, Tennessee  
101 East 11th Street  
Chattanooga, Tennessee 37402

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):* CITICO PUMP RELIABILITY IMPROVEMENTS  
Contract # W-16-013-201

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

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

SURETY

\_\_\_\_\_  
Contractor's Name and Corporate Seal *(seal)*

\_\_\_\_\_  
Surety's Name and Corporate Seal *(seal)*

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature *(attach power of attorney)*

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
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

## Payment Bond

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.

17. 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.

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Section 00 62 76  
Progress Payment Request

**PAY ESTIMATE NUMBER:** \_\_\_\_\_ **PERIOD: FROM** \_\_\_\_\_ **TO** \_\_\_\_\_  
**CONTRACT NUMBER:** \_\_\_\_\_ **RESOLUTION NUMBER:** \_\_\_\_\_

**PROJECT NAME:** CITICO PUMP RELIABILITY IMPROVEMENTS

**SUBMITTED BY:** \_\_\_\_\_

According to the best of our knowledge and belief, we certify that all items and amounts shown on the face of this periodic estimate for partial payment are correct, that all work has been performed and/or materials supplied in full accordance with the requirements of the referenced contract, and/or duly authorized deviations, substitutions, alterations, and/or additions that the foregoing is a true and correct statement of the contract account up to and including the last day of the period covered by this periodic estimate and that no part of the Balance Due this payment has been received.

As per contract specification requirements we understand and agree that the approval of this progress payment shall not be construed as acceptance of any work, material, or products and shall not relieve us in any way from our responsibilities and obligations under this contract, including but not limited to, a final reconciliation of quantities and related costs.

**NET AMOUNT DUE:** \_\_\_\_\_

**CONTRACTOR:** \_\_\_\_\_  
**NAME PRINTED:** \_\_\_\_\_  
**SIGNATURE:** \_\_\_\_\_  
**TITLE:** \_\_\_\_\_  
**DATE:** \_\_\_\_\_

**APPROVALS**

I certify that the above process payment request appears to be accurate and is in general compliance with the amount of work completed during progress payment period.

**REVIEWED BY**

<b>NAME PRINTED:</b>			
<b>SIGNATURE:</b>			
<b>DATE:</b>			
<b>COMPANY:</b>	Burns & McDonnell	Burns & McDonnell	Jacobs Engineering Group, Inc.
<b>TITLE:</b>	Resident Project Representative	Project Manager	Program Manager

**APPROVED FOR PAYMENT**

By: \_\_\_\_\_ DATE: \_\_\_\_\_  
**DIRECTOR OF WASTE RESOURCES DIVISION**





# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

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STANDARD GENERAL CONDITIONS OF THE  
CONSTRUCTION CONTRACT

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## 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. After issuance, any addenda shall become a part of the specifications, as much as though fully contained therein.

1.1 Administrator—The Administrator, Director or Department Head of the Department of the City of Chattanooga under whose general administration and observation this contract is being performed.

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.

4.1 Award—The formal acceptance of the proposal of the lowest responsible bidder by the City Council, subject to the execution and approval of a satisfactory contract and the required bonds therefor, and following such other conditions as may be specified or otherwise required by law or the purchasing requirements of the City of Chattanooga.

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.

8.1 Bonds-Bid, Performance and Payment Bonds and other instruments of security to be furnished by the Contractor in accordance with the Contract Documents.

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+ Not at 6.5"

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. The document to be executed shall be a Change Request Form (CRF) as included in these Contract Documents.

9.1 City-The City of Chattanooga, Tennessee.

9.2 City Attorney-The person duly authorized by the City to act in the capacity of City Attorney, his authorized designee, or special counsel to the City, acting severally within the scope of the particular duties entrusted to them.

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. Whenever, in any portion of the Contract Documents, a requirement of the Contract is stated, it shall be interpreted to mean a requirement of the Contract Documents as defined herein, unless the context indicates the more restricted definition of that portion of the Contract Documents which is captioned "Contract".
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 submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents. Whenever, in any portion of the Contract Documents, the terms "plans and specifications" or "specifications" or "contract" or words of like import appear, they shall be interpreted to mean "Contract Documents" as defined herein unless the context indicates that a more restrictive designation of a particular portion of the Contract Documents is intended.
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 whose proposal is accepted by the Owner with whom Owner has entered into the Agreement: for performance of the work covered by and in conformance with these Contract Documents.



16. *Cost of the Work*—See Paragraph 11.01 for definition.

16.1 Designer - The individual or entity named as such in the Agreement, if a different person or entity from Engineer.

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. The term Drawings shall be considered synonymous with the term Plans.

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.~~The City Engineer (or when retained by the City, an architect or engineer, with such entity being named in the Agreement) and his duly authorized assistants, observers, inspectors or administrators acting severally within the scope of the particular duties entrusted to them

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 01 of the Specifications. The General Requirements are applicable to all Sections of the Specifications and to the entire Work.

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.

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.

23.1 Inspector-An authorized representative of the Engineer assigned to make necessary observations of the work performed by the Contractor.

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.

25.1 Liquidated Damages – amounts shall be as stipulated elsewhere in the Contract Documents. Liquidated damages shall apply to the Contract Times for the Project. Liquidated Damages shall be both additive and cumulative. Liquidated Damages shall end upon Substantial Completion, Completion of the Work associated with each Milestone Date, and upon final completion of the Work. Liquidated damages are not a penalty, but constitute liquidated damages for loss to the City because of increases in expenses for administration, legal counsel, accounting, engineering, construction supervision, inspection, and any other

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expenses incurred directly as a result of the delay of the Contractor in completing the work. This provision for liquidated damages shall be effective between the parties ipso facto without necessity for demand or putting in default by any notice or other means than by the terms of these Contract Documents, the Contractor hereby waiving any such other notice of default and acknowledging that the Contractor shall be deemed to be in default by the mere act of his failure to complete the work within the Contract Time, or within any valid extension of such time hereunder.

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. The City of Chattanooga, Tennessee. The Owner may designate an authorized representative to exercise the authority, in whole or in part, identified in these contract Documents, with such designation being identified in the Supplementary Conditions.
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.
- 31.1 *Plan or Plans*—All of the drawings pertaining to the contract showing the scope and characteristics of the work or a part thereof, including such supplementary drawings as the Engineer may issue in order to elucidate other drawings or for the purpose of showing the changes in the work or for showing details not shown thereon. The term Plans shall be considered synonymous with the term Drawings.
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 its table(s) of contents.

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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. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *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.
38. *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.
39. *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.
40. *Shop Drawings*—All drawings, diagrams, illustrations, [brochures](#), schedules, [specified design related submittals](#), 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 [will be fabricated or installed](#). [Shop drawings may also mean detail drawings, working drawings, construction drawings, and engineering data](#).
41. *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.
- [41.1 Special Provisions-The special clauses setting forth conditions or requirements peculiar to the specific Project, supplementing the General Conditions and Supplementary Conditions and taking precedence over any condition or requirements of the General Conditions and Supplementary Conditions with which they are in conflict.](#)
42. *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.
43. *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. [All Subcontractors shall be deemed to be agents of the Contractor.](#)
44. *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 [to provide the following: \(i\) the Owner full time, uninterrupted, continuous operation of the work; and \(ii\) all required functional, performance, and operational or startup testing has been successfully demonstrated for all components, devices, equipment, and systems to the satisfaction of the](#)

Engineer in accordance with the requirements of the Specifications; and (iii) all required inspections and other work necessary for the Engineer to certify “substantially complete” have been completed. ~~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.

44.1 Submittals – All administrative documents, Shop Drawings, Samples, product data, manufacturer’s literature, quality control documents, design related documents, record documents, contract close-out documents, and/or any other specified document prepared or assembled by or for Contractor and submitted by Contractor to the Owner and/or Engineer.

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45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

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

47. *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 Subcontractor.

47.1 Surety or Sureties—The corporate body which is bound by such bonds as are required with and for the contractor, and which engages to be responsible for the entire and satisfactory fulfillment of the contract and for any and all requirements as set out in the specifications, contract or plans.

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48. *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.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *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, materials, tools, equipment, incidentals, 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.

51. *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.

52. Working Day. Any day, other than a City holiday pursuant to Chattanooga City Code or Sunday, on which the approximate normal working forces of the Contractor may proceed with regular work for at least six hours toward completion of the work, unless work be suspended for causes beyond the contractor control.

## 1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated 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 information in the Contract Documents and with the design concept of the 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.

2. Where the word “similar” occurs in the Contract Document, it shall have a general meaning and not be interpreted as being identical, and all details shall be worked out in relation to their location and their connection with other parts of the Work.

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 that 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 ~~Owner~~ other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which ~~Owner~~ either of them or any additional insured may reasonably request) which Contractor ~~is and Owner~~ respectively are required to purchase and maintain in accordance with Article 5.

### 2.02 *Copies of Documents*

- A. Owner ~~shall will~~ furnish to Contractor up to ~~ten-four~~ printed or hard copies of the ~~Drawings and Project Manual~~ Contract Documents and one counterpart of the executed Contract Agreement. 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~~ date established in the

Notice to Proceed. A Notice to Proceed may be given at any time within ~~30-60~~ 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~~ may start to perform the Work on the date when the Contract Times commence to run. The Contractor shall begin the work within ten days of the date of the Notice to Proceed. The Contractor shall notify the City and the Engineer two working days in advance of the date he will begin onsite operations. 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 ~~Commencement of the Contract Time~~ Effective Date of the Agreement (unless otherwise specified in Section 01 32 16 – Construction Schedules of 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; which indicates each required Submittal and the dates for submitting, time for reviewing and processing each Submittal (periodic Submittals may be listed by a common monthly date); and
  3. a preliminary Schedule of Values for all of the Work in a format acceptable to the Engineer and in accordance with the requirements specified in Section 01 32 16 – Construction Schedules of the General Requirements, 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; Designation of Authorized Representatives*

- 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.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.



## 2.07 Initial Acceptance of Schedules

- A. ~~At least 10 days before submission of the first Application for Payment a~~ Within ten days after the preconstruction conference 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 as being the Contractor's schedule for the 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. The Progress Schedule may subsequently be adjusted in accordance with Paragraph 6.04 and applicable provisions of Section 01 32 16 – Construction Schedules of the General Requirements.
  2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals. The Schedule of Submittals may subsequently be adjusted in accordance with Paragraph 6.04 and applicable provisions of Section 01 32 16 – Construction Schedules of the General Requirements.
  3. Contractor's Schedule of Values will be acceptable to the Engineer as to form and substance if it is provided in accordance with the requirements specified in Section 01 32 16 – Construction Schedules of the General Requirements.~~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 individual components of 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 reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated 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.
- D. Each and every clause or other provision required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted.



or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be amended to make such insertion.

E. “Imperative” or “Command” type language is used in the Contract Documents. This command language refers to and is directed to the Contractor.

F. Emphasis, such as italics, underlining, bold text or quotes, may have been used throughout the Contract Documents. Use of emphasis shall not change the meaning of the term emphasized.

### 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. Tentative specifications shall be construed as current unless otherwise noted. Where obsolete Federal Specifications have been referenced, they shall be superseded by the Federal Specification in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids).
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, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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. All sections of governing standard specifications relating to measurement and payment shall not apply to the work specified herein.

### 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 discovers, or has actual knowledge of, 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 (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then 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 had actual knowledge 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, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).
2. In resolving inconsistencies within the Contract Documents, precedence shall be given in the following descending order:
  - a. Change Orders
  - b. Work Change Directives
  - c. Field Orders
  - d. Engineer's written interpretations and clarifications
  - e. Notice to Proceed
  - f. Addenda
  - g. Contract Agreement
  - h. Supplementary Conditions
  - i. General Conditions
  - j. Specifications

k. Drawings

1. Schedules on Drawings
2. Notes on Drawings
3. Details on Drawings
4. Large Scale Drawings
5. Small Scale Drawings
6. Dimensions given as Figures
7. Scaled Dimensions

l. Bidding Requirements

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; or
  - ~~2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or~~
  23. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
  1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
  2. reuse any 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 adaptation by Engineer.
- B. The prohibitions 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.

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### 3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by 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.

### 3.07 *Contract Times*

- A. All Contract Times and time limits stated in the Contract Documents are of the essence of the Agreement.
- B. The Contractor shall proceed with the Work at a rate of progress which will ensure completion within the Contract Times.
- C. It is expressly understood and agreed by and between the Contractor and the Owner, that the Contract Times for the Work described herein are reasonable time, taking into consideration the average climatic and economic conditions, and other factors prevailing in the locality of the Work.
- D. If the Contractor shall fail to perform the Work required within the Contract Times, or extended Contract Times if authorized by Change Order, then the Contractor shall pay to the Owner the full amount of liquidated damages specified in the Contract Documents for each calendar day that the Contractor shall be in default after the Contract Times stipulated in the Contract Documents.

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

### 4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements

for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide, at his own expense and without liability to the City, for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.
- D. Prior to the issuance of the Notice to Proceed, the City will have obtained most of the land and rights-of-way, including easements, necessary for carrying out and for the completion of the work to be performed pursuant to these Contract Documents, unless mutually agreed or specified in the Specifications. In the event all land and rights-of-way have not been obtained as herein contemplated before construction begins, the Contractor shall begin the work upon such land and rights-of-way as the City may have previously acquired, and no claim for damages whatsoever will be allowed by reason of the delay in obtaining the remaining land and rights-of-way. Should the City be prevented or enjoined from proceeding with the work, or from authorizing its prosecution, either before or after the commencement, by reason of any litigation, or by reason of its inability to procure any lands or rights-of-way for the work, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay, or to withdraw from the contract except by consent of the City; but time for completion of the work will be extended to such time as the City determines will compensate for the time lost by such delay, such determination to be set forth in writing.

#### 4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
  - 1. those reports ~~known to Owner~~ of explorations and tests of subsurface conditions at or contiguous to the Site that have been utilized by the Engineer in preparing the Contract Documents; -and
  - 2. those drawings ~~known to Owner~~ of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities that have been utilized by the Engineer in preparing the Contract Documents).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors 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 that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, ~~will~~ may 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 or should have known 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, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

#### 4.04 *Underground Facilities*

##### A. General

1. The Contractor shall notify the owners of adjacent utilities when the prosecution of the work may affect the utility facilities or operation.
2. The Contractor shall perform and carry on the work so as not to interfere with or damage utility facilities in the vicinity of the work. The Contractor shall take every possible precaution to properly protect and preserve, including temporary supports and bracing where necessary, the utility facilities from damage, injury or displacement. The Contractor shall remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor or any person directly or indirectly employed or engaged by the Contractor or a subcontractor or any person for whose acts the Contractor or a subcontractor is liable.
3. The City and the Engineer will not be responsible for any delay in performing the work resulting from the existence, removal or adjustment of any utility facilities. Additional costs incurred by the Contractor as a result thereof shall be borne solely by the Contractor.
4. Utility facilities, such as water mains, gas mains, storm sewers, sanitary sewers, telephone lines, power lines and buried facilities and structures in the vicinity of the work are indicated

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on the drawings only to the extent such information has been made available to or discovered by the Engineer during the course of preparing the drawings. The actual locations of the utility facilities may vary from the locations shown, and there may be utility facilities existing that are not indicated on the Drawings. It is understood and agreed that there is no guarantee as to the accuracy or completeness of the utility information indicated on the drawings, and all responsibility for the accuracy or completeness thereof is expressly disclaimed. Generally, service connections are not indicated on the Drawings.

5. The Contractor shall be solely responsible for locating all existing underground facilities, including service connections, in advance of excavating, trenching or other work, by contacting the owners of the facilities or prospecting. The Contractor shall use his own information and shall not rely upon the information shown on the Drawings concerning utility facilities.
6. In the event of accidental damage to or disruption of utilities by the Contractor or any of his subcontractors or agents, the Contractor shall immediately take all necessary steps to replace any pieces of damaged equipment and all damaged materials, make all necessary repairs and restore all services to normal. The Contractor shall engage any and all required additional labor, individuals, subcontractors or other outside services which may be deemed necessary, to operate on a continuous "around-the-clock" basis until services are restored. He shall also provide and install all required equipment and materials to maintain temporary emergency services for uninterrupted use of facilities. All costs involved in making the repairs and restoring the disrupted service to normal shall be borne by the Contractor responsible for such disruption of services, and he shall be fully responsible for any and all damage claims resulting from such disruption.
7. Under no circumstances shall the Contractor or any of his subcontractors or agents disrupt or disconnect any type of facility whatsoever without first obtaining the written permission of the utility owner to do so. Request for disruption or disconnection shall state:
  - a. The location of the required disconnect and which utility is concerned.
  - b. The exact date and time at which the disconnect will be required.
  - c. The duration of the proposed disconnect or interruption.
8. Where it is necessary to temporarily interrupt services, the Contractor shall notify the utility owner, both before the interruption and again immediately before service is resumed. Before disconnecting any pipes or cables, the Contractor shall obtain permission from the owners thereof, or shall make suitable arrangements for their disconnection by the owners. Where it is necessary to temporarily interrupt house services, the Contractor shall notify the house owner or occupant, both before the interruption and again immediately before service is resumed. Should underground utilities or structures be encountered that are in minor conflict with the alignment or gradient of the proposed work, the proposed work may be adjusted by the Engineer where such adjustment is feasible and will not interfere with the operation of the proposed system. No payment will be made for these adjustments.



9. Where major conflicts in the proposed work and existing utilities or structures occur and adjustment of the new work is not feasible, then the Engineer may revise the alignment and/or grade to suit these conditions. If, in the opinion of the City, these revisions are necessary and are outside the scope of the bid items, they will be paid for as extra work.

B. 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 provided by others; 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.

BC. 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 Field Order, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment ~~shall~~may 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 caused a change as described in Paragraph A.9 of this Article 4.04. ~~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.

D. The dimensions and descriptions given on the Drawings for adjacent work by others, if any, (including any existing facilities or utilities previously constructed for Owner) are based on the design drawings and not as-built drawings. Prior to commencing the Work, the Contractor shall verify all as-built conditions and information whenever existing facilities or utilities may impact the Work. Failure of Contractor to so verify all as-built conditions prior to commencing the Work shall bar Contractor from later seeking additional compensation for conflicts with existing facilities or utilities.

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E. Prior to the construction or installation of any proposed facility or pipeline, the Contractor shall expose all existing utilities true to their vertical and horizontal location, within the vicinity of the Work. In order to avoid conflicts between existing and proposed facilities or utilities, the Contractor shall either relocate the existing or proposed utility on a temporary or permanent basis, or shall take whatever means necessary to protect the existing facilities or utilities during the installation of proposed utilities, as approved by the Engineer. No additional payment will be made for the relocation of existing utilities or for any work associated with the protection of existing facilities or utilities.

#### 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.

B. Engineer may check the lines, elevations, and reference marks set by Contractor, and Contractor shall correct any errors disclosed by such check. Such a check shall not be considered as approval of Contractor's work and shall not relieve Contractor of the responsibility for accurate construction of the entire Work. Contractor shall furnish personnel to assist Engineer in checking lines and grades.

C. The Contractor shall review the Contract Documents and the Project site to determine the presence and location of any property or rights-of-way monuments or markers, and to assess the possibility of disruption to these monuments or markers. It will be the Contractor's responsibility to flag, erect guard post, or provide offset references for the protection or the re-monumentation of these property or rights-of-way monuments or markers. In the event these monuments or markers are covered over or disturbed, it will be the Contractor's responsibility to employ a surveyor licensed in the state of that the Project is located to re-establish those monuments or markers of property or rights-of-way, which were present prior to Work on the Project.

D. It shall be the Contractor's responsibility to verify all reference points shown on the Contract Documents prior to beginning Work on the site. This verification shall be conducted by professionally qualified personnel in a manner which will verify the accuracy of the information shown in the Contract Documents. On projects which involve the connection to, or additions to existing structures, the elevations of these existing structures shall also be verified. Any findings which differ from those shown on the Contract Documents shall be submitted in writing to the Engineer for resolution.

E. Additional surveys necessary for the construction staking shall be performed by the Contractor, the cost of which shall be incorporated into the appropriate items of Work. On projects in which payment is classified by depth of cut, the construction staking shall be performed in a manner that will allow for the determination of cut classification.

#### 4.06 Hazardous Environmental Condition at Site

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors 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. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- 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 written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may issue a Work Change Directive or Change Order as appropriate regarding said condition. ~~order the portion of the Work that is in the area affected by such condition to be deleted from the Work.~~ If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, 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, members, 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~~ is made by the Owner 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 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 or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- 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 by the State of Tennessee 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 below; in the Supplementary Conditions:~~

1. Surety shall be in good standing with the Tennessee Department of Commerce and Insurance.
2. Surety and Insurers must have an A.M. Best Financial Strength Rating of A or higher, with a Financial Size Category of X or higher.
3. The surety shall have an underwriting limitation in Circular 570 in excess of the Contract Amount.

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4. No surety will be accepted who is now in default or delinquent on any bond.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee 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 and loss payee 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.~~
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such 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, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, 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 contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
  - 4. 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);
  - 5. 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
  - 6. include completed operations coverage:
    - a. Such insurance shall remain in effect for two years after final payment.
    - b. 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~~Contractor 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, members, 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 a loss payee;
2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that 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 loss payee to whom a certificate of insurance has been issued.

- ~~B. Owner shall purchase and maintain such equipment breakdown 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,~~



~~members, 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 a loss payee.~~

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this 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 loss payee 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 this 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 Paragraphs 5.04 and 5.06 by Contractor will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, 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 loss payees thereunder. ~~Owner and Contractor waive all rights against each other and their respective officers, directors, members, 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 as loss payees (and the officers, directors, members, 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/Contractor as trustee or otherwise payable under any policy so issued.

~~B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, 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, members, 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 loss payees, 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~~ Contractor in accordance with this Article 5 on the basis of ~~non-conformance~~ its not complying with the Contract Documents, ~~the objecting party shall so~~ Owner will notify ~~the other party~~ Contractor in writing thereof within 10 days ~~after receipt of the certificates (or other evidence requested) required by~~ of the date of delivery of such certificate to Owner in accordance with Paragraph 2.01.B. ~~Owner and Contractor shall each provide to the other~~ such additional information in respect of insurance provided by Contractor as ~~the other~~ Owner 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.~~

B. All policies and bonds shall be subject to approval by the City Attorney. Should the City Attorney at any time in his sole discretion determine that the insurance policies and certificate provided may not be sufficient to protect the interests of the City because of the insolvency of the insurance company or otherwise, the Contractor shall replace such policies with policies meeting his approval.

#### 5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner ~~chooses~~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, provide quality control, 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. Any method of work suggested by the City or Engineer, but not specified, shall be used at the risk and responsibility of the Contractor; and the City and Engineer will assume no responsibility therefore. 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 ~~have on site assign~~ a competent ~~resident~~ superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. Contractor shall also designate, in writing, a representative, hereinafter referred to as Project Manager, assigned to the Project on a full-time basis during execution of the Work who shall have the authority to act on behalf of Contractor, including executing the orders or directions of the Engineer without delay. This Superintendent and/or Project Manager shall have full authority to promptly supply products, tools, plant equipment, and labor as may be required to diligently prosecute the Work. All communications given to or received from the Superintendent and/or the Project Manager shall be binding on Contractor.

~~C. If at any time during the Project the Superintendent or Project Manager leaves the Project site while Work is in progress. Engineer shall be notified and provided with the name of Contractor's representative having responsible charge.~~

~~CD. Contractor shall also designate the person responsible for Contractor's quality control while Work is in progress. Engineer shall be notified in writing prior to any change in quality control representative assignment.~~

~~DE. Prior to the Commencement of the Contract Time, Contractor shall furnish to the Owner and Engineer the names, resumes, 24 hour contact information and other relevant information associated with the Project Manager and the Superintendent that are to be assigned to this project. The Project Manager and Superintendent must be acceptable to the Owner and Engineer.~~

## 6.02 Labor; Working Hours

A. Contractor shall provide competent, skilled, 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. Contractor shall, upon demand from the Engineer, immediately remove any manager, superintendent, foreman or workman whom the Engineer or Owner may consider incompetent or undesirable.

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 City holiday pursuant to the Chattanooga City Code legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

C. Regular working hours may be Monday through Friday, excluding holidays, occurring between the hours of 7:00 AM and 6:00 PM, unless restricted otherwise. Contractor shall establish regular scheduled work times, e.g., four 10-hour days or five 8-hour days, or five 10-hour days within the hours and days allowed above. Approval for specific work outside regular scheduled work times shall be requested no less than 48 hours prior to the requested work period. Contractor shall request approval of changes in regular scheduled work times no less than one week prior to the desired change. Occasional unscheduled overtime on weekdays may be permitted provided reasonable notice is given to Engineer. Night work will not be established as a regular procedure, excluding emergencies, except with written permission. Such permission, if granted, shall be upon such terms and conditions deemed appropriate in the Engineer's sole discretion.

D. Contractor shall pay all extra costs incurred by the Owner associated with work, outside of normal working hours, including additional support services, inspection services, testing services, utilities or other applicable costs. The cost associated with the Owner's inspection overtime will be the amounts as provided in the Supplementary Conditions per hour per individual, depending upon individuals assigned to the Project, the type of work being inspected, and the date of the invoice; i.e., allowing for salary escalation. Contractor will not be

responsible for extra costs associated with inspection overtime for work in excess of 40 hours per week when such overtime work is explicitly required by the Contract Documents.

E. Except in the case of emergencies or other unusual circumstances, no work shall be permitted on the project on Sunday or locally observed national holidays.

F. The Engineer will determine to what extent extraordinary onsite personnel work is required during Contractor's overtime work or working hours outside regular scheduled work hours.

G. During unfavorable weather, wet ground, or other unsuitable construction conditions, the Contractor shall confine his operations to work which will not be affected adversely thereby. No portion of the work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by the Contractor to perform the work in a proper and satisfactory manner.

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### 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, quality control, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, and if not specified, shall be of good quality, and new and unused, except as otherwise provided in the Contract Documents and shall be installed in an undamaged condition. All products provided on this Project shall be products currently manufactured by the manufacturer, i.e., products shall not be discontinued or out-of-date products nor shall they be of the last production run of the product. Contractor shall incorporate the previous sentence in any contract or agreement between Contractor and subcontractor or supplier supplying products provided on this Project. All special warranties and guarantees required by the ~~Specifications~~ Contract Documents 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.

D. Without limiting the responsibility or liability of the Contractor pursuant to this agreement, all warranties given by manufacturers on materials or equipment incorporated in the work are hereby assigned by the Contractor to the Owner. Such assignment shall be effective upon completion of Contractor's warranty period. If requested, the Contractor shall execute formal assignments of said manufacturer's warranties to the Owner. All such warranties shall be directly enforceable by the Owner. Such assignment shall in no way affect the Contractor's responsibilities and duties during the warranty period.

E. Wherever a stock size of manufactured item or piece of equipment is specified by its nominal size, it shall be the responsibility of the Contractor to determine the actual space requirements for setting and for entrance to the setting space and to make all necessary allowances and adjustments therefor in his work without additional cost to the City.

F. Equipment and Construction Plant. All equipment and construction plant shall be suitable to produce the quality of work and materials required for the satisfactory completion of the work within the Contract Time and shall be satisfactory to the Engineer. The Contractor shall provide adequate and suitable equipment and construction plant to meet the requirements of the work as specified in these Contract Documents. The Contractor shall remove unsuitable equipment from the work and add to the construction plant when ordered to do so by the Engineer. The Contractor shall obtain written permission from the City prior to constructing temporary buildings or other structures on land owned or leased by the City. If a permit is granted, said buildings or other structures shall comply with all applicable regulations regarding their construction and maintenance and shall be satisfactory to the City.

#### 6.04 Progress Schedule

A. Contractor shall provide all resources, labor, materials, equipment, services, etc. necessary to adhere to the Progress Schedule established in accordance with Paragraph 2.07 and Section 01 32 16 – Construction Schedules of the General Requirements as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in and Section 01 32 16 – Construction Schedules of the General Requirements) an updated – the Progress Schedule that will not result in changing the Contract Times and an updated Schedule of Submittals with each partial payment request, but no less than monthly. Contractor’s failure to provide acceptable updated Progress Schedule and Schedule of Submittals will delay processing of the pay request until receipt of the acceptable updated Progress Schedule and/or an updated Schedule of Submittals. Such adjustments will updates and adjustments shall comply with any provisions of Section 01 32 16 – Construction Schedules 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.

3. Number of anticipated days associated with weather conditions, as defined in the General Requirements, shall be included on the critical path of Project Schedule.

B. The Contractor shall implement the detailed schedule of activities to the fullest extent possible between Project Coordination Meetings.

C. The Contractor shall prepare its daily report by 10:00 a.m. of the day following the report date. This daily report will contain, as a minimum, the weather conditions; number of workers by craft, including supervision and management personnel on site; active and inactive equipment on site; work accomplished by schedule activity item; problems; and visitors to the jobsite.

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D. If a current activity or series of activities on the overall project schedule is behind schedule and if the late status is not due to an excusable delay for which a time extension would be forthcoming, the Contractor shall attempt to reschedule the activity to be consistent with the overall Project schedule so as not to delay any of the Contract milestones. The Contractor agrees that:

1. The Contractor shall attempt to expedite the activity completion so as to have it agree with the overall progress schedule. Such measures as the Contractor may choose shall be made explicit during the Project Coordination Meeting.

2. If, within two weeks of identification of such behind-schedule activity, the Contractor is not successful in restoring the activity to an on schedule status, the Contractor shall:

a. Carry out the activity with the scheduled crew on an overtime basis until the activity is complete or back on schedule.

b. Increase the crew size or add shifts so the activity can be completed as scheduled.

c. Commit to overtime or increased crew sizes for subsequent activities, or some combination of the above as deemed suitable by the Engineer.

3. These actions shall be taken at no increase in the Contract amount.

E. The Contractor shall maintain a current copy of all construction schedules on prominent display in the Contractor's field office at the Project site.

F. The Contractor shall cooperate with the Owner and Engineer in all aspects of the Project scheduling system. Failure to implement the Project scheduling system or to provide specified schedules, diagrams and reports, or to implement actions to re-establish progress consistent with the overall progress schedule may be causes for withholding of payment.

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#### 6.05 *Substitutes and "Or-Equals"*

~~A. See Section 01 25 00 – Substitutions and Options of the General Requirements. 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:~~

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~~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; and~~
- ~~3) it has a proven record of performance and availability of responsive service.~~

~~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 if 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 by 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 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~~

~~e) whether 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; and~~

~~4) 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 a Change Order in the case of a substitute and 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 so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable 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. Acceptance of any Subcontractor, other person or organization by Owner shall not constitute a waiver of any right of Owner to reject defective Work. 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 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. Such arrangement shall not operate to make the

Engineer or the City an arbitrator to establish subcontract limits between Contractor and Subcontractor.

- G. All Work performed for Contractor by a Subcontractor or Supplier ~~will shall~~ 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 a loss payee 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, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, 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.~~
- H. Owner or Engineer may furnish to any Subcontractor, Supplier or other person or organization, to the extent practicable, information about amounts paid on their behalf to Contractor in accordance with Contractor's Applications for Payment.
- I. Specialty Subcontractors: Contractor shall utilize the services of Specialty Subcontractors on those parts of the Work which is declared as specialty work in Specifications and which, under normal contracting practices, is best performed by Specialty Subcontractors, as required by the Engineer in Engineer's sole discretion, at no additional cost to the Owner. If Contractor desires to self-perform specialty work, Contractor shall submit a request to the Owner, accompanied by evidence that Contractor's own organization has successfully performed the type of work in question, is presently competent to perform the type of work, and the performance of the work by Specialty Subcontractors will result in materially increased costs or inordinate delays.
- J. The Contractor shall perform a minimum of 50 percent of the onsite labor with its own employees.

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, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors 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 specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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 temporary and permanent permits and licenses, necessary and incidental to the due and lawful prosecution of the work, including all permits on any part of the Work as required by law in connection with the Work.~~ Owner ~~shall will~~ assist Contractor, when ~~required by the permitting agency 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.

B. Railway Crossings. When the work encroaches upon the right-of-way of any railway, the City will secure for the Contractor all the necessary easements or authority to enter upon such right-of-way for the prosecution and completion of the work. Contractor shall, however, take such special precaution for the safety of the work and the traveling public as may be necessary, by sheeting, bracing, and thoroughly supporting the sides of any excavation and supporting and protecting any adjacent structures. Contractor shall be bound by all requirements as stated in Supplemental Agreement between the City and railroad authority, as included in an appendix to these Contract Documents.

#### 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 responsibility to make certain that the Specifications and

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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, or both. 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.

D. It is understood and agreed that the Contractor shall be familiar with and shall observe and comply with, all Federal, State, County, and City laws, codes, ordinances, regulations, orders, and decrees, including air and water pollution and noise abatement regulations, existing, or enacted subsequent to the execution of the Contract, that in any manner affect those engaged or employed in the work, or the materials or equipment used in the work, or which in any way affect the conduct of the work. The Contractor shall strictly observe all applicable laws and regulations as to public safety, health and sanitation. No pleas of misunderstanding or ignorance on the part of the Contractor will in any way serve to modify or mitigate the provisions of these Contract Documents. The Contractor and his Surety shall indemnify and save harmless the City and the Engineer and all their officers, agents, and servants against any claim or liability arising from, or based on the violation of, any such law, code, ordinance, regulation, order or decree, whether by himself, his agents or his employees.

F. Where professional engineering and/or architectural services are required in connection with any of the components required by the Contract, all Bidders and component suppliers must make certain that there is full compliance with all applicable laws of the state in which the Project is located and any other state governing professional engineering and/or architecture. The Owner and Engineer do not warrant that any entity listed as an acceptable manufacturer is or will be in compliance with such laws.

G. Any fines levied against the Owner for failure of Contractor to properly maintain required NPDES erosion and sediment control measures or any other related requirements will be deducted as set-offs from payments due Contractor.

#### 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, members, 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 Record Documents as specified in the Section 01 78 39 – Record Documents of the General Requirements ~~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~~ shall 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. Such responsibility does not relieve

Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all ~~necessary~~ precautions for the safety of, and shall provide the ~~necessary~~ protection to prevent pollution of or 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. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or 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).
- F. 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).
- G. The property, improvements or facilities at the site shall be replaced or restored to a condition as good as when Contractor entered upon the Site. In case of failure on the part of Contractor to restore such property, or make good such damages or injury, the Owner may, after 48 hours written notice, or sooner in the case of an emergency, proceed to repair, rebuild, or otherwise



restore such property, improvements or facilities as may be deemed necessary. The cost thereof will be deducted from any monies due or which may become due Contractor under this Contract.

H. Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

I. The Contractor shall give due notice to any controlling person, department, or public service company, prior to adjusting items to grade and shall be held strictly liable to the City if any such items are disturbed, damaged or covered up during the course of the work.

J. Fire hydrants on or adjacent to the work shall be kept accessible to the fire-fighting apparatus at all times, and no material or obstruction shall be placed within 10 feet of any hydrant. Adjacent premises must be given access, as far as practicable, and obstruction of sewer inlets, gutters and ditches will not be permitted.

K. Public Safety and Convenience

1. The Contractor shall conduct his operations in a manner that will offer the least possible obstruction and inconvenience to the public and he shall not have under construction an amount of work greater than he can prosecute properly with due regard to the rights of the public.

2. Construction operations shall be conducted in a manner that will cause as little inconvenience as possible to abutting property owners. Convenient access to driveways, houses, buildings or other facilities in the vicinity of the work shall be maintained and temporary access facilities for public roadways shall be provided and maintained in satisfactory condition.

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.

B. The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards, including sufficient lights and danger signals on or near the work; he shall erect suitable railings, barricades, covers, or other protective devices about unfinished work, open trenches, holes, embankments or other hazards and obstructions; where hazards to workmen or the public exist. The Contractor shall provide, at all times, all necessary watchmen on the project, for the safety of employees, delivery personnel, and the

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general public, and to diligently guard and protect all work and materials, including Owner-furnished equipment. Construction equipment shall be suitably night-marked and lighted as necessary for safety considerations. No separate payment will be made for providing lights on vehicles and equipment, signs, barricades, lights, flags, watchmen and other protective devices, and the costs thereof shall be included in the Contract Price(s).

#### 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~~ and Other Submittals

- A. Contractor shall submit ~~Shop Drawings and Samples~~ Submittals to Engineer for review and approval in accordance with the accepted or adjusted Schedule of Submittals (as required by Paragraph 2.07). Each submittal ~~will~~ shall be identified as Engineer may require.

##### 1. Shop Drawings:

- a. Submit number of copies specified in the Section 01 33 23 – Shop Drawings, Product Data and Samples of the General Requirements.
- b. Data shown on the Shop Drawings ~~will~~ shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

##### 2. Samples:

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

- B. Where ~~a Shop Drawing or Sample~~ any Submittal 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:

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

*D. Engineer's Review:*

1. Engineer will return as incomplete or will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval or disapproval 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 or disapproval 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 Field Order 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.

4. Review by the City or Engineer of any plan or method of work proposed by the Contractor shall not relieve the Contractor of any responsibility therefor, and such review shall not be considered as an assumption of any risk or liability by the City or Engineer, or any officer, agent, or employee thereof. The Contractor shall have no claim on account of the failure or inefficiency of any plan or method so reviewed.

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.

F. Excessive Submittal Resubmission: Engineer will record time required by Engineer for excessive Submittal review occasioned by Contractor's resubmission, in excess of two resubmissions of any required Submittal, caused by unverified, unchecked or unreviewed, incomplete, inaccurate or erroneous, or nonconforming Submittals. Upon receipt of Engineer's accounting of time and costs, Contractor will reimburse Owner for the charges of Engineer's review for excessive resubmissions through set-offs from the recommended Owner payments to Contractor as established in Paragraph 14.02.D. of these General Conditions.

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G. In the event that Contractor provided a submittal for a previously approved item, whether such is as a substitution or in addition to the previously approved item, Contractor shall reimburse Owner for Engineer's charges for such time as may be required to perform all reviews of the substitute item, unless the change is specifically requested by the Owner.

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 officers, directors, members, partners, employees, agents, consultants, and subcontractors 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 s~~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 and Liability*

- A. It is understood and agreed that the Contractor shall be deemed and considered an independent contractor in respect to the work covered by these Contract Documents, and shall assume all risks and responsibility for casualties of every description in connection with the work, except that he shall not be held liable or responsible for delays or damage to work caused by acts of God, acts of public enemy, quarantine restrictions, general strikes throughout the trade, or freight embargoes not caused or participated in by the Contractor. The Contractor shall have charge and control of the entire work until completion and final acceptance of the work by the City. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity .

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

D. Contractor, Subcontractors, Suppliers and others on the Project, or their sureties, shall maintain no direct action against the Engineer, their officers, employees, affiliated corporations, consultants, and subcontractors, for any claim arising out of, in connection with, or resulting from the engineering services performed. Only the Owner will be the beneficiary of any undertaking by the Engineer.

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E. Defense of Suits: In case any action in court is brought against the City or the Engineer, or any officer, agent or employee of any of them, for the failure, omission, or neglect of the Contractor to perform any of the covenants, acts, matters, or things by this contract undertaken; or for injury or damage caused by the alleged negligence of the Contractor or his subcontractors or his or their agents, or in connection with any claim based on lawful demands of subcontractors, workmen, material-men, or suppliers, the Contractor shall indemnify, defend and save harmless the City and the Engineer and their officers, agents and employees, from all losses, damages, costs, expenses (including attorneys' fees), judgments, or decrees arising out of such action.

#### 6.21 Delegation of Professional Design Services

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations,

specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

#### 6.22 Project Coordination Meetings

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- A. The Contractor shall participate in Project Coordination Meetings to be held on the site monthly, or more often if conditions warrant, to establish the current state of completion and revise the schedule as necessary. The Project Coordination Meeting will be conducted by the Owner and/or the Engineer.

### **ARTICLE 7 – OTHER WORK AT THE SITE**

#### *7.01 Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
  - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
  - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times or both that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with

such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' 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~~s 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 with other contractors.

#### 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 wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

#### 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 the work at the site be made by any separate contractor against Contractor, Owner, Engineer, or any other person, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by mediation, arbitration, or at law.

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B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold Owner, Engineer, and the officers, directors, employees, agents, and other consultants of each and any of them harmless 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 directly, indirectly or consequentially out of or resulting from any action, legal or equitable, brought by any separate contractor against Owner, Engineer, or the officers, directors, employees, agents, and other consultants of each and any of them to the extent based on a claim arising 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 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 the officers, directors, employees, agents, and other consultants of each and any of them 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 mediator or arbitrator which seeks to impose liability on or to recover damages from Owner, Engineer, or the officers, directors, employees, agents, or other consultants of each and any of them 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 hereto, 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, and/or Engineer and the officers, directors, employees, agents, or other consultants of each and any of them for any delay, disruption, interference or hindrance caused by any separate contractor. This Paragraph does not prevent recovery from Owner, Engineer, and/or Designer for activities that are their respective responsibilities.

## **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 with respect to 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 relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's ~~shall not have any~~ responsibilities, ~~if any,~~ with 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 with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

### 8.13 Testing of Materials and Equipment

A. The testing of materials shall be made by a competent laboratory or other person selected and paid for by the City. The Contractor shall submit samples of materials for testing as required by the Engineer. The cost of all retests made necessary by the failure of materials to conform to the requirements of these Contract Documents shall be paid by the Contractor.

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## **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.

### *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, but will not be on-site at all hours the Work is in progress. 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 therefore 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 have authority to determine the actual quantities and classifications of Unit Price Work performed by Contractor. If Engineer exercises such authority, 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 initial 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 believes 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, except that Owner shall determine whether bonds, certificates of insurance and release of liens comply 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.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

9.11 Authority of the City Engineer

- A. If the City has retained an engineer to assist the City Engineer in administering the contract, then the authority of the City Engineer shall be as specified herein. If the administration of the contract is performed by the City Engineer without having an engineer, then the authority of the City Engineer shall be as specified in this section and this Article 9.
- B. The general administration and observation of the performance and execution of the work under these Contract Documents is vested in the City Engineer. The detailed administration and observation of the performance and execution of the work is vested in the Engineer as set forth above.
- C. The City Engineer may authorize a person to act as the City Engineer's authorized representative or agent in carrying out the duties specified in these Contract Documents. The instructions of the City Engineer, or authorized representative, shall be strictly and promptly followed in every case.
- D. The City Engineer, or authorized representative, shall have authority to suspend operations at any time, without additional cost to the Owner, when the work, in the City Engineer's opinion, is not being carried out in conformity with the Drawings, Specifications, and other Contract Documents.
- E. The City Engineer, or authorized representative, may appoint Inspectors as are necessary to observe the performance of the work under these Contract Documents and the amount, character, and quality of materials supplied.

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**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).

1. Owner may, in anticipation of possibly ordering an addition, deletion or revision to the Work, request Contractor to prepare a proposal of cost and times to perform Owner's contemplated changes in the Work. Contractor's written proposal shall be transmitted to the Engineer promptly, but not later than fourteen days after Contractor's receipt of Owner's written request and shall remain a firm offer for a period not less than sixty days after receipt by Engineer.

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2. Contractor is not authorized to proceed on an Owner contemplated change in the Work prior to Contractor's receipt of a Change Order (or Work Change Directive) incorporating such change into the Work.

3. Owner's request for proposal or Contractor's failure to submit such proposal within the required time period will not justify a claim for an adjustment in Contract Price or Contract Time (or Milestones).

4. The Owner shall not be liable to the Contractor for any costs associated with the preparation of proposal associated with the Owner's contemplated changes in the Work.

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*

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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.D.

#### 10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of

executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

B. In signing a Change Request Form, the Owner and Contractor acknowledge and agree that:

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1. The stipulated compensation (Contract Price or Contract Time, or both) set forth in the Change Order includes payment for:

a. the Cost of the Work covered by the Change Order,

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b. Contractor's fee for overhead and profit,

c. interruption of Progress Schedules,

d. delay and impact, including cumulative impact, on other work under the Contract Documents, and

e. extended home office and jobsite overhead;

2. the Change Order constitutes full mutual accord and satisfaction for the change to the Work;

3. No reservation of rights to pursue subsequent claims on the Change Order will be made by either party; and

4. No subsequent claim or amendment of the Contract Documents will arise out of or as a result of the Change Order.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety 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), 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 and Disputes*

- 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 ~~30-10~~ 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 written supporting data shall be delivered to the Engineer and the other party to the Contract within ~~60~~ 20 days (and monthly thereafter for continuing events) 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 Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
  2. approve the Claim; or
  3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

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

### 11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of



the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

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 on the Work. 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.

1. Full rental cost for rented, leased, and/or owned equipment shall not exceed the rates listed in the Rental Rate Blue Book published by Equipment Watch, a unit of Penton Media, Inc., as adjusted to the regional area of the Project. The most recent published edition in effect at the commencement of the actual equipment use shall be used.
2. Rates shall apply to equipment in good working condition. Equipment not in good condition, or larger than required, may be rejected by Engineer or accepted at reduced rates.
3. Equipment in Use: Actual equipment use time documented by the Engineer shall be the basis that the equipment was on and utilized at the Project site. In addition to the leasing rate above, equipment operational costs shall be paid at the estimated operating cost, payment category (and the table below), and associated rate set forth in the Blue Book if not already included in the lease rate.

The hours of operation shall be based upon actual equipment usage to the nearest full hour, as recorded by the Engineer.

<u>Actual Usage</u>	<u>Blue Book Payment Category</u>
<u>Less than 8 hours</u>	<u>Hourly Rate</u>
<u>8 or more hours but less than 7 days</u>	<u>Daily Rate</u>
<u>7 or more days but less than 30 days</u>	<u>Weekly Rate</u>
<u>30 days or more</u>	<u>Monthly Rate</u>

4. Equipment when idle (Standby): Idle or standby equipment is equipment on-site or in transit to and from the Work site and necessary to perform the Work under the modification but not in actual use. Idle equipment time, as documented by the Engineer, shall be paid at the leasing rate determined in 11.01.A.5.c., excluding operational costs.
5. Where a breakdown occurs on any piece of equipment, payment shall cease for that equipment and any other equipment idled by the breakdown. If any part of the Work is shutdown by the Owner, standby time will be paid during non-operating hours if

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diversion of equipment to other Work is not practicable. Engineer reserves the right to cease standby time payment when an extended shutdown is anticipated.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as 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 any of the Work that has been completed and accepted by the Owner, 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. If, however, any such loss or damage to the Work that has been accepted by Owner requires reconstruction and Contractor is placed in charge thereof, Contractor shall be paid for services, a fee proportionate to that stated in Paragraph 12.01.c.
- 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, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
  5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- 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 to any other item of Work; and~~
- ~~3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.~~

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

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### 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 value fixed by the Owner or by unit price values fixed by the Owner (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 where the method under Paragraph 12.01.B.2. is not selected by the Owner, 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 based on subcontractor's actual Cost of the Work;
  - 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 Paragraphs 12.01.C.2.a and 12.01.C.2.b 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; except the maximum total allowable cost to Owner shall be the Cost of the Work plus a maximum collective aggregate fee for Contractor and all tiered Subcontractors of 26.8 percent.
  - 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~~ may 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, quarantine restrictions, strikes, freight embargoes, acts of war (declared or not declared), 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~~ may be entitled to an equitable adjustment in Contract Times, but not Contract Price, 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 their officers, directors, members, partners, employees, agents, consultants, or subcontractors 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.
- F. If the Progress Schedule reflects a completion date or milestone date prior to the completion date or milestone date established by the Contract Documents, this shall afford no basis to claim for delay should Contractor not complete the Work prior to the projected completion date. Should a change order be executed with a revised completion date or milestone date, the Progress Schedule shall be revised to reflect the new completion date or milestone date.

G. Abnormal Weather Delays

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1. Extensions of Contract Time: If, in accordance with this Paragraph 12.03, the basis exists for an extension of time due to delays caused by abnormal weather, then an extension of time on the basis of abnormal weather may be granted only for the number of weather delay days in excess of the number of weather days listed as the Standard Baseline below for that month.

2. Standard Baseline for Average Climatic Range

a. The City has reviewed weather data available from the National Oceanic and Atmospheric Administration and determined a Standard Baseline of average climatic range for the State of Tennessee.

b. The Standard Baseline shall be regarded as the normal and anticipated number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is to be included in the work and not eligible for an extension of the contract time.

c. The Standard Baseline, in days, is as follows:

<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>
<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>11</u>	<u>8</u>
<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
<u>11</u>	<u>7</u>	<u>9</u>	<u>8</u>	<u>9</u>	<u>12</u>

3. Adverse Weather and Weather Delay Days

a. Adverse weather is defined as the occurrence of one or more of the following conditions which prevents only exterior construction activity or access to the site within a 24-hour period:

- 1. Precipitation (rain, snow, or ice) in excess of one-tenth inch liquid measure.
- 2. Temperatures which do not rise above 32 degrees F by 10:00 AM.
- 3. Standing snow in excess of one inch.

b. Adverse weather days may include, if appropriate, “dry-out” or “mud” days when:

- 1. Precipitation (rain, snow, or ice) exceeds one-tenth inch liquid measure, and
- 2. There is a hindrance to site access or site work, such as excavation, backfill, and footings; but
- 3. May accumulate at a rate no greater than 1 make-up day for each day or consecutive days of rain that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Engineer.



c. An adverse weather day may be counted only if adverse weather prevents work on the project for 50 percent or more of the Contractor's scheduled work day, including a weekend day or holiday if the Contractor has scheduled construction activity that day.

#### 4. Documentation and Submittals

a. Monthly submit Daily Jobsite Work Log showing which and to what extent construction activities have been affected by weather.

b. Submit actual weather data to support a claim for the time extension obtained from nearest NOAA weather station or other independently verified source approved by the Engineer at the beginning of the Project.

c. Maintain a rain gauge, thermometer, and clock at the jobsite. Keep daily records of precipitation, temperature, and the time of each occurrence throughout the Project.

d. Use the Standard Baseline data provided in this section when documenting actual delays due to weather in excess of the average.

e. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for claims established in Article 10 of these General Conditions.

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### **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. 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, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

#### *13.03 Tests and Inspections*

A. Contractor is responsible for the initial and subsequent inspections of Contractor's Work to ensure that the Work conforms to the requirements of the Contract Documents. 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. Contractor shall establish an inspection program and a testing plan

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acceptable to the Engineer and shall maintain complete inspection and testing records available to Engineer.

- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all non-contractor 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 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, Contractor shall, if requested by Engineer, uncover such Work 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.

G. Tests required by Contract Documents to be performed by Contractor and that require test certificates to be submitted to Owner or Engineer for acceptance shall be made by an independent testing laboratory or agency licensed or certified in accordance with Laws and Regulations and applicable state and local statutes. In the event state license or certification is not required testing laboratories or agencies shall meet the following applicable requirements:

1. "Recommended Requirements for Independent Laboratory Qualification", published by the American Council of Independent Laboratories.
2. Basic requirements of ASTM E329, "Standard of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction" as applicable.

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3. Calibrate testing equipment at reasonable intervals by devices of accuracy traceable to either the National Bureau of Standards or accepted values of natural physical constants.

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.

B. If Owner stops Work under Paragraph 13.05.A. Contractor shall not be entitled to an extension of Contract Time or increase in Contract Price.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written 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.

C. Contractor shall promptly segregate and remove rejected products from the Site.

D. If rejected products or Work is not removed within 48 hours, the Owner will have the right and authority to stop the Work immediately and will have the right to arrange for the removal of said rejected products or Work at the cost and expense of the Contractor.

### 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, and all to the satisfaction of the Owner:

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/shall 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.

F. Repetitive malfunction of an equipment or product item shall be cause for replacement and an extension of the correction period to a date one year following acceptable replacement. A repetitive malfunction shall be defined as the third failure of an equipment or product item following original acceptance.

#### 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 for 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~~shall be paid by Contractor to Owner.

#### 13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time, as defined by the Engineer, after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

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

## ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

### 14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A and as modified 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 five copies of 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. Retainage:

a. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

b. No form of collateral in lieu of cash will be acceptable as retainage.

c. Amounts retained by the Contractor from payments due to suppliers and subcontractors (expressed as a percentage) shall not exceed that being retained by the Owner.

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 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, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and 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. 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.

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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~~ Thirty 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 remedies the reasons for such action.
3. Upon a subsequent determination 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 and subject to interest as provided in the Agreement; if any.

4. Items entitling Owner to retain set-offs from the amount recommended, include but are not limited to:

a. Owner compensation to Engineer at an estimated average rate as specified in the Supplementary Conditions per each extra personnel hour for labor plus expenses because of the following Contractor-caused events:

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(1) Witnessing retesting of corrected or replaced defective Work;

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(2) Return visits to manufacturing facilities to witness factory testing or retesting;

(3) Submittal reviews in excess of three reviews by Engineer for substantially the same Submittal;

(4) Evaluation of proposed substitutes and in making changes to Contract Documents occasioned thereby;

(5) Hours worked by Contractor, in excess of normal work hours as defined by Article 6.02 of the General Conditions, necessitating Engineer to work overtime;

(6) Return visits to the Project by Engineer for Commissioning Activities not performed on the initial visit;

b. Fines levied against the Owner for Contractor's performance of NPDES Erosion and Sedimentation Control Measures or other permit violations.

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c. The repair, rebuilding or restoration of property improvements or facilities by the Owner as outlined in Paragraph 6.13.

d. Liability for liquidated damages incurred by Contractor as set forth in the Agreement.

E. Retainage Held as Security

1. Notwithstanding any other provision of this Contract to the contrary, in the event the City shall have reasonable grounds to suspect that:

(a) The Contractor or associated person has breached the Affidavit of No Collusion contained in these Contract Documents or has breached such an affidavit in any other contract which Contractor may have with City; or

(b) The Contractor or associated person has violated or participated in a violation of the Sherman Act (15 U.S.C. Sec. 1-2), or the Racketeer Influenced and Corrupt Organizations Act (18 U.S.C. Sec.1961-1968), or the Hobbs Act (18 U.S.C. Sec. 1951), or the mail or wire fraud statutes (18 U.S.C. Sec. 1341, 1343), the false statements statement (18 U.S.C. Sec. 1001), or other similar provision of Federal or State law in connection with this Contract or with any other contract which the Contractor or associated person has, had, or shall have with the City (including without limitation the submission of bids on such a contract);

then the City shall have the right to withhold and retain any retainage described in this section as security for any damage claim arising from such action.

2. For purposes of this section, the term "associated person" shall include (a) in the case of a corporation: the corporation, its officers, directors, shareholders, employees and agents, and its parents, subsidiaries or affiliates, whether in existence at the time of the violation or subsequently formed or acquired; (b) in the case of a partnership or joint venture: the partnership or joint venture, its general or limited partners and joint venturers, its officers, employees and agents; and (c) in the case of a sole proprietorship: the individual proprietor, and his employees and agents. Where a partner or joint venturer is a corporation, the partnership or joint venture shall have attributed to it the actions of persons attributable to the corporation under paragraph (a) of this subsection.

3. The City shall promptly notify the Contractor in writing of the exercise of its right to retain such amounts.

4. The City shall have the right to retain such funds until the City's damage claims are finally determined. The claim shall be "finally be determined" when a court of competent jurisdiction enters judgment on the merits of any claim made for damages by the City (unless City appeals that judgment, in which event, when the appeal is decided). In the event that City voluntarily waives his damage claim by written instrument signed on City's behalf, then such claim shall be "finally determined" at the time such waiver is effective. City covenants that it will commence an action for damages with respect to its damage claim as soon as

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practicable after it exercises its right for retaining such amounts for the causes set forth in this paragraph.

5. In the event such a claim is finally determined in favor of City, any amount of retainage for such claim shall be applied to satisfy the judgment. Any excess of retainage hereunder over the amount of such judgment, or in the event that a damage claim is finally determined in favor of Contractor or its associated person, the amount shall be promptly paid to Contractor, together with interest, at the applicable rate for post-judgment interest set forth in T.C.A. Sec. 47-14-121, provided that interest shall not be paid upon amounts which City could have otherwise properly retained under other provisions of this Contract.

6. Any claim, dispute, or other matter arising out of or relating to City's retention of payment for a damage claim under this section shall not be subject to arbitration. The City's failure to retain all or a portion of any payment due under this Contract pursuant to this section, even if grounds for such retention exists, shall not constitute a waiver of any of City's rights under this section.

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#### 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, retainage notwithstanding, free and clear of all Liens.

B. No materials or supplies for the Work shall be purchased by Contractor or subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. Contractor warrants that Contractor has good title to all materials and supplies used by Contractor in the Work, free from all liens, claims or encumbrances.

#### 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. Specific items of Work that must be completed prior to the Engineer's issuance of a certificate of Substantial Completion include, but are not limited to, the following:

1. Correction of all deficient Work items listed by all state, local, and other regulatory agencies or departments.

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2. All submittals must be received and approved by the Engineer, including but not necessarily limited to, the following:

a. Record documents.

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b. Factory test reports, where required.

c. Equipment and structure test reports.

d. Manufacturer's Certificate of Proper Installation.

e. Operating and maintenance information, instructions, manuals, documents, drawings, diagrams, and records.

f. Spare parts lists.

3. All additional warranty or insurance coverage requirements have been provided.

4. All manufacturer/vendor-provided operator training is complete and documented.

5. Other items of Work specified elsewhere as being prerequisite for 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 remove its property and complete or correct items on the tentative list.

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#### 14.05 *Partial Utilization*

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- 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 direct~~ Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to ~~be ready for~~ sufficiently progressed towards its intended use ~~and substantially complete~~. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D 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 described in Paragraph 14.05.A.1 ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
  3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
  4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

#### 14.06 *Final Inspection and Final Acceptance of the Work*

- ~~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.~~
- A. Upon receipt of written notice from the Contractor that all items listed for completion or correction during the inspection for substantial completion have been performed and that the work has been completed in conformity with the Contract Documents, the Engineer shall promptly examine the work, in company with the City, making additional tests and investigations as he may deem proper and using due care and judgment normally exercised in the examination of the completed work by a properly qualified and experienced professional engineer and shall satisfy himself that the Contractor's statement appears to be correct. The Engineer shall then inform the City and, when applicable, regulatory agencies that the work is, in

his opinion, complete in apparent conformity with these Contract Documents and shall schedule the final inspection.

B. Should the Engineer consider that the work is not finally complete, he will notify the Contractor in writing, stating reasons for his determination. The Contractor shall take immediate steps to remedy the stated deficiencies and/or conditions and, after correction of the deficiencies and/or conditions, send another written notice to the Engineer certifying that the work is complete. The Engineer, in company with the City, will re-inspect the work.

C. After the final inspection and after the submission by the Contractor items required by these Contract Documents, the Engineer shall notify the City in writing that he has examined the work and that, in his opinion, it appears to conform to these Contract Documents and therefore recommends acceptance of the work and final payment to the Contractor. It is understood and agreed that such statement by the Engineer does not in any way relieve the Contractor or his Sureties from any duties, responsibilities, and obligations under these Contract Documents.

D. After the Engineer recommends acceptance of the work covered by these Contract Documents and final payment to the Contractor, the City will, if it concurs in the Engineer's recommendation, promptly notify the Contractor in writing that the work is accepted. If the City does not concur in the Engineer's recommendation, the City will promptly notify the Contractor in writing that it does not accept the work as complete and stating the deficiencies and/or conditions that shall be corrected or resolved before final acceptance will be made. After the deficiencies and/or conditions are corrected or resolved and the City is satisfied that the work is complete, the City will notify the Contractor in writing that the work is considered complete and final acceptance is made. The guarantee period(s), as specified in these Contract Documents, shall begin on the date the Contractor is notified by the City that final acceptance of the work is made. Final acceptance of the work by the City will not be made until the Project Record Documents, operation and maintenance data and other required items are acceptable to the City.

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E. It is understood and agreed that said notice of final acceptance or final payment by the City shall not in any way be construed to relieve the Contractor, or his Sureties from any duties, responsibilities or obligations under or in connection with these Contract Documents.

#### 14.07 Final Payment

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##### 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. Under no circumstances will Contractor's application for final payment be accepted by the Engineer until all Work required by the Contract Documents has been completed.

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.6;
- b. consent of the surety, if any, to final payment, if requested by the Engineer;
- c. a list of all Claims against Owner that Contractor believes are unsettled;
- d. an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work have been paid or otherwise satisfied;
- e. the final Change Request Form signed by the Contractor to close the Contract;
- f. certificate of occupancy issued by City of Chattanooga Inspection Department, if buildings are a part of the Project;
- g. copy of Notice of Completion which had been filed with the appropriate office at the Hamilton County Tennessee Courthouse; and
- h. 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, if requested by the Engineer.

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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 might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, 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 all 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~~ Thereupon 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. If the Application for Payment and accompanying documentation are appropriate as to form and substance, Owner will in accordance with the applicable State or local General Law, pay Contractor the amount recommended by Engineer.

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.~~

14.10 Labor and Material

- A. Contractor shall indemnify and save Owner harmless from all claims growing out of the lawful demands for payment by subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. Contractor shall, at Owner's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If Contractor fails to do so, then Owner may, after having served written notice on the said Contractor either pay unpaid bills, of which Owner has written notice, direct, or withhold from Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to Contractor shall be resumed, in accordance with the terms

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of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon Owner to either Contractor or to Contractor's Surety. In paying any unpaid bills of Contractor, Owner shall be deemed the agent of Contractor and any payment so made by Owner shall be considered as payment made under the Contract by Owner to Contractor and Owner shall not be liable to Contractor for any such payment made in good faith.

#### 14.11 Scope of Payment

A. The Contractor shall accept compensation provided in these Contract Documents as full payment for furnishing all labor, materials, supplies, tools, equipment, taxes, fees, contingencies, and other items necessary or convenient to the completed work and for performing all work contemplated and embraced in these Contract Documents; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the acceptance by the City and for all risks of every description connected with the prosecution of the work; also for all expenses incurred in consequence of the suspension or discontinuance of the work as provided in these Contract Documents; and for completing the work in accordance with these Contract Documents. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material or of any provisions of these Contract Documents.

B. No compensation will be made in any case for loss of anticipated profits.

### 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~~ may 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.

B. The City shall have the authority to suspend the work wholly or in part, for such period as may be necessary, due to unsuitable weather, such other conditions as are considered unfavorable for the suitable prosecution of the work; or due to the failure on the part of the Contractor to carry out orders given, supply sufficient skilled workmen, supply suitable material, prosecute the work satisfactorily and in a workmanlike manner, make prompt payments to Subcontractors or for labor, materials, or equipment, or to perform any obligations or requirements of these Contract Documents. The Contractor shall immediately comply with the written order of the City to suspend the work wholly or in part. The suspended work shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the City.

C. In the event that a suspension of the work is ordered by the City under Paragraph B above, the Contractor shall, at his expense, do all the work necessary to secure the work and the area affected by the work and to protect all previously completed work as specified herein or as

directed by the City. The suspension of the work by the City shall not relieve the Contractor of any duties, obligations, or responsibilities set forth in these Contract Documents. In the event the Contractor fails to secure and protect the work and area as specified or as ordered, the City will perform, or cause to be performed, all work considered necessary, and the cost thereof will be deducted from monies due or to become due the Contractor under the terms of these Contract Documents.

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 repeated disregard of the authority of Engineer; ~~or~~
4. Contractor's violation in any substantial way of any provisions of the Contract Documents;
5. If Contractor abandons the Work, or sublets this Contract or any part thereof, without the previous written consent of Owner, or if the Contract or any claim thereunder shall be assigned by Contractor otherwise than as herein specified;
6. Contractor is adjudged bankrupt or insolvent;
7. Contractor makes a general assignment for the benefit of creditors;
8. A trustee or receiver is appointed for Contractor or for any of Contractor's property;
9. Contractor files a petition to take advantage of any debtor's relief act, or to reorganize under the bankruptcy or applicable laws;
10. Contractor repeatedly fails to make prompt payments to subcontractors or material suppliers for labor, materials or equipment, or
11. The payment of any compensation, irrespective of its character or form, or the giving of any gratuity, or the granting of any valuable favor, directly or indirectly, by the Contractor to any authorized representative of the City or Engineer.

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, unless Contractor otherwise cures the deficiency in accordance with Paragraph 15.02.D.:

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 or discontinue, in whole or in part, 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. direct 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; ~~and~~.
  5. ten percent overhead and profit for those costs agreed to in Paragraphs 15.03.A.1 through 15.03.A.4 above.
- B. Contractor shall submit within 30 calendar days after receipt of notice of termination a written statement setting forth its proposal for an adjustment to the Contract Price to include only the incurred costs described in this clause. Owner shall review, analyze, and verify such proposal and negotiate an equitable amount and the Contract may be modified accordingly.
- C. 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.
- C. Except as allowed in Paragraph A above, the Contractor shall not suspend the work and shall not remove any equipment, tools, supplies, materials, or other items without the written permission of the City.

## 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 the intent to submit the Claim to a court of competent jurisdiction.~~

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## 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, or by facsimile transmission and followed by written confirmation, to the last business address known to the giver of the notice.

B. All notices required of Contractor shall be performed in writing to the appropriate entity.

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C. Electronic mail and messages will not be recognized as a written notice.

D. If the Contractor does not notify the Owner in accordance with Paragraph 10.05 of the belief that a field order, work by other contractors or the Owner, or subsurface, latent, or unusual unknown conditions entitles the Contractor to a Change Order, no consideration for time or money will be given the Contractor.

### 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~~

A. Each and every provision of this Agreement shall be construed in accordance with and governed by Tennessee law. The parties acknowledge that this Contract is executed in Hamilton County, Tennessee and that the Contract is to be performed in Hamilton County, Tennessee. Each party hereby consents to the Hamilton Superior Court's sole jurisdiction over any dispute which arises as a result of the execution or performance of this Agreement, and each party hereby waives any and all objections to venue in the Hamilton Superior Court.

17.06 *Headings*

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

17.07 *Addresses*

A. Both the address given in the Bid form upon which this Agreement is founded, and Contractor's office at or near the site of the Work are hereby designated as places to either of which notices, letters, and other communications to Contractor shall be certified, mailed, or delivered. The delivering at the above named place, or depositing in a postpaid wrapper directed to the first-named place, in any post office box regularly maintained by the post office department, of any notice, letter or other communication to Contractor shall be deemed sufficient service thereof upon date of such delivery or mailing. The first-named address may be changed at any time by an instrument in writing, executed by Contractor, and delivered to and acknowledged by the Owner and Engineer. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon Contractor personally.

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17.08 Forms and Record

A. The form of all Submittals, notices, change orders and other documents permitted or required to be used or transmitted under the Contract Documents shall be determined by the Engineer.

B. Contractor shall maintain throughout the term of the Contract, complete and accurate records of all Contractor's costs which relate to the work performed, including the extra work, under the terms of the Contract. The Owner, or its authorized representative, shall have the right at any reasonable time to examine and audit the original records.

C. Records to be maintained and retained by Contractor shall include, but not be limited to:

1. Payroll records accounting for total time distribution of Contractor's employees working full or part time on the work;
2. Cancelled payroll checks or signed receipts for payroll payments in cash;
3. Invoices for purchases, receiving and issuing documents, and all other unit inventory records for Contractor's stores, stock, or capital items;
4. Paid invoices and cancelled checks for materials purchase, subcontractors, and any other third parties' charges;
5. Original estimate and change order estimate files and detailed worksheets;
6. All project-related correspondence; and
7. Subcontractor and supplier change order files (including detailed documentation covering negotiated settlements).

D. Owner shall also have the right to audit: any other supporting evidence necessary to substantiate charges related to this agreement (both direct and indirect costs, including overhead allocations as they may apply to costs associated with this agreement); and any records necessary to permit evaluation and verification of Contractor compliance with contract requirements and compliance with provisions for pricing change orders, payments, or claims submitted by Contractor or any payees thereof. Contractor shall also be required to include the right to audit provision in the contracts (including those of a lump-sum nature) of all subcontractors, insurance agents, or any other business entity providing goods and services.

17.09 Assignment

A. Contractor shall not assign, sell, transfer or otherwise dispose of the whole or any part of this Contract or any monies due or to become due hereunder without written consent of the Owner. In case Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to Contractor shall be subject to prior liens of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for under this Contract.

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17.10 Use of Work by City

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A. Prior to substantial completion, the City may use any completed or substantially completed portions of the work, provided that such use will not substantially affect the Contractor's rights and obligations under the contract. It is understood and agreed that said use shall not constitute an acceptance of any such portions of the work.

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B. The City, or another Contractor under contract to the City, shall have the right to enter the premises for the purpose of doing work not covered by these Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the work, or the restoration of any damaged work except such as may be caused by agents, employees, or other contractors of the City.

17.11 Inspection by Public Agencies

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A. Authorized representatives of the Environmental Protection Agency, Department of the Interior, Tennessee Department of Public Health, and other governmental agencies having jurisdiction over the work or any part thereof shall have access to the work and any records relevant to the prosecution and progress of the work. The Contractor shall provide proper facilities for such access and inspection.

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17.12 Hindrances and Delays

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A. The Contractor expressly agrees that the construction period named in these Contract Documents includes allowance for all hindrances and delays incident to the work. It is understood and agreed that no claim shall be made by the Contractor for hindrances or delays from any cause during the progress of the work, except as provided otherwise under the terms of these Contract Documents.

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17.13 Losses from Natural Causes

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A. It is understood and agreed that all loss or damage arising out of the nature of the work, or from the action of the elements, or from floods or overflows, or from ground water, or from seepage, or from any unusual obstruction or difficulty, or from any other natural or existing circumstance either known or unforeseen, which may be encountered in the prosecution of the work, shall be sustained and borne by the Contractor at his own cost and expense.

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17.14 New Job Opportunities

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A. The Contractor shall, to the maximum extent practicable, follow hiring and employment practices that will insure the availability of new job opportunities for unemployed and underemployed persons. The Contractor shall insert, or cause to be inserted, a similar provision in each contract with Subcontractors or Suppliers.

17.15 No Waiver of Legal Rights

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A. Neither the inspection by the City or Engineer or any of their officials, employees, or agents, nor any order by the City or Engineer for payment of money, or any payment for, or acceptance of, the whole or any part of the work by the City or Engineer, nor any extension of time, nor any

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possession taken by the City or its employees, shall operate as a waiver of any provision of these Contract Documents, or of any power herein reserved to the City, or any right to damages herein provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach.

B. Any waiver of any provisions of these Contract Documents shall be specific, shall apply only to the specified item or matter concerned and shall not apply to other similar or dissimilar items or matters.

17.16 Sewage, Surface, Subsurface and Flood Flows

A. The Contractor shall furnish all necessary equipment, materials and labor, at his expense, for handling, passing and disposing of all sewage, seepage, surface, subsurface and flood flows encountered at any time during the prosecution of the work. It is understood and agreed that the Contractor shall bear all risks associated with said flows; shall indemnify the City and the Engineer from any liabilities resulting from said flows; and shall not make any claim for additional compensation for delays or damage resulting from said flows. The manner of providing for these flows shall be satisfactory to the Engineer and in conformance with all applicable laws and regulations.

17.17 Maintenance of Existing Traffic

A. Satisfactory facilities shall be provided by the Contractor for maintaining public access and travel, and every effort shall be made to reduce any necessary inconveniences to a minimum.

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These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2007 Edition, with City of Chattanooga Modifications 07-30-13). All provisions which are not so amended or supplemented remain in full force and effect.

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

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

The provisions in this Section of the Specifications shall govern in the event of any conflict between this Section and the General Conditions.

SC-1.01      *Definitions*

SC-1.01.A.3.      Add the following language to the end of Paragraph 1.01.A.3:

The Application for Payment form to be used on this Project is as included as Section 00 62 76, as supported by additional documentation as may be requested by the Owner or Engineer.

SC-1.01.A.9.      Add the following language to the end of Paragraph 1.01.A.9:

The Change Order form to be used on this Project is as included in these Contract Documents.

SC-4.02      *Subsurface and Physical Conditions*

SC-4.02      Add the following new paragraphs immediately after Paragraph 4.02.B:

C.      The following reports of explorations and tests of subsurface conditions at or contiguous to the Site have been used by the Owner's Consultant in preparing the Contract Documents:

1.      Report dated April 12, 2017, prepared by S&ME, Inc., entitled: "Report of Geotechnical Exploration, Citico Pump Reliability Improvements, Chattanooga, Tennessee, S&ME Project No. 1281-17-015". The "technical data" contained in such report upon which Contractor may rely is none.

D.      The following drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) have been used by the Owner's Consultant in preparing the Contract Documents:

1.      Drawings dated March 17, 1992, prepared by Hensley Schmidt, Inc., entitled: "Citico II Pumping Station Contract No. 37C". None of the information in such drawings constitutes "technical data" on which Contractor may rely.

SC-4.06        *Hazardous Environmental Conditions*

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

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.
- B. Not Used.

SC-5.03        *Certificates of Insurance*

SC-5.03, following Paragraph E, add the following,

- F. Copies of endorsements showing that each additional insured identified herein have been added to the policies as an additional insured shall be attached to each of the certificates.
- G. Each insurance certificate for all coverages other than Worker's Compensation Insurance must show that a waiver of rights of recovery against any of the insured or the additional insured is in effect.
- H. Certificate for Worker's Compensation and Employer's Liability coverage must indicate inclusion or exclusion for any proprietor, partner, executive officer or member.

SC-5.04        *Contractor's Insurance*

SC-5.04.B.1, There are no other additional insureds other than the Owner and Engineer.

SC-5.04.C, following Paragraph 5.04.B.6.b, Add,

- C. The limits of liability for the insurance required by paragraph 5.04.B.2 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
  - 1. Worker's compensation, disability benefits and other similar employee benefit acts, and damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees as provided in Paragraphs 5.04.A.1 and 5.04.A.2 of the General Conditions:
    - a. Workers Compensation: Statutory limits
    - b. Employer's Liability, Each Accident: \$1,000,000
    - c. Employer's Liability, Each Employee: \$1,000,000
    - d. Employer's Liability, Disease – Policy Limit: \$1,000,000
  - 2. Contractor's General Liability Insurance under paragraphs 5.04.A.3 through 5.04.A.5 of the General Conditions shall provide the following minimum limits and conditions:

- a. Each Occurrence: \$1,000,000.
  - b. Damage to Rented Premises (each occurrence) \$100,000.
  - c. Medical Expenses (any one person) \$5,000.
  - d. Personal and Advertising Injury: \$1,000,000.
  - e. General Aggregate: \$2,000,000.
  - f. Products-Completed Operations Aggregate: \$2,000,000.
  - g. Explosion, collapse, and underground coverage shall be included with such indicated on the insurance certificate under General Liability.
  - h. The general aggregate policy limits must be designated to the Project.
  - i. Contractual Liability coverage, as required under Paragraph 5.04.B.3 must be indicated on the insurance certificate under General Liability.
3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions, providing for Combined Single Limit (each accident) for all owned, hired, and non-owned vehicles: \$1,000,000.
  4. Provide Excess Liability or Umbrella Liability insurance providing protection for at least the hazards insured under the primary liability policies with the following limits:
    - a. General Aggregate: \$5,000,000.
    - b. Each Occurrence: \$5,000,000.

SC-6.02 *Labor; Working Hours*

SC-6.02 Add the following subparagraph 6.02.D.1:

1. The following rates will apply for the overtime work on behalf of the Owner: \$173.75/hour to \$213.08/hour, depending on actual Resident Project Representative assigned to the Project.

SC-6.13 *Safety and Protection*

SC-6.13 Delete the second sentence of Paragraph 6.13.C.

SC-9.03 *Project Representative*

SC-9.03 Add the following new paragraphs immediately after Paragraph 9.03.A:

- B. The Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be only through or with the full knowledge and approval of Contractor. The RPR shall:
1. *Schedules:* Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.
  2. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
  3. *Liaison:*
    - a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, assist in providing information regarding the intent of the Contract Documents.
    - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
    - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
  4. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
  5. *Shop Drawings and Samples:*
    - a. Record date of receipt of Samples and approved Shop Drawings.
    - b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
  6. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.
  7. *Review of Work and Rejection of Defective Work:*
    - a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

- b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
8. *Inspections, Tests, and System Startups:*
- a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
  - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.
9. *Records:*
- a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
  - b. Maintain records for use in preparing Project documentation.
10. *Reports:*
- a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.
  - b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
  - c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.
11. *Payment Requests:* Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

12. *Certificates, Operation and Maintenance Manuals:* During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
  13. *Completion:*
    - a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
    - b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.
    - c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.
- C. The RPR shall not:
1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
  2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
  3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's superintendent.
  4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.
  5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
  6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
  7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
  8. Authorize Owner to occupy the Project in whole or in part.

SC-10.01 *Authorized Changes in the Work*



SC-10.01.A, first sentence, Change "... Owner may, at any time ..." to "... Owner may, subject to written approval by the Agency, at any time ..."

SC-14.02 Progress Payments

SC-14.02.A.4. Add the following new Paragraph after Paragraph 14.02.A.3:

4. The Application for Payment form to be used on this Project is EJCDC No. C-620. The Agency must approve all Applications for Payment before payment is made.

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

1. The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-14.02.D.1.c, delete "or"

SC-14.02.D.1.d, change "... 15.02.A." to "... 15.02.A; or"

SC-14.02.D.1, following Paragraph d., Add

- "e. the Contractor's performance or furnishing of the Work is inconsistent with funding Agency requirements."

SC-14.02.D.4.e After paragraph 14.02.D. 4.d, add the following:

5. The following rates will apply for additional services performed by the Engineer on behalf of the Owner:

<u>Labor Grade</u>	<u>Rate</u>
Level 7	\$ 85.23
Level 8	\$115.83
Level 9	\$130.03
Level 10	\$142.05
Level 11	\$158.45
Level 12	\$170.47
Level 13	\$183.58
Level 14	\$195.60
Level 15	\$205.43
Level 16	\$210.90
Level 17	\$217.45

END OF SECTION



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Equal Employment Opportunities Specifications

Following is the standard language which must be incorporated into all solicitations for offers and bids on all construction contracts or subcontracts in excess of \$10,000 to be performed in designated geographical areas:

"Minority" includes:

- a. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
- b. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
- c. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
- d. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

END OF SECTION



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Equal Employment Opportunity Clause

The City of Chattanooga is an equal opportunity employer and during the performance of this contract, the Contractor agrees to abide by the equal opportunity goals of the City of Chattanooga as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their 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 Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
3. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. In all construction contracts or subcontracts in excess of \$10,000 to be performed for the City of Chattanooga, any Contractor and/or subcontractor is further required to file in duplicate within ten (10) days of being notified that it is the lowest responsible bidder, an affirmative action plan with the EEO Director of the City of Chattanooga. This plan shall state the Contractor's goals for minority and women utilization as a percentage of the work force on this Project.
5. This Plan or any attachments thereto shall further provide a list of employees annotated by job function, race and sex who are expected to be utilized on this Project. This plan or attachment thereto shall further describe the methods by which the Contractor or subcontractor will utilize to make good faith efforts at providing employment opportunities for minorities and women.
6. The Contractor will include the portion of the sentence immediately preceding Paragraph 1 and the provisions of Paragraphs 1 through 6 in every subcontract so that such provisions will be requested of each subcontractor. The Contractor agrees to notify the City of Chattanooga of any subcontractor who refuses or fails to comply with these equal opportunity provisions. Any failure or refusal to comply with these provisions by the Contractor and/or subcontractor shall be a breach of this contract.

END OF SECTION



Contract Name: \_\_\_\_\_

Contract Number: \_\_\_\_\_

## New Retainage Escrow Account Set-up Form - Suntrust

(1) Legal Business Name:

(2) Business Address:

(3) TIN (Tax Identification No):

(4) Contact Name:

Telephone:

Email:

(5) Authorized Signer's Name & Title for Retainage Account:

(6) Owner's Names with Titles and Percentages:

(7) Please provide a copy of the following document that applies:

Corporation      Articles of Incorporation

LLC                Operating Agreement & Articles of Organization

Partnership      Partnership Agreement





Reference Contract # \_\_\_\_\_

Contract Name: \_\_\_\_\_

### **CORPORATE RESOLUTION**

BE IT RESOLVED, that \_\_\_\_\_, a Tennessee Corporation, hereby authorized and empowers the following Officers:

\_\_\_\_\_

to make, execute and deliver, in behalf of the corporation, unto the CITY OF CHATTANOOGA ("CITY"), its ATTORNEY-IN-FACT, with full power and authority to substitute certain retained funds for securities and take custody of and negotiate said securities at any time and to any extent necessary to cause the contract to be fulfilled. Pursuant to Tenn. Code Ann. § 12-4-108, SUNTRUST BANK shall oversee the safekeeping, custodial care and servicing of securities to the extent necessary to effectuate the purposes of the applicable state law.

BE IT ALSO RESOLVED, that the foregoing resolutions and the authority granted the individuals herein named, shall continue until canceled by delivery to and receipt by CITY, of written notice by a duly authorized representative of the corporation canceling any or all of the foregoing resolutions.

IN WITNESS WHEREOF, I have executed my name as Secretary this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_



Reference Contract # \_\_\_\_\_

Contract Name: \_\_\_\_\_

### LIMITED POWER OF ATTORNEY

Be it known that the undersigned CONTRACTOR \_\_\_\_\_ of the County of \_\_\_\_\_, State of \_\_\_\_\_ hereby makes and appoints the CITY of CHATTANOOGA (“CITY”) its true and lawful attorney for specific and limited purposes necessary to empower CITY to substitute certain retained funds for securities consistent with Tenn. Code Ann. § 12-4-108(c) and take custody of the securities and to negotiate said securities at any time and to any extent necessary to cause the contract to be fulfilled in accordance with its provisions.

CITY shall purchase said securities issued by SUNTRUST BANK consistent with CITY’s power to enter into a trust agreement with said bank as set forth in Tenn. Code Ann. § 12-4-108(i).

CITY shall perform all acts under this Limited Power of Attorney consistent with the requirements set forth in Tenn. Code Ann. § 12-4-108.

This Limited Power of Attorney is effective upon execution and shall remain in effect until such time of completion of the contract and satisfaction of any statutory obligations with respect thereto.

Signed this \_\_\_\_\_ day of \_\_\_\_\_,  
\_\_\_\_\_

Signature \_\_\_\_\_

Title \_\_\_\_\_



Contract Name: \_\_\_\_\_

Contract Number: \_\_\_\_\_

## **ESCROW AGREEMENT**

THIS AGREEMENT is entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between the CITY OF CHATTANOOGA (“Project Owner”), \_\_\_\_\_ (“Contractor”), and SUNTRUST BANK, a Georgia state banking corporation (“Bank”) as escrow agent.

### **WITNESSETH:**

WHEREAS, Project Owner and Contractor entered into a construction contract dated \_\_\_\_\_ (the “Contract”). The Contract provides that five percent (5%) of progress payments made under the Contract will be withheld as retainage (“Retainage”) from the total of progress payments made by Project Owner to Contractor; and

WHEREAS, pursuant to T.C.A. § 66-34-104 (the “Statute”), the amount withheld as Retainage is to be deposited in a separate escrow account maintained with a third party, at which time the funds pass out of the control of the Property Owner and shall become the sole and separate property of the Contractor, subject to the terms of this Escrow Agreement; and

WHEREAS, Project Owner and Contractor desire that all Retainage withheld under the Contract, be deposited in an interest bearing escrow account pursuant to and in compliance with the Statute; and

WHEREAS, Bank has agreed to accept the Retainage and cause it to be placed in an interest bearing escrow account and to act as escrow agent for said account.

NOW, THEREFORE, in consideration of the premises and mutual covenants and promises hereinafter set forth, it is agreed as follows:

1. In accordance with the requirements of the Statute, Project Owner shall deposit and the Bank shall hold in an interest bearing escrow account, Account No. \_\_\_\_\_ (“Escrow Account”) all Retainage held pursuant to the Contract.

2. All Retainage withheld from payments to Contractor by Project Owner under the Contract, from this date forward, be deposited in said Escrow Account.

3. The Bank, as escrow agent, shall hold and maintain the Retainage in the Escrow Account until the Bank is presented with a release signed by Project Owner and Contractor, a form of which is attached hereto as Exhibit A, authorizing the disbursement of all or a portion of the funds held on deposit in the Escrow Account plus any accrued interest to Contractor; provided that notwithstanding this Section 3, the Bank may comply with the order of any court of applicable jurisdiction which affects the payment of all or any portion of the funds in the Escrow Account.

The account will use Contractor's tax identification number, and Contractor will furnish the Escrow Agent with a W-9 form for this purpose.

4. In the event of any dispute between the parties resulting in adverse demands being made in connection with this deposit in Escrow, or in the event that any of the parties hereto do not agree as to the disposition of the funds in the Escrow Account, the parties hereto agree that the Bank shall be released of any further obligation under this Agreement by tendering the funds maintained in the Escrow Account into a court of competent jurisdiction in an action in the nature of an interpleader, and the Bank shall have the right to recover its reasonable attorney fees and costs from Project Owner and Contractor, each of whom shall be jointly and severally liable therefor.

5. The Contractor hereto agrees to indemnify and hold Bank harmless from any loss, damages, or liabilities of any kind whatsoever, whether foreseen or unforeseen, whether direct or indirect arising out of or in connection with this Agreement, the Escrow Account and the funds contained therein, or the performance of the Bank's obligations hereunder, except liability resulting from Bank's gross negligence or willful misconduct. The Bank may rely upon the signatures of any correspondence from either or both of Project Owner and/or Contractor as being the authentic signatures of the Project Owner or Contractor or, if the Project Owner or Contractor are not natural persons, of persons duly authorized to act on behalf of the Project Owner or Contractor.

6. The Bank shall not be bound by any modification, amendment, termination, cancellation, rescission or supersession of this Escrow Agreement unless the same shall be in writing and signed by all of the other parties hereto and, hereunder are effected thereby, unless it shall have given prior written consent thereto.

7. The Project Owner and Contractor agree, jointly and severally, to reimburse the Bank for any all costs, damages, expenses or claims, including attorney's fees, which Bank may incur or sustain as a result of or arising out of this Escrow Agreement or Bank's duties relating thereto (except for Bank's willful misconduct or negligence) and will pay them ON DEMAND; and the Bank is hereby given a lien upon, and security interest in, the property deposited in the Escrow Account, to secure Bank's rights to payment or reimbursement.

8. The Bank agrees to provide a statement of the Escrow Account each month to the Project Owner during the term of this Escrow Agreement.

9. The Bank shall receive **no fee** in connection with its rendering of services as escrow agent pursuant to the terms of this Escrow Agreement.

10. The Project Owner and Contractor acknowledge that subject to the rights of Contractor to the Retainage, the Bank maintains a security interest and lien against the Escrow Account and funds contained therein.

11. The Contractor agrees that the Project Owner is not responsible to Contractor for any loss of the Retainage that occurs should Bank be placed in receivership, be taken over by its regulators or otherwise be subject to financial failure.

12. This Escrow Agreement may be executed in three or more counterparts, each of which will be deemed to be an original agreement, but all of which will constitute one and the same document. A counterpart executed by a party and transmitted by facsimile to the other parties will have the same effect as delivery of the original counterpart.

13. This Agreement shall be construed in accordance with the laws of the State of Tennessee without regard to its conflict of law principles.

ENTERED INTO as of the date first above written.

**CONTRACTOR:**

\_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

**PROJECT OWNER:**

**CITY OF CHATTANOOGA**

By: \_\_\_\_\_

Title: \_\_\_\_\_

**BANK:**

**SUNTRUST BANK**

By: \_\_\_\_\_

Title: \_\_\_\_\_

Contract Name: \_\_\_\_\_

Contract Number: \_\_\_\_\_

**EXHIBIT A**

**RELEASE**

The undersigned, City of Chattanooga, as the Project Owner pursuant to a Construction Contract with \_\_\_\_\_ (“Contractor”) dated \_\_\_\_\_ (the “Contract”) hereby certifies that Contractor fully and completely finished all work required of Contractor pursuant to such Contract, except work which may be required pursuant to any guaranty or warranty contained in such Contract, and the undersigned hereby authorizes SunTrust Bank (“Bank”) to release \_\_\_\_\_ (\$\_\_\_\_\_) paid as retainage pursuant to that certain Escrow Agreement between and among the undersigned, City of Chattanooga (“Project Owner”), Contractor, and Bank, and dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, which agreement is specifically incorporated herein by reference.

This release is executed for the sole purpose of releasing the amounts held in escrow as aforesaid and specifically does not, and shall not, be construed to release or otherwise affect any claims or rights which Project Owner has or may have against Contractor pursuant to said contract or the work performed thereunder.

Attest:

**PROJECT OWNER:**

\_\_\_\_\_  
Secretary

**CITY OF CHATTANOOGA**

By: \_\_\_\_\_  
Title: \_\_\_\_\_

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

Affiant makes oath that the above is true, as sworn before me, a Notary Public, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

(SEAL)

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

**APPROVED BY CONTRACTOR:**

\_\_\_\_\_  
By: \_\_\_\_\_  
Title: \_\_\_\_\_



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Part 1 General

1.01 Description

- A. The work to be performed under this Contract shall consist of furnishing all labor, materials, tools, equipment and incidentals and performing all work required to construct complete in place and ready to operate:
1. Emergency backup pump station (EBPS): A submersible wastewater pumping station rated for 45 MGD with submersible pumps, grinders, and overhead canopy and bridge crane, including associated yard piping connections and improvements.
  2. Electrical upgrades and new equipment including switchgear, switchboard, and permanent onsite generator.
  3. HVAC system replacement in existing pump station.
  4. New odor control system serving existing pump station and new EBPS.
  5. Condition assessment of two wastewater force main pipelines by sonar inspection.
- B. All work described above shall be performed as shown on the Drawings and as specified.

1.02 Project Location

The equipment and materials to be furnished will be installed at the locations shown on the Drawings.

1.03 Quantities

The Owner reserves the right to alter the quantities of work to be performed or to extend or shorten the improvements at any time when and as found necessary, and the Contractor shall perform the work as altered, increased or decreased. Payment for such increased or decreased quantity will be made in accordance with the Instructions to Bidders. No allowance will be made for any change in anticipated profits nor shall such changes be considered as waiving or invalidating any conditions or provisions of the Contract and Bond.

1.04 Partial Owner Occupancy

The existing facilities to which these improvements are being made will continue operation during the period of construction. There shall not be any interruption in service. The Contractor is responsible for fines assessed due to his activities.

END OF SECTION



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Part 1 General

1.01 Partial Occupancy By Owner

Whenever, in the opinion of the Engineer, any section or portion of the work or any structure is in suitable condition, it may be put into use upon the written order of the Engineer and such usage will not be held in any way as an acceptance of said work or structure, or any part thereof, or as a waiver of any of the provisions of these Specifications and the Contract. Pending final completion and acceptance of the Work, all necessary repairs and replacements, due to defective materials or workmanship or operations of the Contractor, for any section of the work so put into use shall be performed by the Contractor at Contractor's own expense.

END OF SECTION



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## Part 1 General

### 1.01 Scope

- A. The Contract Price shall cover all Work required by Contract Documents. All costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction, equipment, and tools; and performing all necessary labor and supervision to fully complete the work, shall be included in the lump sum price bid.
- B. Required items of work and incidentals necessary for the satisfactory completion of the work which are not specifically listed in the Bid, and which are not specified in this section to be measured or to be included in one of the items listed in the Bid, shall be considered as incidental to the work. All costs thereof, including Contractor's overhead costs and profit, shall be considered as included in the lump sum for the various Bid items. The Contractor shall prepare the Bid accordingly.
- C. Work includes furnishing all plant, labor, equipment, tools and materials, which are not furnished by the Owner and performing all operations required to complete the work satisfactorily, in place, as specified and as indicated on the Drawings.

### 1.02 Cash Allowances

- A. General
  - 1. The Contractor shall include in the Bid Total all allowances stated in the Contract Documents. These allowances shall cover the net cost of the services provided by a firm selected by the Owner. The Contractor's handling costs, labor, overhead, profit and other expenses contemplated for the original allowance shall be included in the items to which they pertain and not in allowances.
  - 2. No payment will be made for nonproductive time on the part of testing personnel due to the Contractor's failure to properly coordinate testing activities with the work schedule or the Contractor's problems with maintaining equipment in good working condition.
  - 3. No payment shall be provided for services which fail to verify required results.
- B. Should the net cost be more or less than the specified amount of the allowance, the Contract will be adjusted accordingly by change order. The amount of change order will not recognize any changes in handling costs at the site, labor, overhead, profit and other expenses caused by the adjustment to the allowance.
- C. Documentation
  - 1. Submit copies of the invoices with each periodic payment request from the firm providing the services.

2. Submit results of services provided which verify required results.

D. Schedule of Cash Allowances

1. Soils and Concrete Testing: Allow the amount provided in the Bid for the services of a geotechnical engineering firm and testing laboratory to verify soils conditions including trench excavation and backfill and similar issues and for the testing of concrete cylinders for poured in place concrete.
2. Construction Verification Surveying
  - a. Allow the amount provided in the Bid for construction surveying by an independent surveying firm, selected by the Owner, to perform horizontal and vertical alignment checks at the discretion of the Engineer.
  - b. Utility Conflict Resolution: Allow the amount provided in the Bid for unforeseen utility conflict arising from facilities not shown on the drawings.
  - c. This allowance is solely for the use of the Engineer for verification of the Contractor's reference points, centerlines and work performed. The presence of this cash allowance in no way relieves the Contractor of the responsibility of installing reference points, centerlines, temporary bench marks or verifying that the work has been performed accurately.

### 1.03 Erosion and Sedimentation Control

A. General

1. No separate payment shall be made for temporary and/or permanent erosion and sedimentation controls.
2. No payment will be made for any portion of the Project for which temporary erosion and sedimentation controls are not properly maintained.

### 1.04 Earthwork

A. Earth Excavation

1. No separate payment will be made for earth excavation. The cost of such work and all costs incidental thereto shall be included in the lump sum price bid.
2. No separate payment will be made for providing sheeting, bracing and timbering.

B. Rock Excavation

1. No separate payment will be made for rock excavation.

### C. Foundation Excavation

1. Costs for undercutting, foundation preparation, and removal and replacement of unsuitable material, including rock, where shown on the Drawings or specified, shall be included in the lump sum bid.
  2. Payment for removal and replacement of unsuitable material which is ordered by the Engineer which is not shown on the Drawings or specified shall be made at the unit price bid for:
    - a. Replacement with Crushed Stone
    - b. Replacement with Suitable Earth Material
  3. No separate payment will be made for concrete backfill of trenches beneath structures. The cost of this work and all costs incidental thereto shall be included in the lump sum price bid.
  4. Additional costs of corrective work, made necessary by unauthorized excavation of earth or rock, shall be borne by the Contractor.
- D. Dewatering: No separate payment will be made for dewatering required to accomplish the work.
- E. Backfilling: No separate payment will be made for backfilling or excavation, hauling and placement of borrow material.

### 1.05 Trench Excavation and Backfill

- A. No separate or additional payment shall be made for any special or unique method, means, techniques or equipment necessary for the Contractor's compliance with these Specifications, regulatory requirements, permits, laws or regulations which govern this Project.
- B. Trench Excavation: No separate payment shall be made for trench excavation.
- C. Sheet piling, Bracing and Shoring: No separate payment will be made for providing sheet piling, bracing and timbering.
- D. Dewatering Excavations: No separate payment will be made for dewatering excavations.
- E. Trench Foundation and Stabilization: No separate payment will be made for work related to trench foundation and stabilization.

### 1.06 Site Utilities

Solid sleeves and fittings necessary for connections to existing site utilities, even if not shown on the Drawings, are considered incidental to the Project and will not be paid

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**Measurement and Payment**

for separately. Additionally, no payment will be made for fittings provided due to the Contractor's sequence of construction, layout problems, tie-ins or repairs.

**1.07 Clean-Up**

No payment will be made for any portion of the Project for which clean-up and restoration has not been completed, to the satisfaction of the Engineer and Owner.

**1.08 Additional Work**

- A. All estimated quantities stipulated in the Contract Documents for the Additional Work in the BID FORM are approximate and are to be used as a basis for estimating the probable cost of the Work and for the purpose of comparing bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and the materials furnished, documented by field measurements and documentation.
- B. Additional work or increase in the quantities of certain classes of work over those included in the lump sum for Item 1 of the Bid, when ordered by the Engineer, shall be measured and paid for in accordance with the following Paragraphs. Measurement of the quantities of additional work shall be made by the Engineer.
- C. The unit prices bid shall be applicable to any single occurrence of additional work ordered by the Engineer, which do not exceed the quantity in the Bid. Should a single occurrence exceed the quantity in the Bid, the Contractor and the Owner shall both have the right to negotiate a new unit price which is more representative of the larger quantity of work being ordered by the Engineer for that single occurrence. The aforementioned shall not relieve the Owner of its right to require the Contractor to provide additional work at the unit prices bid, nor shall it limit the number of times the additional work can be ordered at the unit prices bid, as long as each single occurrence does not exceed the quantity in the Bid.
- D. The unit prices bid under Additional Work if Ordered by the Engineer shall include all material costs, labor costs, overhead costs, schedule impact costs, incidental costs, and profit.

END OF SECTION



## Part 1 General

### 1.01 Scope

This section outlines the restrictions and requirements for substitutions, product and manufacturer options, and construction method options.

### 1.02 Definitions

- A. For the purposes of these Contract Documents, a “substitute item” shall be defined as one of the following:
  - 1. A product or manufacturer offered as a replacement to a specified product or manufacturer.
  - 2. A product or manufacturer offered in addition to a specified product or manufacturer.
- B. For the purposes of these Contract Documents, a “substitute construction method” shall be defined as one of the following:
  - 1. A mean, method, technique, sequence or procedure of construction offered as a replacement for a specified mean, method, technique, sequence or procedure of construction.
  - 2. A mean, method, technique, sequence or procedure of construction offered in addition to a specified mean, method, technique, sequence or procedure of construction.

### 1.03 General

- A. An item or construction method, which is offered where no specific product, manufacturer, mean, method, technique, sequence or procedure of construction is specified or shown on the Drawings, shall not be considered a substitute and shall be at the option of the Contractor, subject to the provisions in the Contract Documents for that item or construction method.
- B. For products specified only by a referenced standard, the Contractor may select any product by any manufacturer, which meets the requirements of the Specifications, unless indicated otherwise in the Contract Documents.
- C. If the manufacturer is named on the Drawings or in the Specifications as an acceptable manufacturer, products of that manufacturer meeting all requirements of the Specifications and Drawings are acceptable.
- D. Whenever the Engineer's design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or listed first in the list of approved manufacturers in the Specifications. Any Bidder intending to

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## Substitutions and Options

furnish products of other than the first listed manufacturer, or furnish substitute items, shall

1. Verify that the item being furnished will fit in the space allowed, perform the same functions and have the same capabilities as the item specified,
2. Include in its Bid the cost of all accessory items which may be required by the other listed substitute product,
3. Include the cost of any architectural, structural, mechanical, piping, electrical or other modifications required, and
4. Include the cost of required additional work by the Engineer, if any, to accommodate the item.

### 1.04 Approvals

Approval, of a substitution as an acceptable manufacturer, of the Engineer is dependent on determination that the product offered is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, service life and other criteria to that on which the design is based; and will require no major modifications to structures, electrical systems, control systems or piping systems.

### 1.05 Substitutions and Options

#### A. After Notice to Proceed

1. Substitute items will be considered only if the term "equal to" precedes the names of acceptable manufacturers in the Specification.
2. Where items are specified by referenced standard or specified as indicated in Article 1.03, Paragraph A above, such items shall be submitted to the Engineer for review.
3. The Contractor shall submit shop drawings on the substitute item for the Engineer's review in accordance with Section 01 33 23.

#### B. Prior to Opening of Bids

1. No consideration or approvals will be made for products specified by a referenced standard, or specified as indicated in Article 1.03, Paragraph A, above. Such consideration may occur only after the Notice to Proceed.
2. No consideration or approvals will be made for products being offered where the term "equal to" precedes the name of an approved product. Such substitution consideration may occur only after the Notice to Proceed.
3. If the term "or equal" follows the names of acceptable manufacturers, then other manufacturers desiring approval as an acceptable manufacturer may submit the

product information to the Engineer for approval during the bidding phase, as indicated below. With the exception of where the phrase “no substitutions” is associated with a list of manufacturers, where a list of acceptable manufacturers is not preceded by the phrase “equal to”, the list of acceptable manufacturers shall be considered as having the phrase “or equal” following the list, and the list being subject to the “or equal” provisions of this section.

4. The manufacturer shall include the following items in its “or equal” submittal:
  - a. Descriptive literature including information on materials used, minimum design standards, standard design features, manufacturing processes and facilities, and similar information which will indicate experience and expertise in the manufacture of the product being evaluated.
  - b. Performance specifications applicable to the manufacturer's standard design which indicates the level of performance to be expected from the product.
  - c. A complete set of submittal drawings of similar products which have been completed and placed into operation.
  - d. A list of existing installations of products similar in type and size, information required to satisfy specified experience requirements, or a copy of the bond to be submitted in lieu of experience.
  - e. Evidence of technical ability of the manufacturer to design and manufacture products meeting Project requirements.
  - f. Evidence submitted shall include, as a minimum, descriptions of engineering and manufacturing staff capabilities.
  - g. A copy of the manufacturer's most recent annual business report. Include a statement comparing the present net worth of the manufacturer in comparison to the total value of all products proposed to be furnished. Net worth must exceed the total value of all products proposed.
  - h. A complete description of field service capabilities, including the location of field service facilities which would serve the proposed facility and the number and qualifications of personnel working from that location.
  - i. A complete list of all requirements of the Drawings and Specifications with which the manufacturer cannot conform, including reasons why alternate features are considered equivalent.
  - j. If descriptive literature or drawings illustrate standard products with design features or materials not in compliance with Project requirements then these exceptions must be specifically listed. Failure to do so will indicate intent by the manufacturer to modify design features and alter materials to meet Project requirements.

Substitutions and Options

- k. Where additional information is submitted to supplement the submittal, all changes to the list of exceptions shall be specifically noted.
  - l. All other information necessary to fully evaluate the product for consideration.
5. This “or equal” submittal shall reach the Engineer no later than 14 days prior to the Bid date. Submittals which do not include a complete list of exceptions to Project requirements, or the statement “No exceptions to the Specifications will be taken”, will automatically be rejected by the Engineer. Manufacturers will be advised of approval or rejection in writing no later than 10 days prior to the Bid date. Rejected submittals may be supplemented with additional information and resubmitted no later than five days prior to the Bid date. Manufacturers making supplementary submittals will be advised of approval or rejection in writing no later than two days prior to the Bid date.
6. Bids based on products which have not received the approval of the Engineer may be determined non-responsive by the Owner and rejected.

END OF SECTION

## Part 1 General

### 1.01 Scope

The work under this Section includes preparation and submittal of a schedule of values.

### 1.02 General

- A. Timing of Submittal: Submit to the Engineer, a schedule of values allocated to the various portions of the work, within 10 days after Notice to Proceed. The first progress payment will not be made until the next pay cycle following the Engineer's approval of the Contractor's values.
- B. Supporting Data: Upon request of the Engineer, support the values with data which will substantiate their correctness.
- C. Use of Schedule: The schedule of values, unless objected to by the Engineer, shall be used only as a basis of the Contractor's Application for Payment.

### 1.03 Form and Content of Schedule of Values

- A. Form and Identification
  - 1. Type schedule on 8-1/2 x 11-inch white paper.
  - 2. Contractor's standard forms and automated printout may be used.
  - 3. Identify schedule with:
    - a. Title of Project and location
    - b. Engineer
    - c. Name and address of Contractor
    - d. Contract designation
    - e. Date of submission
- B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction. Breakdown shall be by structure, then by CSI Format, for ease of field verification of quantities completed in each structure.

- C. Format
  - 1. Follow the Table of Contents of the Contract Documents as the format for listing the component items.
  - 2. Identify each item with the number and title of the respective major section of the Specifications.
- D. For each major line item list sub-values of major products or operations under the item.
- E. For the Various Portions of the Work:
  - 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
  - 2. For items on which progress payments will be requested for stored materials, break down the value into:
    - a. The cost of the materials, delivered and unloaded, with taxes paid.
    - b. The total installed value, including Contractor's overhead and profit, less item a. above.
- F. The sum of all values listed in the schedule shall equal the Bid Total.
- G. The value of the work associated with conducting the Operating Test Period shall be provided for the Project.

END OF SECTION

## Part 1 General

### 1.01 Scope

- A. Work under this Section includes all scheduling and administering of pre-construction and progress meetings as herein specified and necessary for the proper and complete performance of this work.
- B. Scheduling and Administration by Engineer:
  - 1. Prepare agenda.
  - 2. Make physical arrangements for the meetings.
  - 3. Preside at meetings.
  - 4. Record minutes and include significant proceedings and decisions.
  - 5. Distribute copies of the minutes to participants.

### 1.02 Preconstruction Conference

- A. The Engineer shall schedule the preconstruction conference prior to the issuance of the Notice to Proceed.
- B. Representatives of the following parties are to be in attendance at the meeting:
  - 1. Owner.
  - 2. Engineer.
  - 3. Contractor and superintendent.
  - 4. Major subcontractors.
  - 5. Representatives of governmental or regulatory agencies when appropriate.
- C. The agenda for the preconstruction conference shall consist of the following as a minimum:
  - 1. Distribute and discuss a list of major subcontractors and a tentative construction schedule.
  - 2. Critical work sequencing.
  - 3. Designation of responsible personnel and emergency telephone numbers.
  - 4. Processing of field decisions and change orders.

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Project Meetings

5. Adequacy of distribution of Contract Documents.
6. Schedule and submittal of shop drawings, product data and samples.
7. Pay request format, submittal cutoff date, pay date and retainage.
8. Procedures for maintaining record documents.
9. Use of premises, including office and storage areas and Owner's requirements.
10. Major equipment deliveries and priorities.
11. Safety and first aid procedures.
12. Security procedures.
13. Housekeeping procedures.
14. Work hours.

### 1.03 Project Coordination Meetings

- A. Schedule regular monthly meetings as directed by the Engineer.
- B. Hold called meetings as the progress of the work dictates.
- C. The meetings shall be held at the location indicated by the Engineer.
- D. Representatives of the following parties are to be in attendance at the meetings:
  1. Engineer.
  2. Contractor and superintendent.
  3. Major subcontractors as pertinent to the agenda.
  4. Owner's representative as appropriate.
  5. Representatives of governmental or other regulatory agencies as appropriate.
- E. The minimum agenda for progress meetings shall consist of the following:
  1. Review and approve minutes of previous meetings.
  2. Review work progress since last meeting.
  3. Note field observations, problems and decisions.



4. Identify problems which impede planned progress.
5. Review off-site fabrication problems.
6. Review Contractor's corrective measures and procedures to regain plan schedule.
7. Review Contractor's revision to the construction schedule as outlined in the Supplementary Conditions.
8. Review submittal schedule; expedite as required to maintain schedule.
9. Maintenance of quality and work standards.
10. Review changes proposed by Owner for their effect on the construction schedule and completion date.
11. Complete other current business.

END OF SECTION



## Part 1      General

### 1.01      Scope

- A.    The work under this Section includes preparing, furnishing, distributing, and periodic updating of the construction schedules as specified herein.
- B.    The purpose of the schedule is to demonstrate that the Contractor can complete the overall Project within the Contract Time and meet all required interim milestones.

### 1.02      Submittals

- A.    Overall Project Schedule (OPS)
  - 1.    Submit the schedule within 10 days after date of the Notice to Proceed.
  - 2.    The Engineer will review the schedule and return it within 10 days after receipt.
  - 3.    If required, resubmit within 10 days after receipt of a returned copy.
- B.    Near Term Schedule (NTS)
  - 1.    Submit the first Near Term Schedule within 10 days of the Notice to Proceed.
  - 2.    The Engineer will review the schedule and return it within 10 days after receipt.
- C.    Submit an update of the OPS and NTS with each progress payment request.
- D.    Submit the number of copies required by the Contractor, plus four copies to be retained by the Engineer.

### 1.03      Approval

Approval of the Contractor's detailed construction program and revisions thereto shall in no way relieve the Contractor of any of Contractor's duties and obligations under the Contract. Approval is limited to the format of the schedule and does not in any way indicate approval of, or concurrence with, the Contractor's means, methods and ability to carry out the work.

### 1.04      Overall Project Schedule (OPS)

- A.    The Contractor shall submit to the Owner for approval a detailed Overall Project Schedule of the Contractor's proposed operations for the duration of the Project. The OPS shall be in the form of a Gantt/bar chart.
- B.    Gantt/Bar Chart Schedule
  - 1.    Each activity with a duration of five or more days shall be identified by a

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**Construction Schedules**

separate bar. Activities with a duration of more than 20 days shall be sub-divided into separate activities.

2. The schedule shall include activities for shop drawing preparation and review, fabrication, delivery, and installation of major or critical path materials and equipment items.
3. The schedule shall show the proposed start and completion date for each activity. A separate listing of activity start and stop dates and working day requirements shall be provided unless the information is shown in text form on the Gantt/bar chart.
4. The schedule shall identify the Notice to Proceed date, the Contract Completion date, major milestone dates, and a critical path.
5. The schedule shall be printed on a maximum 11 x 17-inch size paper. If the OPS needs to be shown on multiple sheets, a simplified, one page, summary bar chart showing the entire Project shall be provided.
6. The schedule shall have a horizontal time scale based on calendar days and shall identify the Monday of each week.
7. The schedule shall show the precedence relationship for each activity.

### 1.05 Near Term Schedule (NTS)

- A. The Contractor shall develop and refine a detailed Near Term Schedule showing the day to day activities with committed completion dates which must be performed during the upcoming 30 day period. The detailed schedule shall represent the Contractor's best approach to the Work which must be accomplished to maintain progress consistent with the Overall Project Schedule.
- B. The Near Term Schedule shall be in the form of Gantt/bar chart and shall include a written narrative description of all activities to be performed and describe corrective action to be taken for items that are behind schedule.

### 1.06 Updating

- A. Show all changes occurring since previous submission of the updated schedule.
- B. Indicate progress of each activity and show actual completion dates.
- C. The Contractor shall be prepared to provide a narrative report at the Project Coordination Meetings. The report shall include the following:
  1. A description of the overall Project status and comparison to the OPS.
  2. Identify activities which are behind schedule and describe corrective action to be taken.

3. A description of changes or revisions to the Project and their effect on the OPS.
4. A description of the Near Term Schedule of the activities to be completed during the next 30 days. The report shall include a description of all activities requiring participation by the Engineer and/or Owner.

END OF SECTION



**Part 1 General**

**1.01 Scope**

- A. The Contractor shall furnish all equipment and labor materials required to provide the Owner with digital construction videos and photographs of the Project.
- B. Photo and video files shall become the property of the Owner and none of the videos or photographs shall be published without express permission of the Owner.

**1.02 Pre and Post Construction Videos and Photographs**

- A. Prior to the beginning of any work, the Contractor shall take videos and photographs of the work area to record existing conditions.
- B. Following completion of the work, another set of videos and photographs shall be made showing the same areas and features as in the pre-construction videos and photographs.
- C. All conditions which might later be subject to disagreement shall be shown in sufficient detail to provide a basis for decisions.

**1.03 File Format, Media and Submittals**

- A. Photographs shall be in "jpg" format.
- B. Videos shall be in a format viewable by Microsoft Windows Media Player or Apple QuickTime Player. Audio narration is desirable.
- C. Files shall be named such that what is being viewed is self evident.
- D. Files shall be submitted on a compact disk (CD) or a digital video disk (DVD). If submitted on DVD, disk shall be recorded in "Minus R" format.
- E. The pre-construction videos and photographs shall be submitted to the Engineer within 25 calendar days after the date of receipt by the Contractor of Notice to Proceed. Post-construction videos and photographs shall be provided prior to final acceptance of the Project.

END OF SECTION





## Part 1 General

### 1.01 Scope

- A. The work under this Section includes submittal to the Engineer of shop drawings, product data and samples required by the various Sections of these Specifications.
- B. Submittal Contents: The submittal contents required are specified in each Section.
- C. Definitions: Submittals are categorized as follows:
  - 1. Shop Drawings
    - a. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance curves, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawing is prepared.
    - b. Provide newly-prepared information, on bond sheets, with graphic information at accurate scale (except as otherwise indicated) or appropriate number of prints hereof, with name or preparer (firm name) indicated. The Contract Drawings shall not be traced or reproduced by any method for use as or in lieu of detail shop drawings. Show dimensions and note dimensions that are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirements. Do not allow shop drawings to be used in connection with the Work without appropriate final "Action" markings by the Engineer.
    - c. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, Specification Section, schedule or room numbers shown on the Contract Drawings.
    - d. Minimum assembly drawings sheet size shall be 24 x 36-inches.
    - e. Minimum detail sheet size shall be 8-1/2 x 11-inches.
    - f. Minimum Scale:
      - i. Assembly Drawings Sheet, Scale: 1-inch = 30 feet.
      - ii. Detail Sheet, Scale: 1/4-inch = 1 foot.
  - 2. Product Data
    - a. Product data includes standard printed information on materials, products and systems, not specially prepared for this Project, other than the designation of selections from among available choices printed therein.



unsigned or uncertified submission form or as may otherwise be required will be returned to Contractor unreviewed.

- F. Nonspecified Submissions: Submissions not required under these Contract Documents and not shown on submittal logs generated by the Engineer will not be reviewed, but will be logged for information only, and will be returned to Contractor.
- G. Engineer's Review: Engineer will act upon Contractor's Submittal and transmit response to Contractor not later than 30 days after receipt, unless otherwise specified. Resubmittals will be subject to same review time.
- H. Schedule Delays
  - 1. No adjustment of Contract Times or Price will be allowed due to Engineer's review of Submittals, unless all of the following criteria are met:
    - a. Contractor has notified Engineer in writing that timely review of Submittal in question is critical to progress of Work, and has received Engineer's written acceptance to reflect such on current accepted submissions and progress schedule. Written agreement by Engineer to reduce Submittal review time will be made only for unusual and Contractor-justified reasons. Acceptance of a progress schedule containing Submittal review times less than specified or less than agreed to in writing by Engineer will not constitute Engineer's acceptance of review times.
    - b. Engineer has failed to review and return first submission of a Submittal within agreed time indicated on current accepted schedule of submissions or, if no time is indicated thereon, within 30 days after receipt.
    - c. Contractor demonstrates that delay in progress of Work is directly attributable to Engineer's failure to return Submittal within time indicated and accepted by Engineer.
  - 2. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmission of Submittals, including multiple resubmissions.

## 1.02 Specific Category Requirements

- A. General: Except as otherwise indicated in the individual work sections, comply with general requirements specified herein for each indicated category of submittal. Submittals shall contain:
  - 1. The date of submittal and the dates of any previous submittals.
  - 2. The Project title.
  - 3. The submittal number as indicated in 01 31 29.
  - 4. The Names of:

- a. Contractor
  - b. Supplier
  - c. Manufacturer
5. Identification of the product, with the Specification Section number, permanent equipment tag numbers and applicable Drawing No.
  6. Field dimensions, clearly identified as such.
  7. Relation to adjacent or critical features of the work or materials.
  8. Applicable standards, such as ASTM or Federal Specification numbers.
  9. Notification to the Engineer in writing of any deviations to the requirements of the Contract Documents. The notification of deviation shall be clearly marked by the Contractor in the body of the submittal and stated in text in the Contractor's remarks on the transmittal document of the submittal. Indicate the reasons for the deviations and the benefits to the Project. This information is to be entered into the Document Tracking and Control System as described in Section 01 31 29.
  10. Identification of revisions on resubmittals.
  11. An 8 x 3-inch blank space for Contractor and Engineer stamps.
  12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the work and of Contract Documents.
  13. Submittal sheets or Drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

### 1.03 Routing of Submittals

- A. Submittals and routine correspondence shall be routed as follows:
  1. Supplier to Contractor (through representative if applicable)
  2. Contractor to Engineer
  3. Engineer to Contractor and Owner
  4. Contractor to Supplier

## 1.04 Submittal Log

- A. The submittal log shall be created by the Engineer and issued to the Contractor as the complete listing of submittals required for the Project. The submittal log will define how the submittals will be numbered and described, and identify how the submittals are to be packaged. The Contractor may propose changes and supplements to the log. Submittals which are incorrectly numbered or packaged will not be reviewed and will be returned to the Contractor.
- B. Submittal Identification and Packaging: Submittals shall be incorporated into packages, with numbering as follows: XXXXXX.YY, where 'X' denotes the applicable specification section and 'Y' denotes the individual submittal number for that particular specification section, beginning with 01. The initial submittal shall be identified in Contract Management as "Latest Revision" 000. Subsequent re-submittals shall be identified 001, 002, etc. Packages shall be identified as follows: XXXXXXAA; where 'X' denotes the applicable specification section and 'A' indicates which submittals must be submitted together in a single package. The Contractor shall identify as an activity in the CPM schedule, all major equipment submittals as well as those involving complex reviews and long lead deliveries. Submittal schedule information shall be updated monthly with the Contractor's updated project CPM schedule.

## Part 2 Products

### 2.01 Shop Drawings

- A. Unless otherwise specifically directed by the Engineer, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.
- B. Submit all shop drawings electronically to the fullest extent possible. Contractor shall advise when shop drawings cannot be scanned and submitted electronically. In the limited cases where electronic submissions cannot be made, 6 copies of the submittal shall be provided. All electronically submitted shop drawings shall be in a searchable single file Adobe Acrobat Portable Document Format (PDF). The PDF file shall be fully indexed using the Table of Contents, searchable with thumbnails generated. Electronic files shall be scanned in no greater than 300 dpi utilizing optical character recognition (OCR) software. One signed hard copy of the reviewed submittal shall be returned to the Contractor. Contractor will be responsible for additional markups required for additional distribution to suppliers and subcontractors. See Section 01 31 29.

### 2.02 Manufacturer's Literature

- A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.
- B. Submit the number of copies which are required to be returned (not to exceed three)

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Shop Drawings, Product Data, and Samples

plus three copies which will be retained by the Engineer.

## 2.03 Samples

- A. Samples shall illustrate materials, equipment or workmanship and established standards by which completed work is judged.
- B. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.
- C. Submit all samples in the quantity which is required to be returned plus three samples which will be retained by the Engineer.

## 2.04 Colors

- A. Unless the precise color and pattern is specifically described in the Contract Documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.
- B. Submit the number of color and pattern charts that are desired by the Contractor to be returned plus three color and pattern charts to be retained by the Engineer. Submittal of black and white copies will not be acceptable. Charts shall be furnished to the Contractor by the vendor or supplier. Charts printed from the vendor or supplier's web-site will not be acceptable.
- C. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

## 2.05 Administrative Submittals

- A. Copies: Submit electronically unless otherwise directed by the Engineer. When hard copies are to be submitted, a minimum of 6 copies shall be provided.
- B. Description: Submittals that are not Shop Drawings or Samples, or that do not reflect quality of product or method of construction. May include, but not limited to those Submittals identified below.
- C. Applications for Payment (and Cash Allowance Data and Values): Meet requirements of Section 01 22 00.
- D. Construction Photographs and Video: In accordance with Section 01 32 33 and as may otherwise be required in the Contract Documents.
- E. Progress Reports and Quantity Charts: As may be required in Section 01 32 16.
- F. Schedules
  - 1. Progress Schedule(s): Meet the requirements of Section 01 32 16.

2. Schedule of Values: Meet requirements of Section 01 32 16.
3. Schedule of Submittal Submissions:
  - a. The Engineer will prepare preliminary list of submissions grouped by Specification section number, with identification, numbering and tracking system as specified under Section 01 31 29.
  - b. Submissions will include the following:
    - i. Shop Drawings and Samples.
    - ii. Training plans.
    - iii. Test procedures and reports.
    - iv. Operation and maintenance manuals.
    - v. Specifically required certificates, warranties, and service agreements.
  - c. The Contractor shall coordinate submissions with the progress schedule and shall provide the following:
    - i. Estimated submission date to Engineer.
    - ii. Specifically requested and clearly identified Engineer review time if shorter than that set forth herein, with justification for such request and critical dates Submittals will be needed from Engineer.
    - iii. For first 6-month period from the date the Contract Times commence or following any update or adjustment of the submissions, the estimated submission date shall be week, month, and year; for submissions beyond 6-month time period, show closest month and year.
  - d. Submit to Engineer monthly:
    - i. Updated list if changes have occurred. Otherwise, submit a written notice that no changes have occurred.
    - ii. Adjusted submissions reflecting submission activity planned for forthcoming 6-month time period and beyond. Coordinate with progress schedule updates.
- G. Training Materials: Meet the requirements of Section 01 43 33.
- H. Submittals Required by Laws, Regulations, and Governing Agencies

Shop Drawings, Product Data, and Samples

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to Engineer for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.



## 2.06 Quality Control Submittals

- A. Certificates
  - 1. Manufacturer's Certificate of Compliance: As specified in Section 01 45 33.
  - 2. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in the individual Specification sections.
  - 3. Manufacturer's Certificate of Proper Installation: As specified in Section 01 43 13.
- B. Operation and Maintenance Manual: As required in Section 01 78 23.
- C. Statements of Qualification: Evidence of qualification, certification, or registration. As required in these Contract Documents to verify qualifications of professional land surveyors, Engineers, materials testing laboratories, specialty Subcontractors, trades, specialists, consultants, installers, and other professionals.
- D. Field Samples: Provide as required by individual Specifications and as may be required by Engineer during progress of Work.
- E. Written Test Reports of Each Test and Inspection: As a minimum, include the following:
  - 1. Date of test and date issued, Project title and number, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
  - 2. Date and time of sampling or inspection and record of temperature and weather conditions.
  - 3. Identification of product and Specification section, location of Sample, test or inspection in the Project, type of inspection or test with referenced standard or code, certified results of test.
  - 4. Compliance with Contract Documents, and identifying corrective action necessary to bring materials and equipment into compliance.
  - 5. Provide an interpretation of test results, when requested by Engineer.
- F. Disposition: Engineer will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:
  - 1. Accepted:
    - a. Acceptance will indicate that Submittal conforms to intent of Contract Documents as to form and substance.

- b. Contractor may proceed to perform Submittal related Work.
  - c. One copy furnished Owner.
  - d. One copy furnished Resident Project Representative.
  - e. One copy retained in Engineer's file.
  - f. One copy retained by Designer
  - g. Remaining copies returned to Contractor appropriately annotated.
2. Rejected as Noted:
- a. One copy retained in Engineer's file.
  - b. Remaining copies returned to Contractor appropriately annotated.
  - c. Contractor shall revise/correct or develop replacement and resubmit.

## 2.07 Contract Closeout Submittals

- A. General: In accordance with Section 01 78 39.
- B. Disposition: Engineer will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:
  - 1. No Exceptions Taken (NET) / No Exception Taken with Comments (NETC):
    - a. An NET or NETC status will indicate that Submittal conforms to intent of Contract Documents as to form and substance.
    - b. Contractor may proceed to perform Submittal related Work.
    - c. One copy furnished Owner.
    - d. One copy furnished Resident Project Representative.
    - f. Two copies retained in Engineer's file.
    - g. One copy returned to Contractor appropriately annotated.
  - 2. Make Corrections Noted (MCN), Amend & Resubmit (A&R) or Rejected (Rej):
    - a. Two copies retained in Engineer's file.
    - b. One copy returned to Contractor appropriately annotated.
    - c. Contractor shall revise/correct or develop replacement and resubmit.

## Part 3 Execution

### 3.01 Contractor's Coordination of Submittals

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

1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.
2. Coordinate as required with all trades and all public agencies involved.
3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this Section. Contractor's certification to include the following clause:

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: \_\_\_\_\_  
Contractor (Authorized Signature)

4. Clearly indicate in a letter or memorandum on the manufacturer's or fabricator's letterhead, all deviations from the Contract Documents.
- B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement.
- C. The Owner may backcharge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a "No Exceptions Taken" or "No Exceptions Taken with Comments" status.
- D. Packaging of Submittals
1. Submittals shall be packaged. Submittals in packages shall be submitted simultaneously. Unless otherwise specifically permitted by the Engineer, make all submittals in packages containing all submittals indicated by the submittal log to be packaged together.
  2. No review will be given to partial submittals or incomplete packages of submittals. It is the Contractor's responsibility to assemble the shop drawings for interconnecting and interdependent items, check them and then make one submittal to the Engineer along with Contractor's comments as to compliance, non-compliance or features requiring special attention.

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**Shop Drawings, Product Data, and Samples**

3. The Engineer will provide the Contractor the list of packages with the submittal log. See Section 01 31 29.
- E. Design Data: When specified, provide Project-specific information as required and as necessary to clearly show calculations, dimensions, logic and assumptions, and referenced standards and codes upon which design is based.
- F. Foreign Manufacturers: When proposed, include following additional information:
1. Names and addresses of at least two companies closest to Project that maintain technical service representatives.
  2. Complete inventory of spare parts and accessories for each piece of equipment.
- G. Preparation
1. Format: Whenever possible, schedule for and combine Shop Drawings and Samples required for submission in each Specification section or Division into a single Submittal package. Also combine product data for like items into a single Submittal package.
  2. Present in a clear and thorough manner and of sufficient detail to show kind, size, arrangement, and function of components, materials, and devices and compliance with Contract Documents. Identify details by reference to sheet and detail, and schedule or room numbers shown on Drawings.
  3. Piping Systems: Drawn to scale.
  4. Product Data: Clearly mark each copy to identify pertinent products or models and show performance characteristics and capacities, dimensions and clearances required, wiring or piping diagrams and controls, and external connections, anchorage, and supports required.
  5. Equipment and Component Titles: Identical to title shown on Drawings.
  6. Manufacturer's standard schematic drawings, diagrams, and product data as follows:
    - a. Modify to delete information that is not applicable to Work.
    - b. Supplement standard information to provide information specifically applicable to Work.

### 3.02 Timing of Submittals

- A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.

- B. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal.

### 3.03 Reviewed Shop Drawings

#### A. Engineer Review

1. Allow a minimum of 30 days for the Engineer's initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Engineer on each submittal as to whether processing time is critical to progress of the work, and therefore the work would be expedited if processing time could be foreshortened.
2. Acceptable submittals will be marked "No Exceptions Taken". A minimum of four copies will be retained by the Engineer for Engineer's and the Owner's use and the remaining copies will be returned to the Contractor.
3. Acceptable submittals with a minor comment or comments offered merely to alert the Contractor to some issue or provide information will be marked "No Exceptions Taken with Comment". A submittal with an "NETC" status shall not be resubmitted.
4. Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Contractor may order, fabricate and ship the items included in the submittals, provided the indicated corrections are made. Drawings must be resubmitted for review in accordance with Article 1.01 D above. Re-submittals must be marked "No Exceptions Taken" or "No Exceptions Taken with Comments" prior to installation or use of products.
5. Submittals marked "Amend and Resubmit" must be revised to reflect required changes and the initial review procedure repeated inclusive of Article 1.01 D above.
6. The "Rejected - See Remarks" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.
7. Only two copies of items marked "Amend and Resubmit" and "Rejected - See Remarks" will be reviewed and marked. One copy will be retained by the Engineer and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.

- B. No work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.

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Shop Drawings, Product Data, and Samples

- C. Substitutions: In the event the Contractor obtains the Engineer's approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor's own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.
- D. Use of the "No Exceptions Taken" notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer's review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

### 3.04 Resubmission Requirements

- A. Shop Drawings: Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by the Engineer are provided on the resubmittal. The resubmission shall be accompanied by a letter as referenced in Article 1.01 D above. Clearly mark and alert the Engineer to the presence of changes within the resubmittal that are other than those required by the Engineer's comments on the previous submittal. Requirements specified in initial submittals shall also apply to resubmittals.
- B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with the resubmittal number shown.

END OF SECTION

## Part 1 General

### 1.01 Scope

The scope of this Section is to convey to the Contractor unique and unusual stipulations and requirements which have been established for this Project. Some of the stipulations and requirements are a result of negotiations with various entities and organizations which have an interest in this Project. Some requirements are based on technical aspects of the Project which are not otherwise conveyed to the Contractor. The provisions of this Section shall supersede the provisions of the Division 01 through 49 Specifications but shall not supersede the Bidding Requirements, Contract Forms or Conditions of the Contract.

### 1.02 Submittals

#### A. Sequence Submittal

1. Submit a proposed sequence in accordance with Section 01 33 23 with appropriate times of starting and completion of tasks to Engineer for review.
2. The Contractor may propose alternatives to the sequencing constraints to that shown in this Section in an attempt to reduce the disruption of the operation of the existing facility or streamline the tasks of this Contract. The Owner and Engineer are not obligated to accept any of these alternatives.

### 1.03 Existing Facility Operations

- A. The Contractor shall coordinate the work with the Owner so that the construction will not restrain or hinder the operation of the existing facilities. If, at any time, any portion of the facilities are out of service, the Contractor must obtain approval from the Owner as to the date, time and length of time that portion of the facilities are out of service.
- B. Connections to the existing facilities or alteration of existing facilities will be made at times when the facility involved is not in use or at times, established by the Owner, when the use of the facility can be conveniently interrupted for the period of time needed to make the connection or alteration. Bypass pumping may be required to connect to existing facilities.
- C. After having coordinated the work with the Owner, the Contractor shall prepare a submittal in accordance with Section 01 33 23 to include the time, time limits and methods of each connection or alteration and have the approval of the Engineer before any work is undertaken on the connections or alterations.
- D. Before any roadway or facilities are blocked off, the Owner's approval shall be obtained to coordinate operations for the plant.

## 1.04 Sequencing

### A. General

1. The Contractor shall be solely responsible for all construction sequencing.
2. The completion of specific preliminary sequencing tasks will be required prior to any significant site demolition.
3. The construction schedule and tasks shall be reviewed and approved by the Engineer before site demolition begins.

- B. Notify the Owner at least ten days prior to starting to relocate piping or taking existing components out of service.

## 1.05 Sequencing Constraints

- A. The following construction sequencing constraints are to emphasize critical tasks of the Work in this Contract. It is not a complete list of all work to be completed.

1. Operation of pumping systems at Citico Pump Station shall not be interrupted, except when bypass pumping is provided.
2. Flow of gravity wastewater interceptor(s) to existing Citico Pump Station shall not be interrupted, except when bypass pumping is in place and operational.
3. Supply of potable water to Citico Pump Station and Citico CSO Treatment Facility shall be provided at all times.
4. Maintain odor control of wastewater wet well(s) through-out construction. New odor control system shall be online and operational prior to decommissioning of existing odor control system, or temporary odor control shall be provided at no additional cost to the Owner.
5. Coordinate installation of electrical improvements to schedule single transition to new switchgear. Provide on-site temporary power as necessary to maintain pumping during switchover or execute electrical switchover while bypass pumping is in operation.
6. Construct Emergency Backup Pump Station (EBPS) without connection to existing 72" interceptor. Demolish and tie-in to 72" interceptor only after EBPS is constructed.
7. During connection of EBPS piping to existing 48" force main, isolate and divert Citico Pump Station flow to 30" force main only and tie in to 48" force main while flow is diverted.
8. During connection of EBPS piping to existing 30" force main, isolate and divert Citico Pump Station flow to 48" force main only and tie in to 30" force main while flow is diverted.
9. Pre-screen and bypass pump wastewater from manhole on 72" interceptor upstream of EBPS and pump directly to 48" forcemain via new access point. Demolish 72" interceptor within EBPS and install 72" slide gate.

## 1.06 Administration Period



- 
- A. During the Administration Period the Contractor shall be limited in site access to only the following:
1. Nondestructive field verification of existing conditions.
  2. Install initial erosion control measures.
  3. Construction of Engineer's and Contractor's temporary field offices.
- B. During the Administration Period the Contractor shall complete, as a minimum, the following:
1. Issuance of contracts, subcontracts, and purchase orders for all major products and systems.
  2. Complete all submittals, release for manufacture, and schedule delivery for the products or systems referenced above.
  3. Prepare and submit approvable documents required by Section 01 32 16, including OPS and the Schedule of Values.
  4. Install Engineer's and Contractor's temporary field offices complete with all required utilities, internet, network, supplies, and furnishings required.
  5. Complete software delivery and training required by Section 01 31 29.
  6. Complete and submit all preconstruction photos, videos.
- C. The duration of the Administration Period is 60 consecutive calendar days, after which time the Construction Period shall automatically begin. Construction Period may begin prior to the 60 days, provided all requirements of the Administration Period have been completed, submitted, and approved by the Engineer.

END OF SECTION



Part 1 General

1.01 Scope

- A. Permits and Responsibilities: The Contractor shall, without additional expense to the Owner, be responsible for obtaining all necessary licenses and permits, including building permits, and for complying with any applicable federal, state, county and municipal laws, codes and regulations, in connection with the prosecution of the work.
- B. The Contractor shall take proper safety and health precautions to protect the work, the workers, the public and the property of others.
- C. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the work, except for any completed unit of construction thereof which may heretofore have been accepted.

END OF SECTION



## Part 1 General

### 1.01 Description

- A. Whenever reference is made to conforming to the standards of any technical society, organization, body, code or standard, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the time of advertisement for bids. This shall include the furnishing of materials, testing of materials, fabrication and installation practices. In those cases where the Contractor's quality standards establish more stringent quality requirements, the more stringent requirement shall prevail. Such standards are made a part hereof to the extent which is indicated or intended.
- B. The inclusion of an organization under one category does not preclude that organization's standards from applying to another category.
- C. In addition, all work shall comply with the applicable requirements of local codes, utilities and other authorities having jurisdiction.
- D. All material and equipment, for which a UL Standard, an AGA or NSF approval or an ASME requirement is established, shall be so approved and labeled or stamped. The label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.
- E. The standards which apply to this Project are not necessarily restricted to those organizations which are listed in Article 1.02.

### 1.02 Standard Organizations

#### A. Piping and Valves

ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
DIPRA	Ductile Iron Pipe Research Association
FCI	Fluid Controls Institute
MSS	Manufacturers Standardization Society
NCPI	National Clay Pipe Institute
NSF	National Sanitation Foundation
PPI	Plastic Pipe Institute
Uni-Bell	PVC Pipe Association

#### B. Materials

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute

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 Codes and Standards

- |   |  |
|---|--|
| ASTM                                      | American Society for Testing and Materials           |
| C. Painting and Surface Preparation       |  |
| NACE                                      | National Association of Corrosion Engineers          |
| SSPC                                      | Steel Structures Painting Council                    |
| D. Electrical and Instrumentation         |  |
| AEIC                                      | Association of Edison Illuminating Companies         |
| AIEE                                      | American Institute of Electrical Engineers           |
| EIA                                       | Electronic Industries Association                    |
| ICEA                                      | Insulated Cable Engineers Association                |
| IEC                                       | International Electrotechnical Commission            |
| IEEE                                      | Institute of Electrical and Electronic Engineers     |
| IES                                       | Illuminating Engineering Society                     |
| IPC                                       | Institute of Printed Circuits                        |
| IPCEA                                     | Insulated Power Cable Engineers Association          |
| ISA                                       | The Instrumentation, Systems, and Automation Society |
| NEC                                       | National Electric Code                               |
| NEMA                                      | National Electrical Manufacturers Association        |
| NFPA                                      | National Fire Protection Association                 |
| REA                                       | Rural Electrification Administration                 |
| TIA                                       | Telecommunications Industries Association            |
| UL  | Underwriter's Laboratories                           |
| VRCI                                      | Variable Resistive Components Institute              |
| E. Aluminum                               |  |
| AA  | Aluminum Association                                 |
| AAMA                                      | American Architectural Manufacturers Association     |
| F. Steel and Concrete                     |  |
| ACI                                       | American Concrete Institute                          |
| AISC                                      | American Institute of Steel Construction, Inc.       |
| AISI                                      | American Iron and Steel Institute                    |
| CRSI                                      | Concrete Reinforcing Steel Institute                 |
| NRMA                                      | National Ready-Mix Association                       |
| PCA                                       | Portland Cement Association                          |
| PCI                                       | Prestressed Concrete Institute                       |
| G. Welding                                |  |
| ASME                                      | American Society of Mechanical Engineers             |
| AWS                                       | American Welding Society                             |
| H. Government and Technical Organizations |  |
| AIA                                       | American Institute of Architects                     |
| APHA                                      | American Public Health Association                   |

APWA	American Public Works Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASQC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
CFR	Code of Federal Regulations
CSI	Construction Specifications Institute
EDA	Economic Development Administration
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FmHA	Farmers Home Administration
FS	Federal Specifications
IAI	International Association of Identification
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
NBFU	National Board of Fire Underwriters
(NFPA)	National Fluid Power Association
NBS	National Bureau of Standards
NISO	National Information Standards Organization
OSHA	Occupational Safety and Health Administration
SI	Salt Institute
SPI	The Society of the Plastics Industry, Inc.
USDC	United States Department of Commerce
WEF	Water Environment Federation

#### I. General Building Construction

AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AITC	American Institute of Timber Construction
APA	American Parquet Association, Inc.
APA	American Plywood Association
BHMA	Builders Hardware Manufacturers Association
BIFMA	Business and Institutional Furniture Manufacturers Association
DHI	Door and Hardware Institute
FM	Factory Mutual Fire Insurance Company
HPMA	Hardwood Plywood Manufacturers Association
HTI	Hand Tools Institute
IME	Institute of Makers of Explosives
ISANTA	International Staple, Nail and Tool Association
ISDSI	Insulated Steel Door Systems Institute
IWS	Insect Screening Weavers Association
MBMA	Metal Building Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NAGDM	National Association of Garage Door Manufacturers
NCCLS	National Committee for Clinical Laboratory Standards
NFPA	National Fire Protection Association
NFSA	National Fertilizer Solutions Association
NKCA	National Kitchen Cabinet Association

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 Codes and Standards

NWMA	National Woodwork Manufacturers Association
NWWDA	National Wood Window and Door Association
RMA	Rubber Manufacturers Association
SBC	SBCC Standard Building Code
SDI	Steel Door Institute
SIA	Scaffold Industry Association
SMA	Screen Manufacturers Association
SPRI	Single-Ply Roofing Institute
TCA	Tile Council of America
UBC	Uniform Building Code
J. Roadways	
AREA	American Railway Engineering Association
DOT	Tennessee Department of Transportation
K. Plumbing	
AGA	American Gas Association
NSF	National Sanitation Foundation
PDI	Plumbing Drainage Institute
SPC	SBCC Standard Plumbing Code
L. Refrigeration, Heating, and Air Conditioning	
AMCA	Air Movement and Control Association
ARI	American Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
CGA	Compressed Gas Association
CTI	Cooling Tower Institute
HEI	Heat Exchange Institute
IIAR	International Institute of Ammonia Refrigeration
NB	National Board of Boilers and Pressure Vessel Inspectors
PFMA	Power Fan Manufacturers Association
SAE	Society of Automotive Engineers
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SMC	SBCC Standard Mechanical Code
TEMA	Tubular Exchangers Manufacturers Association
M. Equipment	
AFBMA	Anti-Friction Bearing Manufacturers Association, Inc.
AGMA	American Gear Manufacturers Association
ALI	Automotive Lift Institute
CEMA	Conveyor Equipment Manufacturers Association
CMAA	Crane Manufacturers Association of America
DEMA	Diesel Engine Manufacturers Association
MMA	Monorail Manufacturers Association
OPEI	Outdoor Power Equipment Institute, Inc.



PTI        Power Tool Institute, Inc.  
RIA        Robotic Industries Association  
SAMA      Scientific Apparatus Makers Association

### 1.03    Symbols

Symbols and material legends shall be as scheduled on the Drawings.

END OF SECTION



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## Part 1 General

### 1.01 Scope

- A. The work under this Section defines the minimum scope of services to be provided by the Contractor during installation, start-up, operating test period, and operator training using factory representatives of the manufacturers of the equipment provided.
- B. Furnish all labor, materials, tools, equipment, and services for the cleaning up or preparation of all equipment which is required in conjunction with the instruction work to be performed for the Owner's personnel.
- C. Perform additional instruction of the Owner's personnel for any and all items of work that are incomplete at the time initial instruction sessions are scheduled.
- D. Although such work may not be explicitly specifically indicated elsewhere, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation, and to provide instructions upon the functions of that installation.
- E. Provide instruction for all equipment and systems for which operating and maintenance data is required.
- F. Instruction sessions may be combined to some extent between several pieces of similar equipment within the same training session, but only if that combination is defined in the Contractor's instruction program submittal and approved by the Engineer.
- G. Unless otherwise stipulated in equipment specifications, at least one instruction session for each major type of equipment will be required. The Contractor shall anticipate that up to ten of the Owner's employees will participate in any particular instruction session, and shall be prepared to provide the required number of handouts, manuals, and tools for each session.

### 1.02 Qualification

- A. Qualification of the manufacturer's representatives for installation, start-up, and operator training purposes shall be appropriate for the equipment being installed. Manufacturer's representatives shall be subject to the approval of the Engineer. Where equipment has significant process complexity, furnish the services of engineering personnel knowledgeable in the process involved and the function of the equipment.
- B. References in various equipment sections of the terms "factory representative" or "field representative" shall mean an employee of the equipment manufacturer who is completely knowledgeable of the manufacturing, installation, operation and maintenance of the equipment. A sales representative does not qualify, unless it is documented that they have been specifically trained by the Manufacturer. Any field or factory representative not an active employee of the manufacturer must provide documentation from the manufacturer stating that the individual, by name, has been

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**Manufacturer Services**

formally trained in the installation, operation and maintenance of the equipment and is authorized to make the required certification to perform the required services.

### 1.03 Submittals

- A. No later than one hundred twenty days prior to scheduled Substantial Completion of the Work, the Contractor shall submit a list of proposed instruction sessions for the entire Project. This list shall be organized by Specification Section and its contents will be subject to the approval of the Engineer and Owner.
- B. After approval of the list of the proposed instruction sessions and no later than sixty days prior to the scheduled Substantial Completion of the Work, submit course outlines and training material for each of the approved instruction sessions. Outlines shall be organized by Specification Section, and their contents shall be subject to the approval of the Engineer.
- C. After approval of the program content, the Contractor shall submit a proposed schedule for each of the approved instruction sessions which are to be organized by Specification Section, and the scheduled dates will be subject to the approval of the Engineer.
- D. Submit a separate instruction request/report (form attached) for each system or type of equipment, subject to the Owner's approval of availability of personnel.
  - 1. Submit request/report with preliminary information indicated, to the Engineer at least two weeks prior to first instruction period.
  - 2. After each instruction session, submit three copies of the completed report to the Engineer.

### 1.04 Coordination

- A. Do not begin instructions until component assembly or system has been tested as specified in Section 01 75 16 and is in satisfactory operating condition.
- B. Prior to instruction sessions, assemble instructional aids, tools, test equipment, and "Final" copies of Operations and Maintenance Manuals.
- C. All instruction sessions shall be planned and scheduled such that the Owner's participants will utilize copies of the Project Operations and Maintenance Manuals which will have been previously provided. These copies are in addition to the quantities which have to be provided to the Owner under Section 01 78 23. The use of draft copies of these manuals will be acceptable.
- D. The Contractor shall schedule and coordinate the visits of factory representatives during installation, start-up and operator training in accordance with the requirements of Section 01 75 16 of these Specifications.
- E. The Contractor shall notify the Engineer 72 hours prior to any impending visit by factory representatives so that the Engineer can be present.

## 1.05 Installation, Start-Up, and Testing Services

The Contractor shall furnish the services of a factory representative to provide the Pre-Start-Up Maintenance, Installation, Inspection, Functional Testing, and Operational Testing in accordance with Section 01 75 16 and the equipment sections of these Specifications.

## 1.06 Operator Training Services

- A. Provide all instruction as required to ensure understanding of all operating and maintenance procedures by the Owner designated personnel.
- B. Instruct Owner's personnel in operation and maintenance of equipment and systems. Provide all necessary instruction to satisfaction of the Owner.
- C. Training sessions shall be scheduled at the convenience of the Owner, and may have to be scheduled outside of the Contractor's normal working hours.
- D. Explain use of Operating and Maintenance Manuals.
- E. Tour building areas involved and identify:
  - 1. Maintenance and access points.
  - 2. Control locations and control equipment.
- F. Explain Operating Sequences
  - 1. Identify location and show operation of switches, valves, etc., used to start, stop, and adjust systems.
  - 2. Explain use of flow diagrams, operating sequences, diagrams, etc.
  - 3. Demonstrate operation through complete cycle(s) and full range of operation in all modes, including testing and adjusting relevant to operation
- G. Explain use of control equipment, including temperature settings, switch modes, available adjustments, reading of gauges, and functions that must be serviced only by authorized factory representative.
- H. Explain Trouble Shooting Procedures
  - 1. Demonstrate commonly occurring problems.
  - 2. Note procedures which must be performed by factory personnel.
- I. Explain Maintenance Procedures and Requirements
  - 1. Point out items requiring periodic maintenance.

2. Demonstrate typical preventive maintenance procedures and recommend typical maintenance intervals.
  3. Demonstrate other commonly occurring maintenance procedures not part of preventive maintenance program.
  4. Identify maintenance materials to be used.
- J. Furnish all tools and/or test equipment required for proper instruction of the Owner's personnel. Tools and/or test equipment shall be distributed in "sets" with each two participants having a "set" to work with and retain upon completion of the instruction. Each participant shall sign for their tools at the start of the instruction session, and copies of the assignment documents shall be provided to the Construction Manager by the Contractor.
- K. Thirty-day operating period after start-up: The manufacturers' representative for each piece of equipment shall return to the Project site 30 days after successful completion of the operating test to review the equipment performance, correct any equipment problems, and conduct follow-up operation and maintenance classes as required by the Owner. This follow-up trip is required in addition to the specified services of manufacturer's representative prior to and during equipment start-up. At this time, if there are no equipment problems, each manufacturer shall certify to the Owner in writing that his equipment is fully operational and capable of meeting operating requirements. If the certification is accepted by the Engineer and Owner, the warranty period for that piece of equipment shall be considered to have begun as of the start-up date. If the equipment is operating incorrectly, the factory representative will make no certification to the Owner until the problems are corrected and the equipment demonstrates a successful 30 days operating period. At the conclusion of that period, the warranty start date will be decided upon by the Owner.
- L. Six month operating period after start-up: The manufacturer's representative for each piece of equipment shall return to the Project site six months after the successful completion of the operating test to review the equipment performance, correct any equipment problems, and conduct follow-up operation and maintenance classes as required by the Owner. This follow-up trip is required in addition to the specified services of manufacturer's representative prior to and during equipment start-up. At the time of this trip, if there are no equipment problems, each manufacturer shall certify to the Owner in writing that his equipment is fully operational and capable of meeting operating requirements. If the equipment is operating incorrectly, the service representative will make no certification to the Owner until the problems are corrected and the equipment demonstrates a successful 30-day operating period after problems are corrected.

## 1.07 Documentation

- A. The Contractor shall obtain from all manufacturers an electronic file of all operation and training information and training presentation materials in searchable Adobe Acrobat Portable Document Format (PDF). The PDF file(s) shall be fully indexed using the Table of Contents, searchable with thumbnails generated. File(s) shall be

identified by specification section. All documents shall be scanned at 300dpi or greater utilizing optical character recognition (OCR) software. All text in the document must be text selectable with the exception of pages which are in their entirety drawings or diagrams. Word searches of the PDF document must function successfully. PDF files that fail to comply with the indexing and searchable features described above will not be acceptable.

- B. At the completion of each training session, the training session will be certified by representatives from the Manufacturer, Contractor, Owner and Engineer. A training attendance roster for each session identifying all participants shall be delivered by the Contractor to the Engineer.

END OF SECTION

EQUIPMENT AND SYSTEMS INSTRUCTION REPORT

PROJECT: \_\_\_\_\_

SYSTEM OR EQUIPMENT: \_\_\_\_\_

CONTRACTOR NAME: \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_

SPECIFICATION SECTION

NOTE: The Contractor's Representative must maintain and complete this report during instruction.

\_\_\_\_\_

PRELIMINARY INFORMATION

1. To be completed by the Contractor:

A. Proposed dates for instruction period: From \_\_\_\_\_ To \_\_\_\_\_

B. Name of Representative Instructor: \_\_\_\_\_

C. Approximate number of hours of training required: \_\_\_\_\_

2. To be completed by the Owner:

A. Owner's Designated Personnel to receive instruction: (Identify supervisor, if required).

- |          |           |
|----------|-----------|
| 1) _____ | 6) _____  |
| 2) _____ | 7) _____  |
| 3) _____ | 8) _____  |
| 4) _____ | 9) _____  |
| 5) _____ | 10) _____ |

B. Training Session Location: \_\_\_\_\_  
\_\_\_\_\_

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RECORD INFORMATION (To be Completed after Instruction Session)

Instructor's Signature: \_\_\_\_\_ Date Instruction Completed: \_\_\_\_\_

Construction Managers Signature: \_\_\_\_\_

Owner's Signature: \_\_\_\_\_

SPECIAL CONSIDERATIONS/NOTES:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Part 1 General

### 1.01 Scope

- A. This Section includes testing which the Owner may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.
- B. This work also includes all testing required by the Owner to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength and slump testing, soil compaction, etc.
- C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer, e.g., testing of pipe.
- D. The testing laboratory or laboratories will be selected by the Owner. The testing laboratory or laboratories will work for the Owner.

### 1.02 Payment for Testing Services

- A. The cost of testing services required by the Contract to be provided by the Contractor shall be paid for by the Owner through the CASH ALLOWANCE, i.e., concrete testing, and soil compaction.
- B. The cost of additional testing services not specifically required in the Specifications, but requested by the Owner or Engineer, shall be paid for by the Owner through the CASH ALLOWANCE.
- C. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid for by the Owner.
- D. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor. Retesting shall be performed by the testing laboratory working for the Owner.

### 1.03 Laboratory Duties

- A. Cooperate with the Owner, Engineer and Contractor.
- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling and testing of materials.
  - 1. Comply with specified standards, ASTM, other recognized authorities, and as specified.
  - 2. Ascertain compliance with requirements of the Contract Documents.

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Testing Laboratory Services

- D. Promptly notify the Engineer and Contractor of irregularities or deficiencies of work which are observed during performance of services.
- E. Promptly submit three copies (two copies to the Engineer and one copy to the Contractor) of report of inspections and tests in addition to those additional copies required by the Contractor with the following information included:
  - 1. Date issued
  - 2. Project title and number
  - 3. Testing laboratory name and address
  - 4. Name and signature of inspector
  - 5. Date of inspection or sampling
  - 6. Record of temperature and weather
  - 7. Date of test
  - 8. Identification of product and Specification section
  - 9. Location of Project
  - 10. Type of inspection or test
  - 11. Results of test
  - 12. Observations regarding compliance with the Contract Documents
- F. Perform additional services as required.
- G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the work.

#### 1.04 Contractor Responsibilities

- A. Cooperate with laboratory personnel, provide access to work and/or comply with manufacturer's requirements.
- B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.
- C. Furnish copies of mill test reports.
- D. Furnish required labor and facilities to:

1. Provide access to work to be tested;
  2. Obtain and handle samples at the site;
  3. Facilitate inspections and tests;
  4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.
- E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.
- F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.
- G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

#### 1.05 Quality Assurance

Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

#### 1.06 Product Handling

Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the work.

#### 1.07 Furnishing Materials

The Contractor shall be responsible for furnishing all materials necessary for testing.

#### 1.08 Code Compliance Testing

Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of, and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

#### 1.09 Contractor's Convenience Testing

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

## 1.10 Schedules for Testing

### A. Establishing Schedule

1. The Contractor shall, by advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.
2. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributable to the delay will be back-charged to the Contractor and shall not be borne by the Owner.

## 1.11 Taking Specimens

Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

## 1.12 Transporting Samples

The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

END OF SECTION

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## Part 1 General

### 1.01 Scope

- A. This Section defines the overall requirements for Special Inspections as required in Section 1704 of the International Building Code (IBC) and any state or local amendments.
- B. Special Inspections are in addition to the typical municipal inspections required by the local building department that are specified in IBC Section 109, any specific inspections required in other Sections of these Specifications, any inspections and testing performed by the Contractor and any specific structural observation as may be required by IBC Section 1709.
- C. General provisions of the Contract, including General and Supplementary Conditions, other Division 1 Specification Sections and Drawings, apply to this Section.
- D. This Specification does not include material testing requirements as required in various Sections of these Specifications and as identified in Section 01 45 29 of these Specifications.

### 1.02 Purpose

- A. Special Inspection services are required in accordance with the 2012 IBC, Chapter 17.
- B. Special Inspections are required to ensure that those components shown on the contract documents, critical to the integrity of the structure, are being properly interpreted and construction is in compliance with the requirements specified or indicated. These inspections do not relieve the Contractor of their responsibility to comply with the all components of the Contract document requirements.
- C. Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract document requirements.
- D. Requirements for the Contractor to provide quality control services required by the Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

### 1.03 Definitions

- A. Periodic Special Inspection – as denoted in the Schedule of Special Inspections, periodic special inspection consists of the part-time or intermittent observation of work requiring special inspection by an approved Special Inspector(s) who is present in the area where the work has been or is being performed and at the completion of work. The frequency of inspection for each component shall be 50% unless defined in the Specifications.
- B. Continuous Special Inspection – as denoted in the Schedule of Special Inspections,

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**Special Inspection and Testing**

continuous special inspection consists of the full-time observation of work requiring special inspection by an approved special inspector who is continuously present in the area where the work is being performed.

- C. Registered Design Professional in Responsible Charge – licensed professional engineer identified on the Statement of Special Inspection and employed by Burns & McDonnell Engineering.

#### 1.04 References

- A. Refer to referenced Building Code and local amendments in this Specification.
- B. Special Inspection Plan (following this section).

#### 1.05 Payment of Services

- A. The Owner or an agent of the Owner shall pay for special inspection services specified to be performed by independent agencies.
- B. The Owner or an agent to the Owner shall engage the Special Inspector(s) and submit to the Building Official a list of the individuals, approved agencies or firms intended to be retained for conducting special inspections.

#### 1.06 Coordination

- A. The Contractor shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor, Special Inspector and each testing agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate special inspections and tests.
  - 1. The Contractor shall schedule the times for special inspections at least seven days in advance of all tests, sample taking and similar activities.
  - 2. If the Special Inspector is prevented or delayed from inspecting, testing or taking specimens due to the incompleteness of the work or improper scheduling, the Contractor shall be back-charged all costs attributed to the delay or incompleteness of the work, and costs shall not be borne by the Owner or the Engineer.
- B. Interim Reports: The Special Inspector shall submit certified interim reports to the Contractor, Registered Design Professional in Responsible Charge and to the Building Official. Frequency of interim report submittals shall be as denoted in the Statement of Special Inspections. The reports shall include, as a minimum, a summary or description of the inspections and tests performed for that period, with locations; daily reports for that period; discrepancy reports including a list of unresolved items and parties notified.
- C. Discrepancy Notices: For each discrepancy or nonconforming item, the Special Inspector shall submit a discrepancy notice to the Engineer, Owner and Contractor and

shall include a copy in the interim report for that period. The discrepancy notice shall contain a description and exact location, a reference to applicable Drawing and/or Specifications, resolution or corrective action taken and the date. Discrepancy reports shall be submitted within 24 hours of observation.

- D. Final Report: The Special Inspector shall submit a signed Final Report of Special Inspections documenting and stating that all required special inspections were fulfilled and recorded. The final report shall include all discrepancy notices including corrections of any discrepancies noted in the inspections which have been corrected. The final report shall be submitted to the Building Official, the Owner, the Contractor, and the Registered Design Professional in Responsible Charge at the conclusion of the Project.
- E. Daily Reports of each inspection, test or similar service shall be prepared by the Special Inspector.
- F. The Contractor shall submit a Statement of Responsibility where required.
- G. The Contractor shall submit Fabricator's Certificates of Compliance for approved fabricators.

## Part 2 Products (Not Used)

## Part 3 Execution

### 3.01 Statement of Special Inspections

- A. At time of permit application, the Registered Design Professional in Responsible Charge shall submit the attached Statement of Special Inspections to the local Building Official having jurisdiction.
- B. The Statement of Special Inspections shall use a format acceptable to the local Building Official having jurisdiction. In lieu of any approved format, the form included in the Special Inspection Plan (following this section) shall be used.
- C. The Schedule of Special Inspections, the Requirements for Seismic Resistance and the Requirements for Wind Resistance shall be included with the Statement of Special Inspections.

### 3.02 Schedule of Special Inspections

- A. The Schedule of Special Inspections will be included in the Special Inspections Plan and will include a complete list of materials and work requiring Special Inspection.
- B. The special inspections to be performed and the frequency to perform them (periodic or continuous) will be included in the Schedule of Special Inspections.
- C. The Special Inspector shall maintain the Schedule of Special Inspections during the duration of construction and reflect any changes.

### 3.03 Special Inspector's Requirements and Responsibilities

- A. Special Inspectors shall notify Contractor personnel of their presence and responsibilities at the jobsite.
- B. The Special Inspector is responsible for inspecting construction of the structural systems for the purpose of verifying compliance with the Building Code and the contract documents according to the Special Inspection Plan. The interpretations of the Contract documents will be provided by the appropriate engineer of record. The Special Inspector is responsible to the Building Official, the Registered Design Professional in Responsible Charge, and the Owner.
- C. The Special Inspector engaged to perform inspections and sampling of materials shall cooperate with the engineering design professionals and Contractor in performance of their duties, and shall provide qualified personnel to perform required inspections.
- D. The Special Inspector shall report any discrepancies (irregularities, non-conformances or deficiencies) observed in the work to the immediate attention of the Contractor for correction. All discrepancies shall be recorded on a Discrepancy Notice report similar to the attached form. The special inspector shall maintain and assign unique numbers to each notice. If any such discrepancy is not resolved in a timely manner to conform to the Contract documents, or is soon to be incorporated into the work, the Engineer shall be notified immediately of the discrepancy.
- E. The Special Inspector is not authorized to release, revoke, alter or enlarge requirements of the Contract documents, or approve or accept any portion of the work.
- F. The Special Inspector is not authorized to design any modifications, repairs or changes from the information contained on the Contract documents.
- G. The Special Inspector shall not perform any duties of the Contractor.
- H. The Special Inspector shall be responsible to prepare written inspection reports for each inspection visit. These reports shall be organized in a daily format and submitted with the interim report on a timely basis as noted in the Special Inspection Plan.
- I. The Special Inspector(s) shall keep records of all inspections and shall maintain copies of all required forms at the Project site.

### 3.04 Contractor Responsibilities

- A. The Contractor is responsible to ensure that the special inspector is present for all work requiring special inspection. Any work that requires special inspection and is performed without the special inspector being present is subject to being demolished and reconstructed.
- B. The Contractor shall notify the Special Inspector sufficiently in advance of operations to permit assignment of personnel and scheduling of tests.



- C. The Contractor shall provide to the Special Inspector, a copy of or direct access to the construction documents.
- D. The Contractor shall retain special inspection records on-site to be readily available for review.
- E. The Contractor shall cooperate with Special Inspector and provide safe access to the work to be inspected.
- F. Submit Fabricator's Certificates of Compliance for approved fabricators.
- G. The Contractor shall cooperate with each Special Inspector performing required inspections and provide reasonable auxiliary services as requested. Auxiliary services required include, but are not limited to:
  - 1. Providing access to the work and furnishing incidental labor and facilities necessary to facilitate inspections and tests to assist the special inspector in performing tests/inspections.
  - 2. Providing storage space for the special inspector's exclusive use, such as for storing and curing concrete test samples and delivery of samples to testing laboratories.
  - 3. Providing the Special Inspector with access to all approved submittals.
  - 4. Providing security and protection of samples and test equipment at the Project site.
  - 5. Provide samples of materials to be tested in required quantities.
- H. Each Contractor responsible for the construction or fabrication of a system or component described in the Schedule of Special Inspection must submit a written Statement of Responsibility to the Building Official, Registered Design Professional and the Owner (or owner's agent) where required by the Statement of Special Inspections, prior to the commencement of work on the system or component. The Contractor's Statement of Responsibility shall include:
  - 1. Acknowledgement of awareness of the special requirements contained in the statement of special inspections.
  - 2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the building official.
  - 3. Procedures to exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports.
  - 4. Identification and qualification of the person(s) exercising such control and their positions in the organization.

### 3.05 Registered Design Professional in Responsible Charge Responsibilities

- A. Shall prepare the Special Inspection Plan with the assistance of the Structural Engineer of Record.
- B. Shall submit the Statement of Special Inspections which shall include the Schedule of Special Inspections to the Building Official. These documents are to be submitted with the permit application.
- C. Shall perform the duties of the Owner, where engaged as the Owner's Agent.
- D. Shall approve qualified Special Inspectors/Inspection Agencies submitted by the special inspection agency or firm.
- E. Shall respond to identified field discrepancies.

### 3.06 Owner's Responsibilities

- A. The Owner or an agent of the Owner is responsible for funding special inspection services.
- B. Owner or an agent of the Owner shall ensure that the scope of work and duties of the Special Inspector as outlined in the Statement of Special Inspection are not compromised.
- C. Owner or an agent of the Owner shall submit a list of qualified individuals, qualified agencies or firms to be retained for conducting the intended special inspections to the Registered Design Professional in Responsible Charge and Building Official.

### 3.07 Repair and Protection

- A. Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

### 3.08 Special Inspector's Scope of Work

See Special Inspection Plan following this section for Special Inspector's scope of work.

END OF SECTION

**CONTRACTOR'S STATEMENT OF RESPONSIBILITY**

Each contractor responsible for the construction or fabrication of a main wind or seismic force-resisting system, designated seismic system or wind or seismic-resisting component listed in the Statement of Special Inspections, Requirements for Seismic or Wind Resistance, must submit a Statement of Responsibility.

**PROJECT:** \_\_\_\_\_

**CONTRACTOR'S NAME:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**LICENSE NO.:** \_\_\_\_\_

Description of building systems and components included in Statement of Responsibility:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**CONTRACTOR'S ACKNOWLEDGEMENT OF SPECIAL REQUIREMENTS**

I hereby acknowledge that I have received, read, and understand the Statement of Special Inspections and Special Inspection Plan.

I hereby acknowledge that control will be exercised to obtain conformance with the Special Inspection Plan and the approved construction documents.

\_\_\_\_\_  
Name and Title (type or print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**CONTRACTOR'S PROVISIONS FOR QUALITY CONTROL**

Procedures for exercising control within the contractor's organization, the method and frequency of reporting and distribution of reports is attached to this Statement.

Identification and qualifications of the person(s) exercising such control and their position(s) in the organization are attached to this Statement.

**FABRICATOR'S CERTIFICATE OF COMPLIANCE**

Each approved fabricator that is exempt from Special Inspection of shop fabrication and implementation procedures per section 1704.2 of the International Building Code must submit *Fabricator's Certificate of Compliance* at the completion of fabrication.

**PROJECT:** \_\_\_\_\_

**FABRICATOR'S NAME:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**CERTIFICATION OR APPROVAL AGENCY:** \_\_\_\_\_

**CERTIFICATION NUMBER:** \_\_\_\_\_

**DATE OF LAST AUDIT OR APPROVAL:** \_\_\_\_\_

Description of structural members and assemblies that have been fabricated:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby certify that items described above were fabricated in strict accordance with the approved construction documents.

\_\_\_\_\_  
Name and Title (type or print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Attach copies of fabricator's certification or building code evaluation service report and fabricator's quality control manual.

BURNS & MCDONNELL ENGINEERING

# Special Inspection Plan

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## CITICO PUMP RELIABILITY IMPROVEMENTS CHATTANOOGA, TENNESSEE

April 2017

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## 1.0 Special Inspection Requirements

### 1.01 Overview

- A. Special Inspection services are required in accordance with the 2012 IBC, Chapter 17.
- B. This Special Inspection Plan defines the overall requirements for Special Inspections as required in Section 1704 of the International Building Code (IBC) and any State or local amendments.
- C. Special Inspections are in addition to the municipal inspections required by the local building department specified in IBC Section 109, any specific inspections required in other Standards, and any specific structural observations as required by the IBC Section 1709.
- D. Special Inspections are required to verify that those components shown on the contract documents, critical to the integrity of the structure, are being properly interpreted and construction is in compliance with the requirements specified or indicated. These special inspections do not relieve the Contractor of their responsibility to comply with all components of the Contract document requirements.
- E. Special inspections, tests and related actions specified herein are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract document requirements.
- F. Requirements for the Contractor to provide quality control services required by the Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Special Inspection Plan.
- G. The Special Inspection process is also in addition to the inspections and testing performed by the Contractor.

### 1.02 Definitions

- A. Periodic Special Inspection – as denoted in the Schedule of Special Inspections, periodic special inspection consists of the part-time or intermittent observation of work requiring special inspection by an approved Special Inspector(s) who is present in the area where the work has been or is being performed and at the completion of work. The frequency of inspection for each structural component shall be at least 50% of the total unless defined otherwise in this Special Inspection Plan.
- B. Continuous Special Inspection – as denoted in the Schedule of Special Inspections, continuous special inspection consists of the full-time observation of work requiring special inspection by an approved Special Inspector who is continuously present in the area where the work is being performed.
- C. Registered Design Professional in Responsible Charge – licensed professional engineer identified in the Statement of Special Inspection and employed by Burns &

McDonnell Engineering.

### 1.03 Submittals

- A. Statement of Qualifications: The Special Inspector(s) shall submit a detailed statement of his qualifications to the Registered Design Professional in Responsible Charge demonstrating compliance with the requirements of this Special Inspection Plan.
- B. Special Inspector(s): Names and qualifications of the Special Inspector(s) and Special Inspector's representatives shall be submitted for review and approval to the Owner, the Building Official having jurisdiction, and the Registered Design Professional in Responsible Charge. As used herein, the term Special Inspector includes the authorized representative, unless otherwise indicated. Insofar as possible, the Special Inspector shall not be changed throughout the duration of the Project.
- C. Daily Reports of each inspection, test or similar service shall be prepared and submitted with various reports by the special inspector(s). An example of a daily report is included herein.
- D. Interim Reports: The Special Inspector shall submit certified interim reports to the Contractor, Registered Design Professional in Responsible Charge and to the Building Official. Frequency of interim report submittals shall be as denoted in the Statement of Special Inspections. The reports shall include, as a minimum, a summary or description of the inspections and tests performed for that period, with locations; daily reports for that period; discrepancy reports including a list of unresolved items and parties notified. An example of an interim report is included herein.
- E. Discrepancy Notices: For each discrepancy or nonconforming item, the Special Inspector shall submit a discrepancy notice to the Engineer, Owner and Contractor and shall include a copy in the interim report for that period. The discrepancy notice shall contain as a minimum, a description and exact location, a reference to applicable Drawing and/or Specifications, resolution or corrective action taken and the date.
- F. Final Report: The Special Inspector shall submit a stamped and signed Final Report of Special Inspections documenting and stating that all required special inspections were fulfilled and recorded. The final report shall include as a minimum, a summary sheet similar to the form included in this Special Inspection Plan, all interim reports (including associated daily reports), the completed Schedule of Special Inspections, and discrepancy notices including corrections of any discrepancies noted in the inspections which have been corrected. The final report shall be submitted to the Building Official, the Owner, the Contractor, and the Registered Design Professional in Responsible Charge at the conclusion of the project. Each Special Inspector corresponding to an agent number in the Schedule of Special Inspections will be required to submit a Final Report. The special inspection program will not be considered complete until forms from all agents have been submitted and received. An example of a final report is included herein.

## 2.0 Special Inspectors



## 2.01 Schedule of Special Inspections

- A. The Schedule of Special Inspections includes:
  - 1. A complete list of materials and work requiring Special Inspection.
  - 2. The special inspections to be performed and the frequency to perform them (periodic or continuous).
  - 3. Inspector qualifications, qualified individuals, agencies or firms recommended to be retained for conducting such inspections. Each special inspector or agencies shall be written at the end of the schedule. The number next to the individual, firm or agency shall be listed in the schedule under the column heading "agent" for the special inspection that individual, firm or agency performs. In cases where more than one special inspector is assigned to a given task, the numbers of each would be listed.
  - 4. In cases where multiple structures are included within a project, more than one Schedule of Special Inspections could be developed.
- B. The Special Inspector shall maintain the Schedule of Special Inspections during the duration of construction and reflect any changes.
- C. The Schedule of Special Inspections for this Project is included in this Special Inspection Plan.

## 2.02 Special Inspector's Requirements and Responsibilities

- A. Special Inspector shall review the approved (signed and sealed) plans and specifications for special inspection requirements.
- B. Special Inspector shall review the Special Inspection Plan including the Statement of Special Inspection and the Schedule of Special Inspections.
- C. Special Inspector shall notify Contractor personnel of their presence and responsibilities at the jobsite.
- D. The Special Inspector is responsible for inspecting construction of the structural systems for the purpose of verifying compliance with the IBC Code and the Contract documents according to the Statement and Schedule of Special Inspections. The interpretations of the Contract documents will be provided by the Registered Design Professional in Responsible Charge.
- E. The Special Inspector shall meet the applicable qualifications set forth in Article 2.03 of this Special Inspection Plan.
- F. The Special Inspector engaged to perform inspections and sampling of materials shall cooperate with the engineering design professionals and Contractor in performance of their duties, and shall provide qualified personnel to perform required inspections.

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**Special Inspection and Testing**

- G. The Special Inspector shall be responsible to prepare and submit certified interim reports. Frequency of interim report submittals shall be as denoted in the Statement of Special Inspections. The reports shall include as a minimum, a summary or description of the inspections and tests performed for that period, with locations; daily reports for that period; discrepancy reports including a list of unresolved items and parties notified.
- H. The Special Inspector shall report any discrepancies (irregularities, non-conformances or deficiencies) observed in the work to the immediate attention of the Contractor for correction. All discrepancies shall be recorded on a Discrepancy Notice report similar to the attached form. The special inspector shall maintain and assign unique numbers to each notice. If any such discrepancy is not resolved in a timely manner to conform to the Contract documents, or is soon to be incorporated into the work, the Registered Design Professional in Responsible Charge shall be notified immediately of the discrepancy.
- I. The Special Inspector is not authorized to release, revoke, alter or enlarge requirements of the Contract documents, or approve or accept any portion of the work.
- J. The Special Inspector is not authorized to design any modifications, repairs or changes from the information contained on the Contract documents.
- K. The Special Inspector shall not perform any duties of the Contractor.
- L. The Special Inspector shall be responsible to prepare written daily inspection reports for each inspection visit. These reports shall be organized in a daily format and submitted with the interim report on a timely basis as noted in the Statement of Special Inspections.
- M. The Special Inspector shall maintain the Statement and Schedule of Special Inspection forms during the course of construction and reflect any changes. Changes in names of Special Inspectors, changes in building materials or completed inspections shall be so noted. For completed inspections, the special inspector shall initial and date the "date completed" box in the Schedule of Special Inspections as the inspection activities are completed.
- N. The Special Inspector(s) shall keep records of all inspections.
- O. The Special Inspector shall be responsible to prepare, stamp, sign and submit a signed Final Report of Special Inspections documenting and stating that all required special inspections were fulfilled and recorded. The final report shall include a summary sheet similar to the form included in this Special Inspection Plan, all interim reports (including associated daily reports), the completed Schedule of Special Inspections, and discrepancy notices including corrections of any discrepancies noted in the inspections which have been corrected. The final report shall be submitted to the Building Official, the Owner, the Contractor and the Registered Design Professional in Responsible Charge at the conclusion of the project.
- P. The Special Inspector shall maintain copies of all required forms at the Project site.

## 2.03 Special Inspector Qualifications

- A. Qualification for Service Agencies: Special Inspection service agencies shall be accredited by the IAS Special Inspection Agency Accreditation Program. Independent testing laboratories, shall be prequalified as complying with “Recommended Requirements for Independent Laboratory Qualification” by the American Council of Independent Laboratories, accredited by a program recognized by the National Cooperation for Laboratory Accreditation, and which specialize in the types of inspections and tests to be performed.
1. Each independent special inspection agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state in which the Project is located.
- B. Special Inspector(s) shall comply with the special inspection, testing and reporting requirements of building codes and structural tests and special inspections established in the Contract documents.
- C. All references to Professional Engineer (PE) qualifications shall include being currently licensed in the Project state and the scope of special inspection is within area of expertise (structural, mechanical, electrical, civil, geotechnical) as observed by the State Boards of Professional Registration.
- D. An inspector who does not meet the minimum qualifications for special inspector may be allowed to perform “Special Inspection” at the discretion of the agency’s responsible professional engineer, provided each of the following conditions are met:
1. Individual is working under direct and continuous supervision of a fully qualified special inspector.
  2. Individual has at least 10 years of direct inspection experience and is working under direct and periodic supervision of a fully qualified PE to perform the specific special inspection.
  3. Individual is specifically approved by the Building Official and the Registered Design Professional in Responsible Charge.
- E. Soils: The special inspector shall meet one of the following qualifications to inspect and test placement and compaction of soils:
1. Current ICC certification in soils inspection and a minimum of five years of experience related directly to soils testing and inspection; or
  2. PE in geotechnical engineering and a minimum of five years of direct experience in site preparation, fill placement and compaction type construction; or
  3. NICET II or III (geotechnical /construction or construction material testing/soils), a minimum of five years or experience related directly to soils testing and inspection and under the direct supervision of a P.E. in geotechnical engineering.
- F. Pier and Pile Foundation Construction: The special inspector shall meet the following qualifications:

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Special Inspection and Testing

1. Current ICC certification in reinforced concrete inspection in addition to one of the following:
  - a. PE and a minimum of five years of direct experience in pier and pile foundation construction including load tests; or
  - b. NICET III or IV (geotechnical/construction or construction material testing/soils), and a minimum of five years or experience to observe installation only (load tests excluded); or
  - c. NICET CT Certified Engineering Technologist and a minimum of five years of experience to observe installation only (load tests excluded).
  
- G. Reinforced Concrete Construction: The special inspector shall meet the following qualifications to inspect reinforced concrete construction:
  1. Current ICC certification in reinforced concrete inspection and a minimum of two years of experience; or
  2. PE and a minimum of three years of direct experience in reinforced concrete construction; or
  3. National Institute for Certification of Engineering Technicians (NICET) Level II or III certification in reinforced concrete construction and three years of experience; or
  4. ACI Concrete Construction Special Inspector and a minimum of five years of direct experience in reinforced concrete construction.
  
- H. Post-Installed Structural Anchors in Concrete: The special inspector shall meet the following qualifications to inspect post-installed structural anchors in concrete:
  1. Current ICC certification in reinforced concrete inspection and a minimum of two years of direct experience in post-installed anchor construction, or
  2. PE and a minimum of one year of direct experience in post-installed anchor design or construction,
  
- K. Structural Steel Fabricators: The special inspector shall meet the following qualifications:
  1. Current International Code Council (ICC) certification in structural steel inspection and a minimum of one year of experience structural steel construction; or
  2. American Welding Society (AWS) Certified Weld Inspector (CWI) and a minimum of one year of direct experience in structural steel construction.
  
- L. Cold-Formed Metal Fabricators: The special inspector shall meet the following

qualifications:

1. PE and a minimum of one year of direct experience in cold-formed metal construction.
- M. Structural Steel, Welding and Bolting Construction: The special inspector shall meet the following qualifications:
1. Welding: Current ICC certification as a structural steel and welding special inspector and a minimum of one year experience or AWS Certified Welding Inspector (CWI) and a minimum of one year experience.
  2. Bolting: Current ICC certification as a structural steel and bolting special inspector and a minimum of one year experience or PE with a minimum of one year of direct experience in structural steel bolted construction.
  3. Structural Steel: PE and a minimum of three years of direct experience in structural steel construction or current ICC certification as a structural steel and bolting special inspector and a minimum of one year experience.
- N. Masonry Construction: The special inspector shall meet one of the following qualifications:
1. Current ICC certification in masonry construction and a minimum of two years of experience; or
  2. PE and a minimum of two years of direct experience in masonry construction; or
- O. Seismic and Wind Resistant Systems and Components: The special inspector shall meet all the following qualifications:
1. PE and a minimum of two years of direct experience.

## 2.04 Minimum Checklist for Special Inspector

- A. General: Review approved plans and specifications for special inspection requirements. Comply with special inspection requirements of the enforcing jurisdiction. Notify the Contractor of deviations from approved plans and specifications. If the deviations are uncorrected, notify the Registered Design Professional in Responsible Charge and the Building Official. Submit reports as defined in related sections of this document.
- B. Checklists: Refer to checklists included herein and the descriptions below. The checklists are provided as a guide – other checklists may be used provided approval is obtained from the Registered Design Professional in Responsible Charge.
- C. Soils Special Inspection
1. Verify that the subgrade has been approved by the geotechnical and that the subgrade has not been disturbed by inclement weather during the time between inspection and concrete placement.

2. Verify that the aggregate below the footings has been properly placed and compacted.
3. Verify that the retaining wall backfill has been properly placed.

? D. Reinforced Concrete Special Inspector

1. Concrete Quality: Verify that individual batch tickets indicate delivery of the approved mix as specified. Verify time limits of mixing, total water added, and proper consistency and workability for placement. Determine the required type, quantity and frequency of tests to be performed on fresh and hardened concrete. Observe sampling of concrete, field testing of fresh concrete and making of test specimens. Provide or arrange for proper specimen identification, site storage and protection, and transportation to the testing laboratory. Provide or arrange for communication of field-testing results to the architect or engineer of record and to the Building Official.
2. Concrete Reinforcement: Verify that reinforcing steels are of the type, grade and size specified and are in conformance with acceptable quality standards. Ensure that reinforcing steel is free of oil, dirt and rust and that steel is properly coated and/or sheathed as specified. Verify that reinforcing steels are located within acceptable tolerances and are adequately supported and secured to prevent displacement during concrete placement. Verify that minimum concrete cover is provided. Verify that placement of reinforcing steel (or ducts) complies with required spacing, profile and quantity requirements, as indicated by both the approved plans and installation drawings. Verify that hooks, bends, ties, stirrups and supplemental reinforcement are fabricated and placed as specified. Verify that required lap lengths, stagger and offsets are provided. Verify proper installation of approved mechanical connections per the manufacturer's instruction and/or evaluation reports. Ensure that all welds of reinforcing steel and other weldments are as specified and have been inspected and approved by an approved welding inspector.
3. Formwork, Joints and Embeds: Verify that formwork will provide concrete elements of the specified size and shape. Verify that the location and preparation of construction joints are in accordance with the approved plans, specifications and building code requirements. Verify that the type, quantity, size, spacing and location of embedded items are as specified.
4. Concrete Placement, Protection and Curing: Verify acceptable conditions of the place of deposit before the concrete is placed. Verify that methods of conveying and depositing concrete avoid contamination and segregation of the mix. Verify that concrete is being properly consolidated during placement. Verify that concrete is protected from temperature extremes, and determine that proper curing is initiated.

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F. Structural Steel and Bolting Special Inspector

1. **Material Sampling, Testing and Verification:** Verify that the steel shapes and bolts are of the type, size, grade and condition specified on the approved plans and specifications. Verify the required type, quantity, location and frequency of tests to be performed, and witness preparation of properly identified test material samples on all materials. Provide or arrange for documentation and transportation of samples to the laboratory. Verify that required testing is performed on materials as required by applicable standards and specifications.
2. **High-Strength Bolting:** Verify correct type, size and location of bolts and bolt holes, nuts and washers for type of connection specified on approved plans and specifications. Verify protected storage of bolts, nuts and washers as required by applicable standards and specifications. Verify that faying surfaces at connections utilizing high-strength bolts are in compliance with applicable standards. Observe or conduct bolt tension verification tests on required high-strength bolt assemblies. Identify and verify joint type and installation of bolt assemblies per approved plans and specifications. Verify use of the approved method and sequence of bolt tightening.
3. **Steel Framing Observation:** Verify that structural steel frame orientation, details and frame member sizes are in accordance with approved plans and specifications. Verify that column base plates are the designed configuration, have correct sized holes and proper clearance for grouting. Verify grout placement and sampling. Verify that base plates are securely seated and fastened in accordance with applicable plans and specifications.

G. **Structural Welding Special Inspector**

1. **Material Sampling, Testing and Verification:** Verify that the steel shapes, base metals, filler metals and gases are of the type, size, grade and condition specified on the approved plans, specifications and Welding Procedures Specifications. Verify the required type, quantity, location and frequency of tests to be performed, and witness preparation of properly identified test material samples on all materials. Provide or arrange for documentation and transportation of samples to the testing laboratory. Verify that required destructive testing is performed on materials as required by applicable standards and specifications. Verify that required nondestructive examinations are performed as required by applicable standards and specifications.
2. **Structural, Reinforcing and Sheet Steel Welding:** Verify that the welding equipment and process has the capability to produce the specified welds. Insure that welding equipment is calibrated and appropriate for use with the welding process. Verify and/or witness qualification of welders, welding operators and tackers for conformance with American Welding Society standards and specifications. Verify that welders are qualified to perform the specified work. Verify that the proposed welding procedure for structural steel, reinforcing steel and sheet metal is a standard prequalified procedure, or has been properly qualified and approved. Verify that welding processes, sequences and procedures are followed in accordance with approved Welding Procedures Specifications. Review approved plans and specifications for weld types and locations. Verify that filler materials are stored and handled in accordance with manufacturer and Project Specifications. Verify that base metal to be welded is

properly prepared and oriented. Verify that weldments have proper joint geometry and have backing and start/runoff tabs where required. Inspect to ensure that weld and structural steel repairs are performed in accordance with approved procedures. Verify that fabricated elements are within permissible tolerances. Verify that welds have the specified length and effective throat. Verify that the weld profile meets applicable shape, size and quality requirements.

#### H. Structural Masonry Inspector

1. **Materials:** Verify that brick, block, cement, lime, aggregates, reinforcement, connectors, water, admixtures, and other materials are the type specified and approved. Verify that materials are properly stored. Verify that mix proportions, material handling and mixing are in accordance with code requirements. Verify that grout is batched in accordance with approved mix. Determine the required material strengths, type and frequency of tests to be performed. Observe sampling, field testing and fabrication of test specimens. Verify that masonry strength meets approved specifications. Verify proper sample identification, site storage, protection and transportation to the testing laboratory.
2. **Masonry Placement:** Verify that the condition of substrate is acceptable for placement, that mortar is properly placed and that the masonry units are placed in accordance with the approved plans. Verify that the type, quantity, size, spacing and location of embedded items are as specified. Verify that the location and preparation of movement joints are in accordance with the approved plans, specifications and building code requirements. Verify that the masonry is protected from temperature extremes and adverse weather conditions.
3. **Reinforcement and Connector Placement:** Verify that the reinforcing steel and connectors comply with required size, spacing, profile, condition and quantity requirements, as indicated by both the approved plans and installation drawings. Verify that reinforcing steel and connectors are placed in the proper location within acceptable tolerances. Verify minimum coverage and clearance to masonry surfaces. Verify that hooks, bends, ties, stirrups and supplemental reinforcement are fabricated and placed as specified. Verify that required lap lengths, stagger and offsets are provided. Verify installation of approved mechanical connections per manufacturer's instructions and/or evaluation reports.
4. **Grout Placement:** Verify that grout spaces are free of obstructions and that cleanouts are provided as required. Verify that methods of conveying and placing grout avoid contamination and segregation and comply with time limits and grout lift requirements. Verify that grout is being properly consolidated and reconsolidated during placement.

## 3.0 Contractors, Owners, and Registered Design Professionals in Responsible Charge

### 3.01 Contractor Responsibilities



- A. The Contractor is responsible to ensure that the special inspector is present for all work requiring special inspection. Any work that requires special inspection and is performed without the special inspector being present is subject to being demolished and reconstructed.
- B. The Contractor shall notify the Special Inspector sufficiently in advance of operations to permit assignment of personnel and scheduling of tests. A minimum of 48 hours notice is required.
- C. The Contractor shall provide to the Special Inspector, a copy of or direct access to the construction documents.
- D. The Contractor shall retain special inspection records on-site to be readily available for review.
- E. The Contractor shall cooperate with Special Inspector and provide safe access to the work to be inspected.
- F. The Contractor shall cooperate with each Special Inspector performing required inspections and provide reasonable auxiliary services as requested. Auxiliary services required include, but are not limited to:
  - 1. Providing access to the work and furnishing incidental labor and facilities necessary to facilitate inspections and tests to assist the special inspector in performing tests/inspections.
  - 2. Providing storage space for the special inspector's exclusive use, such as for storing and curing concrete test samples and delivery of samples to testing laboratories.
  - 3. Providing security and protection of samples and test equipment at the Project site.
  - 4. Providing the Special Inspector with access to all approved submittals.
  - 5. Provide samples of materials to be tested in required quantities.
- G. Each Contractor responsible for the construction or fabrication of a system or component described in the Schedule of Special Inspection must submit a written Statement of Responsibility to the Building Official, Registered Design Professional and the Owner (or owner's agent) where required by the Statement of Special Inspections, prior to the commencement of work on the system or component. The Contractor's Statement of Responsibility shall include:
  - 1. Acknowledgement of awareness of the special requirements contained in the statement of special inspections.
  - 2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the Building Official.

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**Special Inspection and Testing**

3. Procedures to exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports.
  4. Identification and qualification of the person(s) exercising such control and their positions in the organization.
- H. The Contractor shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor, Special Inspector and each testing agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate special inspections and tests.
1. The Contractor shall schedule the times for special inspections at least two days in advance of all tests, sample taking and similar activities.
  2. If the Special Inspector is prevented or delayed from inspecting, testing or taking specimens due to the incompleteness of the work or improper scheduling, the Contractor shall be back-charged all costs attributed to the delay or incompleteness of the work, and costs shall not be borne by the Owner or the Engineer.

### 3.02 Registered Design Professional in Responsible Charge Responsibilities

- A. Shall prepare the Special Inspection Plan including the Statement of Special Inspections and the Schedule of Special Inspections with the assistance of the Structural Engineer of Record.
- B. Shall submit the Statement of Special Inspections and the Schedule of Special Inspections to the Building Official. These documents are to be submitted with the permit application.
- C. Shall perform the duties of the Owner, where engaged as the Owner's Agent.
- D. Shall approve qualified Special Inspectors/Inspection Agencies submitted by the special inspection agency or firm.
- E. Shall respond to identified field discrepancies.

### 3.03 Owner's Responsibilities

- A. The Owner or an agent of the Owner is responsible for funding special inspection services.
- B. Owner or an agent of the Owner shall ensure that the scope of work and duties of the Special Inspector as outlined in the Statement of Special Inspection are not compromised.
- C. Owner or an agent of the Owner shall submit for approval a list of qualified individuals, qualified agencies or firms to be retained for conducting the intended special inspections to the Registered Design Professional in Responsible Charge and Building

Official.

## STATEMENT OF SPECIAL INSPECTIONS

PROJECT: CITICO Pump Reliability Improvements \_\_\_\_\_

LOCATION: Chattanooga, Tennessee \_\_\_\_\_

PERMIT APPLICANT: \_\_\_\_\_

APPLICANT'S ADDRESS: \_\_\_\_\_

STRUCTURAL ENGINEER OF RECORD: Peter Grosskamp \_\_\_\_\_

REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE: Peter Grosskamp \_\_\_\_\_

This Statement of Special Inspections is submitted in accordance with Section 1704 of the 2012 International Building Code. It includes a *Schedule of Special Inspection Services* applicable to the above-referenced Project as well as the identity of the individuals, agencies, or firms intended to be retained for conducting these inspections. If applicable, it includes *Requirements for Seismic Resistance* and/or *Requirements for Wind Resistance*.

Are *Requirements for Seismic Resistance* included in the *Statement of Special Inspections*?  Yes  No

Are *Requirements for Wind Resistance* included in the *Statement of Special Inspections*?  Yes  No

The Special Inspector(s) shall keep records of all inspections and shall furnish interim inspection reports to the Building Official and to the Registered Design Professional in Responsible Charge at a frequency shown below. Discrepancies shall be brought to the immediate attention of the Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge prior to completion of that phase of work. A *Final Report of Special Inspections* documenting required special inspections and corrections of any discrepancies noted in the inspections shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge at the conclusion of the project.

Frequency of interim report submittals to the Registered Design Professional in Responsible Charge:

\_\_\_ Weekly      X Bi-Weekly      \_\_\_ Monthly      Other; specify: \_\_\_\_\_

Frequency of interim report submittals to the Building Official:

X Monthly      \_\_\_ Bi-Monthly      \_\_\_ Upon Completion      Other; specify: \_\_\_\_\_

The Special Inspection program does not relieve the Contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Statement of Special Inspections Prepared by:  
\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Building Official's Acceptance:  
\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Permit Number \_\_\_\_\_



**Statement of Special Inspections  
Requirements for Seismic Resistance**

See the Schedule of Special Inspections for inspection and testing requirements

**Seismic Design Category: C \_\_\_\_\_**

**Statement of Special Inspection for Seismic Resistance Required: Yes \_\_\_\_\_**

**Description of seismic force-resisting system subject to special inspection and testing for seismic resistance:**

Crane Structure:

North-South Direction: Steel Ordinary Moment Frame with Unlimited Height  
East-West Direction: Steel Ordinary Concentrically Brace Frame with Unlimited Height

Emergency Backup Pump Station:

Below-Grade Concrete Structure

**Description of designated seismic systems and additional systems and components subject to special inspection and testing for seismic resistance:**

Not Applicable – Component Importance Factor is equal to one, per ASCE 7-10 Section 13.1.3.

**Description of additional seismic components and anchorage requiring special inspections and testing:**

All post-installed anchors in hardened concrete for the following items:

Crane Structure Column Base

Cable Tray Support Column Base

Existing Station Concrete Pipe Collar around new HVAC penetration

Expansion Anchors in existing masonry for building interior Cable Tray supports

**Statement of Responsibility:**

Each contractor responsible for the construction or fabrication of a system or component described above must submit a Statement of Responsibility.

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**Statement of Special Inspections  
Requirements for Wind Resistance**

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See the Schedule of Special Inspections for inspection and testing requirements

**Basic Wind Speed (3 second gust): 120\_ m.p.h.**

**Wind Exposure Category: C\_\_\_\_\_**

**Statement of Special Inspection for Wind Resistance Required : Yes\_\_\_\_\_**

(Required in wind exposure Category B, where the basic wind speed is 120 miles per hour or greater.  
Required in wind exposure Category C or D, where the basic wind speed is 110 miles per hour or greater)

**Description of main wind force-resisting system subject to special inspection for wind resistance:**

Crane Structure:

North-South Direction: Steel Ordinary Moment Frame with Unlimited Height  
East-West Direction: Steel Ordinary Concentrically Brace Frame with Unlimited Height

**Description of wind force-resisting components subject to special inspection for wind resistance:**

All outdoor electrical and mechanical equipment anchorage.

**Statement of Responsibility:**

Each contractor responsible for the construction or fabrication of a system or component described above must submit a Statement of Responsibility.

SCHEDULE OF SPECIAL INSPECTION					
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED
<b>1704.2 Inspection of Fabricators</b>					
Verify fabrication/quality control procedures.	In-plant review	Y	Periodic		
<b>1704.3 Steel, Stainless Steel and Aluminum Construction</b>					
Material verification of high-strength bolts, nuts, and washers	Review material markings and certificates of compliance	Y	Periodic		
Inspection of high-strength bolting:	Field inspection				
a. Bearing-type connections		Y	Periodic		
b. Pre-tensioned or slip-critical					
1) Turn-of-nut with matching markings		Y	Periodic		
2) Direct tension indicator		Y	Periodic		
3) Twist-off bolt		Y	Periodic		
4) Turn-of-nut without matching markings		Y	Continuous		
5) Calibrated wrench		Y	Continuous		
Material verification of structural steel					
a. Identification markings	Field inspection	Y	Periodic		
b. Certified mill tests	Review submittals	Y	Each submittal		
Weld filler materials	Review certificate of compliance and field verification	Y	Periodic and each submittal		
Structural steel welding:	Shop and field inspection				
a. Complete and partial penetration groove welds		Y	Continuous		
b. Multi-pass fillet welds		Y	Continuous		
c. Single-pass fillet welds > 5/16"		Y	Continuous		
d. Single-pass fillet welds ≤ 5/16"		Y	Periodic		
e. Floor and deck welds		Y	Periodic		
Reinforcing steel welding:	Shop and field inspection				
a. Verification of weldability of steel other than ASTM A 706		Y	Periodic		
b. Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special concrete shear walls, and shear reinforcement		Y	Continuous		
c. Shear reinforcement		Y	Continuous		
d. Other reinforcing steel		Y	Periodic		
Inspection of steel, stainless steel and aluminum frame joint details for compliance with approved construction documents.	Field inspection				



SCHEDULE OF SPECIAL INSPECTION					
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED
a. Details such as bracing & stiffening		Y	Periodic		
b. Member locations		Y	Periodic		
c. Application of joint details at each connection		Y	Periodic		
Inspection of metal deck , placement and attachment	Field inspection	Y	Periodic		
<b>1704.4 Concrete Construction</b>					
Inspection of reinforcing steel including installation	Field inspection	Y	Periodic		
Inspection of prestressing steel installation	In-plant or field review	N	Periodic		
Inspection of prestressed concrete	In-plant or field review	N			
a. Application of prestressing force		N	Continuous		
b. Grouting of bonded prestressing tendons in the seismic-force-resisting system		N	Continuous		
Inspection of cast-in-place anchor rods prior to and during placement of concrete	Field inspection	Y	Continuous		
Inspection of post-installed anchor rods to verify the hole drilling method is in accordance with manufacturer's printed installation instructions, hole location, hole diameter and depth, hole cleaning in accordance with manufacturer's printed installation instructions, anchor type, anchor diameter and length, anchor embedment, adhesive identification and expiration date, adhesive installation in accordance with manufacturer's printed installation instructions, edge distances(s), anchor spacing(s), concrete type, concrete compressive strength, age of concrete, concrete thickness and installation torque.	Field Inspection	Y	Continuous		
The special inspector must verify the initial installations of each type and size of anchor by construction personnel on site. Subsequent installations of the same type and size of anchor, by the same construction personnel is permitted to be performed in the absence of the special inspector. Any change in the anchor product being installed or the personnel performing the installation must require an initial inspection. For ongoing installations over an extended period of time, the special inspector must make regular inspections to confirm correct handling and installation the product.	Field Inspection	Y	Periodic		
Verification of required design mix	Review submittals	Y	Periodic		
Verify fresh concrete sampling	Field testing	Y	Continuous		
Verify fresh concrete slump, air content and concrete temperature at the time fresh concrete is sampled to make specimens for strength tests	Field testing	Y	Continuous		
Inspection of concrete and shotcrete placement for proper application techniques	Field review	Y	Continuous		

## SCHEDULE OF SPECIAL INSPECTION

MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED
Concrete curing operations	Field review	Y	Periodic		
Erection of precast concrete members	Field review	N	Periodic		
Evaluation of concrete strength	Field testing and review of laboratory reports	Y	Periodic		
Verification of in-situ concrete strength, prior to stressing of tendons	Review field testing and laboratory reports	N	Periodic		
Inspection of formwork for shape, lines, location and dimensions	Field inspection	Y	Periodic		
<b>1704.5 Masonry Construction</b>					
Verify proportions of site prepared mortar, grout and prestressing grout for bonded tendons.	Field and submittal review	Y	Periodic		
Verify construction of mortar joints.	Field inspection	Y	Periodic		
Verify location of reinforcement and connectors, and placement of prestressing tendons and anchorages.	Field inspection	Y	Periodic		
Verify prestressing technique	Field inspection	Y	Periodic		
Verify size and location of structural masonry elements.	Field and submittal review	Y	Periodic		
Verify type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction	Field inspection	Y	Level 1 - Periodic Level 2 - Continuous		
Verify size, grade, and type of reinforcement	Field inspection	Y	Periodic		
Verify welding of reinforcing bars.	Field inspection	Y	Continuous		
Verify protection of masonry during hot/cold weather.	Field inspection	Y	Periodic		
Verify grout space is clean prior to grouting.	Field inspection	Y	Continuous		
Verify grout placement complies with code and construction document provisions	Field inspection	Y	Continuous		
Observe preparation of grout specimens, mortar specimens, and/or prisms.	Field inspection	Y	Continuous		
Verify compliance with required testing provisions of construction documents and the approved submittals.	Field inspection	Y	Periodic		
Verify grade and size of prestressing tendons and anchorages.	Field inspection	N	Periodic		
Verify proper grouting of prestressing tendons.	Field inspection	N	Continuous		
Verify application and measurement of prestressing force	Field inspection	N	Continuous		
<b>1704.6 Wood Construction</b>					
Inspection of the fabrication process of wood structural elements and assemblies in accordance with Section 1704.2	In-plant review	N	Periodic		
For high-load diaphragms, verification of grade	Field inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTION					
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED
and thickness of structural panel sheathing.					
For high-load diaphragms, verify nominal size of framing members at adjoining panel edges, nail or staple diameter and length, number of fastener lines, and that spacing between fasteners in each line and at edge margins agrees with approved bldg. plans.	Field inspection	N	Periodic		
<b>1704.7 Soils</b>					
Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	Field inspection	Y	Periodic		
Verify excavations are extended to proper depth and have reached proper material.	Field inspection	Y	Periodic		
Perform classification and testing of controlled fill materials	Field inspection	Y	Periodic		
Verify site preparation complies with approved soils report.	Field inspection	Y	Continuous		
Verify use of proper materials, densities, and lift thicknesses during placement and compaction of controlled fill	Field inspection	Y	Continuous		
Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly	Field inspection	Y	Continuous		
Verify dry-density of compacted fill complies with approved soils report	Review field testing	Y	Continuous		
<b>1704.8 Pile Foundations</b>					
Verify pile materials, sizes and lengths comply with requirements.	Field inspection and submittal review	N	Continuous		
Verify capacities of test piles and results of additional load tests, as required.	Field inspection and submittal review	N	Continuous		
Observe pile driving operations and maintain complete and accurate records for each pile	Field inspection and submittal review. Submittal to the bldg. official of the results of pile load tests.	N	Continuous		
Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, verify required penetrations to achieve design capacity, record tip and butt elevations, and document any pile damage.	Field inspection and submittal review	N	Continuous		
For steel piles, perform additional inspections per Section 1704.3	See Section 1704.3	N	See Section 1704.3		
For concrete piles and concrete-filled piles, perform additional inspections per Section 1704.4	See Section 1704.4	N	See Section 1704.4		
For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.	Field inspection	N	Periodic or Continuous		
For augered uncased piles and caisson piles, perform inspections per Section 1704.9.	See Section 1704.9	N	See Section 1704.9		

## SCHEDULE OF SPECIAL INSPECTION

MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED
<b>1704.9 Pier Foundations</b>					
Observe drilling operations and verify that complete and accurate records are maintained for each pier.	Field inspection and submittal review	N	Continuous		
Verify placement locations and plumbness, confirm pier diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable), and adequate end bearing strata capacity.	Field inspection and submittal review	N	Continuous		
For concrete piers, perform additional inspections per Section 1704.4	See Section 1704.4	N	See Section 1704.4		
For masonry piers, perform additional inspections per Section 1704.5	See Section 1704.5	N	See Section 1704.5		
<b>1704.10 Sprayed Fire-resistant Materials</b>					
Verify surface condition preparation of structural members	Field inspection	N	Periodic		
Verify application of sprayed fire-resistant materials	Field inspection	N	Periodic		
Verify average thickness of sprayed fire-resistant materials applied to structural members	Field inspection	N	Periodic		
Verify density of the sprayed fire-resistant material complies with approved fire-resistant design.	Field inspection and submittal review	N	Periodic		
Verify the cohesive/adhesive bond strength of the cured sprayed fire-resistant material	Field inspection and submittal review	N	Per IBC section 1704.11.5		
<b>1704.11 Mastic and Intumescent Fire-Resistant Coatings</b>					
Inspect mastic and intumescent fire-resistant coatings applied to structural elements and decks, in accordance with AWCI 12-B	Field inspection	N	Periodic		
<b>1704.12 Exterior Insulation and Finish Systems (EIFS)</b>					
Inspect EIFS applications	Field inspection	Y	Periodic		
<b>1704.13 Special Cases</b>					
Inspection of ladders including anchorages	Field inspection	Y	Periodic		
Inspection of aluminum handrail and anchorages	Field inspection	Y	Periodic		
Inspection of fence posts anchorages	Field inspection	Y	Periodic		
Inspection of PVC, TPER, HR and retrofit waterstops	Field inspection	Y	Periodic		
Inspection of aluminum grating installation	Field inspection	Y	Periodic		
Inspection of pre-engineered wood truss anchorage, permanent bridging, diaphragm shear transfer connections and associated framing	Field inspection	Y	Periodic		
Inspection of pre-engineered cold-formed steel	Field inspection	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION					
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED
truss anchorage, permanent bridging, diaphragm shear transfer connections and associated framing					
<b>1704.14 Smoke Control Systems</b>					
Leakage testing and recording of device locations prior to concealment	Field testing	Y	Periodic		
Prior to occupancy and after sufficient completion, pressure difference testing, flow measurements, and detection and control verification	Field testing	Y	Periodic		
<b>1707.2 Structural Steel Special Inspections for Seismic Resistance</b>					
Continuous inspection of structural welding in accordance with AISC 341, Seismic Provisions	Shop and field inspection	Y	Continuous		
<b>1707.3 Structural Wood Special Inspections for Seismic Resistance</b>					
Inspection of field gluing operations of elements of the seismic-force resisting system	Field inspection	N	Continuous		
Inspection of nailing, bolting, anchoring and other fastening of components with the seismic-force-resisting system	Shop and field inspection	N	Periodic		
<b>1707.4 Cold-formed Steel Framing Special Inspections for Seismic Resistance</b>					
Inspection during welding operations of elements of the seismic-force-resisting system	Shop and field inspection	N	Periodic		
Inspections for screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system	Shop and field inspection	N	Periodic		
<b>1707.5 Pier Foundations Special Inspections for Seismic Resistance</b>					
Inspection during placement of reinforcing	Field inspection	Y	Periodic		
Inspection during placement of concrete	Field inspection	Y	Continuous		
<b>1707.6 Storage Racks and Access Floors Special Inspections for Seismic Resistance</b>					
Inspection during the anchorage of access floors and storage racks 8 feet or greater in height	Field inspection	N	Periodic		
<b>1707.7 Architectural Components Special Inspections for Seismic Resistance</b>					
Inspection during the erection and fastening of exterior cladding and interior and exterior veneer	Field inspection	Y	Periodic		
Inspection during the erection and fastening of interior and exterior non load bearing walls	Field inspection	Y	Periodic		
<b>1707.8 Mechanical and Electrical Components Special Inspections for Seismic Resistance</b>					
Inspection during the anchorage of electrical equipment for emergency or standby power systems	Field inspection	Y	Periodic		
Inspection during the anchorage of other electrical equipment	Field inspection	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION					
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED
Inspection during installation of piping systems intended to carry flammable, combustible, or highly toxic contents and their associated mechanical units	Field inspection	Y	Periodic		
Inspection during the installation of HVAC ductwork that will contain hazardous materials	Field inspection	Y	Periodic		
Inspection during the installation of vibration isolated systems	Field inspection	Y	Periodic		
<b>1707.9 Designated Seismic System Verification</b>					
Inspect and verify that the component label, anchorage or mounting conforms to the certificate of compliance in accordance with 1708.5	Field inspection	Y	Periodic		
<b>1707.10 Seismic Isolation System</b>					
Inspection during the fabrication and installation of isolator units and energy dissipation devices used as part of the seismic isolation system	Shop and field inspection	Y	Periodic		
<b>1708.1 Masonry Testing and Verification for Seismic Resistance</b>					
Certificates of compliance used in masonry construction	Review submittals	Y	Each submittal		
Verification of $f_m$ and $f_{ACC}$ prior to construction	Review submittals and field testing	Y	Periodic		
Verification of $f_m$ and $f_{ACC}$ every 5,000 SF during construction	Review submittals and field testing	Y	Periodic		
Verification of proportions of materials in mortar and grout as delivered to the site.	Field review	Y	Periodic		
<b>1708.3 Reinforcing and Prestressing Steel Testing for Seismic Resistance</b>					
Review certified mill test reports	Field review	Y	Each submittal		
Verify reinforcing steel weldability	Review testing reports	Y	Each submittal		
<b>1708.4 Structural Steel Testing for Seismic Resistance</b>					
Test in accordance with the quality assurance requirements of AISC 341, Seismic Provisions	Shop and field testing	Y	Each occurrence		
Ultrasonically test for discontinuities behind and adjacent to welds with base metal thicker than 1.5 inches where subject to through-thickness weld shrinkage strains	Shop and field testing	Y	Each occurrence		
<b>1708.5 Seismic Qualification of Mechanical and Electrical Equipment</b>					
Review certificate of compliance for designated seismic system components	Certificate of compliance review	Y	Each submittal		
<b>1708.5 Seismically Isolated Structures</b>					
Test seismic isolation system in accordance with ASCE 7 Section 17.8	Prototype testing	N	Per ASCE 7		

**SCHEDULE OF SPECIAL INSPECTION**

MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT **	DATE COMPLETED

INSPECTION/TESTING AGENTS	FIRM	ADDRESS	TELEPHONE NO.
1. TBD			
2. TBD			
3. TBD			
4. TBD			
5. TBD			
<p><i>Notes: 1. The inspection and testing agent(s) shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official prior to commencing work.</i></p> <p><i>2. The qualifications of the Special Inspector(s) and/or testing agencies shall be subject to the approval of the Building Official and the Design Professional.</i></p> <p><i>3. (**) The list of Special Inspectors may be submitted as a separate document, if noted as "TBD" above.</i></p> <p><b>Encircle "Yes" or "No" as appropriate and date this document below:</b></p> <p>Are Requirements for Seismic Resistance included in the Statement of Special Inspections? <b>Yes</b></p> <p>Are Requirements for Wind Resistance included in the Statement of Special Inspections? <b>No</b></p> <p>Date:</p>			



# Special Inspection Daily Report

**Project Name:** \_\_\_\_\_ **Project Number:** \_\_\_\_\_

**Project Address:** \_\_\_\_\_ **Weather/Temp:** \_\_\_\_\_

**Structure/Area:** \_\_\_\_\_ **Discrepancy Notice #:** \_\_\_\_\_

<b>Report Details</b>	<p>Inspection Type: <input type="checkbox"/> Continuous <input type="checkbox"/> Periodic</p> <p>Inspection Date with Start and Ending Time(s): _____</p> <p>Material/Activity: <input type="checkbox"/> Steel Construction <input type="checkbox"/> Concrete Construction <input type="checkbox"/> Soils <input type="checkbox"/> Pile Foundations  <input type="checkbox"/> Sprayed Fire-Resistant Materials <input type="checkbox"/> Mastic and Intumescent Fire-Resistant Coatings <input type="checkbox"/> Special  <input type="checkbox"/> Other _____</p> <p>Description of Inspections Made:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>List of Tests Made: <input type="checkbox"/> Concrete Cylinders <input type="checkbox"/> In-situ concrete strength <input type="checkbox"/> Bearing Capacity  <input type="checkbox"/> Pile Capacity <input type="checkbox"/> Other _____</p> <p>List of Items Requiring Corrections, Corrections of Previously Listed Items and Previously Listed Uncorrected Items.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Comments:</p> <p>_____</p> <p>_____</p>
<b>Certification</b>	<p>To the best of my knowledge, work inspected was in accordance with the approved design Drawings and Specifications, except as noted above.</p> <p>Name of Testing Agency: _____</p> <p>Inspector Name (Printed): _____</p> <p>Signature: _____ Date: _____</p> <p>Certification: _____ Number: _____</p> <p>Note: One copy of this report shall remain at job site with the contractor for review upon request.</p>

# Special Inspection Interim Report

Project Name: \_\_\_\_\_ Project Number: \_\_\_\_\_

Project Address: \_\_\_\_\_ Weather/Temp: \_\_\_\_\_

Structure/Area: \_\_\_\_\_ Discrepancy Notice #: \_\_\_\_\_

<b>Report Details</b>	Inspection Type: <input type="checkbox"/> Continuous <input type="checkbox"/> Periodic Inspection Date(s) with Start and Ending Time(s): _____ _____
	Material/Activity: <input type="checkbox"/> Steel Construction <input type="checkbox"/> Concrete Construction <input type="checkbox"/> Soils <input type="checkbox"/> Pile Foundations <input type="checkbox"/> Sprayed Fire-Resistant Materials <input type="checkbox"/> Mastic and Intumescent Fire-Resistant Coatings <input type="checkbox"/> Special <input type="checkbox"/> Other _____
	Description of Inspections Made: _____ _____ _____
	List of Tests Made: <input type="checkbox"/> Concrete Cylinders <input type="checkbox"/> In-situ concrete strength <input type="checkbox"/> Bearing Capacity <input type="checkbox"/> Pile Capacity <input type="checkbox"/> Other _____ List of Items Requiring Corrections, Corrections of Previously Listed Items and Previously Listed Uncorrected Items. _____ _____ _____
<b>Certification</b>	Comments: _____ _____
	To the best of my knowledge, work inspected was in accordance with the approved design Drawings and Specifications, except as noted above.
	Name of Testing Agency: _____ Inspector Name (Printed): _____ Signature: _____ Date: _____ Certification: _____ Number: _____
	Note: One copy of this report shall remain at job site with the contractor for review upon request.



# Special Inspection Final Report

**PROJECT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**PERMIT APPLICANT:** \_\_\_\_\_

**APPLICANT'S ADDRESS:** \_\_\_\_\_

To the best of my information, knowledge, and belief, which are based upon observations or diligent supervision of our inspection services for the above-referenced Project, I hereby state that the special inspections or testing required for this Project, and designated for this Agent in the *Schedule of Special Inspection Services*, have been completed in accordance with the Contract Documents.

The Special Inspection program does not relieve the Contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Interim reports submitted prior to this final report and numbered \_\_\_\_\_ to \_\_\_\_\_ form a basis for, and are to be considered an integral part of this final report. The following discrepancies that were outstanding since the last interim report dated \_\_\_\_\_ have been corrected:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*(Attach 8 1/2" x 11" continuation sheet(s) if required to complete the description of corrections)*

**Prepared By:**

Preparer's Seal

\_\_\_\_\_  
Special Inspection Agent/Firm

\_\_\_\_\_  
Type or print name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## Concrete Inspection Checklist

Inspector: \_\_\_\_\_ Firm: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Project Name: \_\_\_\_\_ Project Number: \_\_\_\_\_

Project Location: \_\_\_\_\_ Weather/Temp: \_\_\_\_\_

Structure/Area: \_\_\_\_\_

Applicable Code/Details:  IBC \_\_\_\_\_  Special Inspections  Seismic Design Category: \_\_\_\_\_

<b>Reinf Placement</b>	<p><b>Material Storage:</b> <input type="checkbox"/> Adequate <input type="checkbox"/> Unsuitable</p> <p><b>Rebar:</b> <input type="checkbox"/> ASTM A615 <input type="checkbox"/> ASTM A185/ASTM A82 (WWR) <input type="checkbox"/> Other _____</p> <p><input type="checkbox"/> Clean of Debris <input type="checkbox"/> Concrete Cover <input type="checkbox"/> Size, spacing, location and laps match approved SD's</p> <p><b>Chairs &amp; Spacers:</b> <input type="checkbox"/> Bare Metal <input type="checkbox"/> Plastic covered <input type="checkbox"/> Galvanized <input type="checkbox"/> Other _____</p> <p><b>Mechanical Couplers:</b> <input type="checkbox"/> Splices staggered <input type="checkbox"/> Locations as shown on the Drawings <input type="checkbox"/> N/A</p> <p><b>Formwork:</b> <input type="checkbox"/> Leakage prevented <input type="checkbox"/> Shape, location &amp; dims (tolerances per ACI 117 &amp; spec)</p> <p>Rebar Reference Document/Details: _____</p>
<b>Pre-Concrete Pour</b>	<p><input type="checkbox"/> Truck Accepted <input type="checkbox"/> Truck Rejected - Reason: _____</p> <p><b>Batch Ticket:</b> <input type="checkbox"/> Mix # _____ <input type="checkbox"/> Strength _____ psi <input type="checkbox"/> Coarse aggregate # _____</p> <p><input type="checkbox"/> Water amount _____ gallons /CY <input type="checkbox"/> Withholding Water _____ gallons <input type="checkbox"/> Slump _____ in.</p> <p><input type="checkbox"/> Admixtures _____</p> <p><b>Tests:</b> <input type="checkbox"/> Slump Test (ASTM C143) <input type="checkbox"/> Air Content Test (ASTM C173/C231) <input type="checkbox"/> Cylinder Test (ASTM C31)</p> <p><input type="checkbox"/> Concrete samples taken at end of hose <input type="checkbox"/> # of samples _____</p> <p><b>Mixing Time:</b> <input type="checkbox"/> 90 min (temp&lt;85°F) <input type="checkbox"/> 75 min (temp≤90°F) <input type="checkbox"/> 60 min (temp&gt;90°F)</p> <p><b>Hot Weather</b> (90°F to 100°F): <input type="checkbox"/> Steps taken to lower temperature of concrete ingredients</p> <p><b>Cold Weather</b> (&lt; 40°F): <input type="checkbox"/> Concrete temp 70°F to 80°F <input type="checkbox"/> Reinf/Forms/Fillers/Ground is frost-free</p> <p><input type="checkbox"/> 3 days: maintain conc temp of 70°F <input type="checkbox"/> 5 days: maintain conc temp of 50°F</p> <p><b>Construction Joints:</b> <input type="checkbox"/> Locations per Drawings <input type="checkbox"/> Point of minimum shear (Beams/Elevated Slabs)</p> <p><b>Waterstops:</b> <input type="checkbox"/> Type _____ <input type="checkbox"/> Correct locations <input type="checkbox"/> Proper splices (no laps) <input type="checkbox"/> Centered on joint</p> <p><input type="checkbox"/> Continuous around corners and intersections <input type="checkbox"/> Heat fused welding PVC splices (no adhesives)</p> <p><input type="checkbox"/> Adhesive Splicing of HR <input type="checkbox"/> Free of Holes <input type="checkbox"/> Tied-Off to formwork/reinforcement @ 12" o.c.</p> <p><input type="checkbox"/> Retro-fit set in bed of epoxy w/ sst batten bars and ¼"Φ sst anchors @ 6" o.c.</p> <p><b>Form Releasing Agent:</b> <input type="checkbox"/> Sealtight Duoguard by W.R. Meadows <input type="checkbox"/> Other _____</p> <p><b>Vapor Barriers:</b> <input type="checkbox"/> 6 mil w/ ½" holes <input type="checkbox"/> 10 mil <input type="checkbox"/> 15 mil <input type="checkbox"/> Overlaped Joints by 6" and Seam Tape</p> <p><input type="checkbox"/> Penetrations sealed <input type="checkbox"/> Damaged Areas left unrepaired</p>



# Anchor Installation Checklist

**Inspector:** \_\_\_\_\_ **Firm:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Project Name:** \_\_\_\_\_ **Project Number:** \_\_\_\_\_

**Project Location:** \_\_\_\_\_ **Weather/Temp:** \_\_\_\_\_

**Structure/Area:** \_\_\_\_\_

**Applicable Code/Details:**  IBC \_\_\_\_\_  Special Inspections  Seismic Design Category: \_\_\_\_\_

<b>Pre-Inspection</b>	Anchor Manufacturer: <input type="checkbox"/> Hilti <input type="checkbox"/> Simpson <input type="checkbox"/> Powers <input type="checkbox"/> Other _____ Anchor Type: <input type="checkbox"/> Expansion <input type="checkbox"/> Adhesive <input type="checkbox"/> Undercut <input type="checkbox"/> Other _____ Adhesive Gel Time: <input type="checkbox"/> 3 min <input type="checkbox"/> 4 min <input type="checkbox"/> 5 min <input type="checkbox"/> 6 min <input type="checkbox"/> 20 min <input type="checkbox"/> 30 min <input type="checkbox"/> Other _____ Adhesive Cure Time: <input type="checkbox"/> 30 min <input type="checkbox"/> 40 min <input type="checkbox"/> 50 min <input type="checkbox"/> 60 min <input type="checkbox"/> 8 hrs <input type="checkbox"/> 12 hrs <input type="checkbox"/> Other ____ Product Name: _____ Rod Material: <input type="checkbox"/> ASTM A193 (GR. B8M) <input type="checkbox"/> ASTM F1554 <input type="checkbox"/> ASTM A153 <input type="checkbox"/> Other _____ Diameter: <input type="checkbox"/> 1/4" <input type="checkbox"/> 3/8" <input type="checkbox"/> 1/2" <input type="checkbox"/> 5/8" <input type="checkbox"/> 3/4" <input type="checkbox"/> 7/8" <input type="checkbox"/> 1" <input type="checkbox"/> Other _____ Base Material: <input type="checkbox"/> CMU <input type="checkbox"/> CIP Concrete <input type="checkbox"/> Grout <input type="checkbox"/> Other _____ Base Material Thickness: _____ Anchor Length: _____ Design Embedment: _____ Design Projection: _____ Design Anchor Spacing (min): _____ Design Edge Distance (min): _____
<b>Observations</b>	Hole Preparation: <input type="checkbox"/> Compressed Air <input type="checkbox"/> Hand Pump <input type="checkbox"/> Wire Brush <input type="checkbox"/> Other _____ Hole Condition: <input type="checkbox"/> Dry <input type="checkbox"/> Water Saturated <input type="checkbox"/> Fully Submerged <input type="checkbox"/> Other _____ Anchor Condition: <input type="checkbox"/> Debris on rod(s) <input type="checkbox"/> Oil on Rod(s) <input type="checkbox"/> Unsuitable Storage (dirty, wet, etc) Total # of Anchors Observed: _____ Installation per Manufacturer's Instructions: <input type="checkbox"/> Yes <input type="checkbox"/> No (Provide Details Below) Correct Projection Length : <input type="checkbox"/> All Anchors <input type="checkbox"/> Some Anchors (Provide Details) <input type="checkbox"/> No Anchors Correct Anchor Spacing: <input type="checkbox"/> All Anchors <input type="checkbox"/> Some Anchors (Provide Details) <input type="checkbox"/> No Anchors Correct Edge Distance: <input type="checkbox"/> All Anchors <input type="checkbox"/> Some Anchors (Provide Details) <input type="checkbox"/> No Anchors Load applied <u>after</u> cure time: <input type="checkbox"/> All Anchors <input type="checkbox"/> Some Anchors <input type="checkbox"/> No Anchors <input type="checkbox"/> Unknown

**General Observations:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_







Special Inspection and Testing

	<ul style="list-style-type: none"><li><input type="checkbox"/> Construction and protection of masonry during cold weather (&lt;40°F) or hot weather (&gt;90°F)</li><li><input type="checkbox"/> Preparation of grout specimens, mortar specimens and/or prisms</li></ul>
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General Observations: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

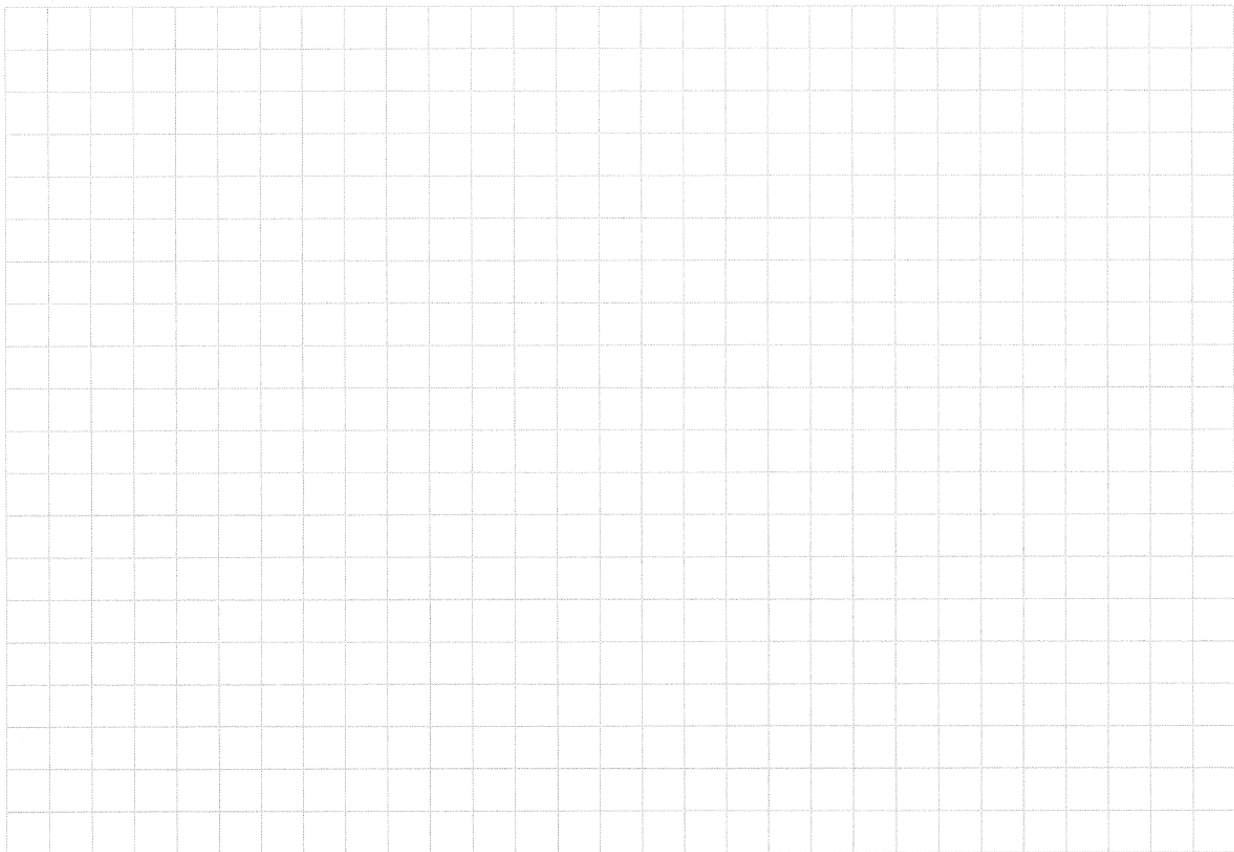
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Sketch Space:



## Part 1 General

### 1.01 Scope

- A. Temporary facilities required for this work include, but are not necessarily limited to:
  - 1. Temporary utilities such as water and electricity.
  - 2. First aid facilities.
  - 3. Sanitary facilities.
  - 4. Potable water.
  - 5. Temporary enclosures and construction facilities.

### 1.02 General

- A. First aid facilities, sanitary facilities and potable water shall be available on the Project site on the first day that any activities are conducted on site. The other facilities shall be provided as the schedule of the Project warrants.
- B. Maintenance: Use all means necessary to maintain temporary facilities in proper and safe condition throughout progress of the work. In the event of loss or damage, immediately make all repairs and replacements necessary, at no additional cost to the Owner.
- C. Removal: Remove all such temporary facilities and controls as rapidly as progress of the work will permit.

### 1.03 Temporary Utilities

- A. General
  - 1. Provide and pay all costs for all water, electricity and other utilities required for the performance of the work.
  - 2. Pay all costs for temporary utilities until Project completion.
  - 3. Costs for temporary utilities shall include all power, water and the like necessary for testing equipment as required by the Contract Documents.
- B. Temporary Water: Provide all necessary temporary piping, back flow preventers, meters and upon completion of the work, remove all such temporary facilities. Provide and remove water meters.
- C. Temporary Electricity

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**Temporary Facilities**

1. Provide all necessary wiring for the Contractor's use.
2. Furnish, locate and install area distribution boxes such that the individual trades may use, their own construction type extension cords to obtain adequate power, and artificial lighting at all points where required by inspectors and for safety.

**1.04 First Aid Facilities**

The Contractor shall provide a suitable first aid station, equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. All first aid facilities and emergency ambulance service shall be made available by the Contractor to the Owner and the Engineer's personnel.

**1.05 Sanitary Facilities**

Prior to starting the work, the Contractor shall furnish, for use of Contractor's personnel on the job, all necessary toilet facilities which shall be secluded from public observation. These facilities shall be either chemical toilets or shall be connected to the Owner's sanitary sewer system. All facilities, regardless of type, shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the area in which the work is performed. Adequacy of these facilities will be subject to the Engineer's review and maintenance of same must be satisfactory to the Engineer at all times.

**1.06 Potable Water**

The Contractor shall be responsible for furnishing a supply of potable drinking water for employees, subcontractors, inspectors, engineers and the Owner who are associated with the work.

**1.07 Enclosures and Construction Facilities**

Furnish, install and maintain for the duration of construction, all required scaffolds, tarpaulins, canopies, steps, bridges, platforms and other temporary construction necessary for proper completion of the work in compliance with all pertinent safety and other regulations.

**1.08 Parking Facilities**

Parking facilities for the Contractor's and Contractor's subcontractors' personnel shall be the Contractor's responsibility. The storage and work facilities provided by the Owner will not be used for parking by the Contractor's or subcontractor's personnel.

END OF SECTION

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## Part 1 General

### 1.01 Scope

- A. This Section covers furnishing, maintaining, and operating a temporary bypass pumping system during construction. The Contractor shall furnish all materials, labor, equipment, power, maintenance, etc., to implement a temporary pumping and control system for the purpose of diverting the existing flow around the work area.
- B. Design and installation of these systems shall be the Contractor's responsibility subject to Engineer's approval as specified.

### 1.02 General

The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a Specialty Contractor (Firm) who can demonstrate to the Engineer that it specializes in the design and operation of temporary bypass pumping systems. The Firm shall provide at least five references of projects of a similar size and complexity as this Project performed by his company within the past three years. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

### 1.03 Submittals

- A. The Contractor shall prepare with the Firm a specific, detailed description of the proposed pumping system(s) required for each location and submit it along with the Firm's references within one month following Notice to Proceed.
- B. The Contractor shall submit detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows in accordance with the submittal section. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, pump and drive control selection and design, materials and all other incidental items necessary and/or required to insure proper protection of the facilities. The plan shall include but not be limited to details of the following:
  - 1. Staging areas for pumps.
  - 2. Sewer or structure plugging method and types of plugs.
  - 3. Number, size, material, location and method of installation of suction piping.
  - 4. Number, size, material, method of installation and location of installation of discharge piping.
  - 5. Bypass pump sizes, capacity, and number of each size to be on site and power requirements.

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**Temporary Bypass Pumping**

6. Motor control package design, including wiring diagrams, voltage and amperage requirements, control logic description.
7. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).
8. Standby power provisions.
9. Thrust and restraint block sizes and locations if applicable.
10. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill.
11. Any temporary pipe supports and anchoring required.
12. Design plans and access provisions to bypass pumping and generator fueling locations indicated on the Drawings.
13. Calculations for selection of bypass pumping pipe size.
14. Schedule for installation and maintenance of bypass pumping lines.
15. Continuous monitoring, operating and emergency response plan.

## Part 2 Products

### 2.01 Design and Performance Requirements

- A. Pumps shall have sufficient capacity to pump from negligible flows to the flows indicated below. The Contractor shall provide all pumps of adequate size to handle the flow events and temporary piping to ensure that the total flow can be safely diverted around the work area.
  - a. Dry weather maximum pumping capacity: 45 MGD
- B. Contractor shall have adequate standby equipment available onsite and ready for immediate operation and use in the event of an emergency or breakdown.
- C. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- D. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
- E. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

- F. The Contractor shall protect water resources wetlands and other natural resources.
- G. The Contractor shall provide standby power to all electric pumping units in the event of power loss.

## 2.02 Equipment

- A. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to handle low flow events for long periods of time to accommodate the cyclical nature of the sewage flows.
- B. The Contractor shall provide the necessary stop/start and variable speed controls for each pump. The motor controls shall use a PLC based level control system with a submersible level transducer to initiate start and stop signals to the motor controls.
- C. Discharge piping systems shall be constructed of restrained joint type piping. Joints shall allow no leakage. Standard aluminum irrigation piping is not acceptable.

## Part 3 Execution

### 3.01 Field Quality Control and Maintenance

- A. The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping prior to actual operation.
- B. The Contractor shall inspect the bypass pumping system every two hours to ensure that the system is working correctly.
- C. The Contractor shall ensure that the temporary pumping system is properly maintained and that a responsible operator shall be on hand at all times when pumps are operating.
- D. The Contractor shall submit a plan for the replacement of malfunctioning equipment.
- E. Spare parts for pumps and piping shall be kept on site as required.
- F. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

### 3.02 Installation and Operation

- A. The Contractor shall install the bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Owner and the Engineer. Routing of bypass pipelines shall not impede pump station traffic flow.
- B. The Contractor shall protect the temporary pumping station and piping from damage

Temporary Bypass Pumping

during construction.

- C. Contractor shall provide all fuel and power for the temporary pumping facility. Contractor shall make arrangements for a power meter and pay all associated fees.

END OF SECTION



Part 1 General

1.01 Scope

Limit blowing dust caused by construction operations by applying water or employing other appropriate means or methods to maintain dust control, subject to the approval of the Owner. As a minimum, this may require the use of a water wagon twice a day to suppress dusty conditions.

1.02 Protection of Adjacent Property

- A. The Bidders shall visit the site and note the buildings, landscaping, roads, parking areas and other facilities near the work site that may be damaged by their operations. The Contractor shall make adequate provision to fully protect the surrounding area and will be held fully responsible for all damages resulting from Contractor's operations.
- B. Protect all existing facilities (indoors or out) from damage by dust, fumes, spray or spills (indoors or out). Protect motors, bearings, electrical gear, instrumentation and building or other surfaces from dirt, dust, welding fumes, paint spray, spills or droppings causing wear, corrosion, malfunction, failure or defacement by enclosure, sprinkling or other dust palliatives, masking and covering, exhausting or containment.

END OF SECTION



## Part 1 General

### 1.01 Barricades, Lights and Signals

- A. The Contractor shall furnish and erect such barricades, fences, lights and danger signals and shall provide such other precautionary measures for the protection of persons or property and of the work as necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one light at each barricade and sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any work under construction.
- B. The Contractor will be held responsible for all damage to the work due to failure of barricades, signs and lights and whenever evidence is found of such damage, the Contractor shall immediately remove the damaged portion and replace it at Contractor's cost and expense. The Contractor's responsibility for the maintenance of barricades, signs and lights shall not cease until the Project has been accepted by the Owner.

END OF SECTION



## Part 1 General

### 1.01 Scope

- A. The work specified in this Section consists of providing and maintaining temporary and permanent erosion and sedimentation controls as shown on the Drawings. This Section also specifies the subsequent removal of temporary erosion and sedimentation controls.
- B. Temporary and permanent erosion and sedimentation controls include grassing and mulching of disturbed areas and structural barriers at those locations which will ensure that erosion during construction will be maintained within acceptable limits. Acceptable limits are as established by the Tennessee Water Quality Control Act of 1977, as amended, Section 402 of the Federal Clean Water Act, and applicable codes, ordinances, rules, regulations and laws of local and municipal authorities having jurisdiction. For installation and maintenance guidance, refer to the Tennessee Erosion and Sediment Control Handbook, latest edition.
- C. Land disturbance activity shall not commence until the Land Disturbance Permit and all required stream crossing permits have been issued.
- D. Land disturbance permit shall be obtained and paid for by the Contractor.

### 1.02 Submittals

- A. Submit product data in accordance with the requirements of Section 01 33 23 of these Specifications.
- B. Prior to any construction activity, the Contractor shall submit, for the Engineer's approval, a schedule for the accomplishment of temporary and permanent erosion and sedimentation control work. No work shall be started until the erosion and sedimentation control schedule and methods of operation have been approved by the Engineer.

### 1.03 Quality Assurance

- A. The temporary and permanent erosion and sedimentation control measures shown on the Drawings are minimum requirements. Any additional erosion and sedimentation control measures required by the Contractor's means, methods, techniques and sequence of operation will be installed by the Contractor at no additional cost to the Owner.
- B. Perform all work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated in these Specifications. Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.

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Erosion and Sedimentation Control

- C. Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Tennessee Water Quality Control Act of 1977, as amended, local ordinances, other permits, local enforcing agency guidelines and these Specifications.
  
- D. Basic Principles
  - 1. Coordinate the land disturbance activities to fit the topography, soil types and conditions.
  - 2. Minimize the disturbed area and the duration of exposure to erosive elements.
  - 3. Provide temporary or permanent stabilization to disturbed areas immediately after rough grading is complete.
  - 4. Safely convey run-off from the site to a stable outlet to prevent flooding and damage to downstream facilities resulting from increased runoff from the site.
  - 5. Retain sediment on-site that was generated on-site.
  - 6. Minimize encroachment upon watercourses.
  
- E. Implementation
  - 1. The Contractor is solely responsible for the control of erosion within the Project site and the prevention of sedimentation from leaving the Project site or entering waterways.
  - 2. The Contractor shall install temporary and permanent erosion and sedimentation controls which will ensure that runoff from the disturbed area of the Project site shall pass through a filter system before exiting the Project site.
  - 3. The Contractor shall provide temporary and permanent erosion and sedimentation control measures to prevent silt and sediment from entering the waterways.
  - 4. The Contractor shall limit land disturbance activity to those areas shown on the Drawings.
  - 5. The Contractor shall maintain erosion and sedimentation control measures within disturbed areas on the entire site at no additional cost to the Owner until the acceptance of the Project. Maintenance shall include mulching, re-seeding, clean-out of sediment barriers and sediment ponds, replacement of washed-out or undermined rip rap and erosion control materials, to the satisfaction of the Engineer.
  - 6. All fines imposed for improper erosion and sedimentation control shall be paid by the Contractor.
  - 7. The Contractor shall use all means necessary to control dust on and near the

work and all off-site borrow areas, in accordance to the Tennessee Erosion and Sediment Control Handbook, latest edition. The Contractor should thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of work on the site.

## Part 2 Products

### 2.01 Sediment Barriers

#### A. Silt Fence

1. Type A silt fence shall meet the requirements of Tennessee Erosion and Sediment Control Handbook, latest edition. Posts shall be 4 feet in length and can either be made of steel, soft wood or oak. Steel posts shall be 1.3lb./ft. minimum. Soft wood post shall be 3" diameter or 2" x 4". Oak posts shall be minimum 1.5" x 1.5". Fasteners for wood posts shall be wire staples or nails. Wire staples are to have a minimum 17 gauge, 3/4" crown width, and a 1/2" leg length. Nails are to have a minimum 14 gauge, 3/4" button head, and a 1" length.
2. Type C silt fence is a combination of Type A silt fence fabric with woven wire reinforcement. Type C silt fence woven wire reinforcement shall meet the requirements of Tennessee Erosion and Sediment Control Handbook, latest edition. Posts shall be 4 feet in length and shall be made of steel. Steel posts shall be 1.3lb./ft. minimum.
3. Silt fence fabric shall meet the requirements of the Tennessee Erosion and Sediment Control Handbook, latest edition.

### 2.02 Storm Drain Inlet Protection

- A. Silt Fence Inlet Protection: Type C Silt fence supported by steel posts shall be used. See Silt Fence this Part.

### 2.03 Construction Exit

- A. Stone: Use sound, tough, durable stone resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Aggregate size shall be TDOT #1 or #2 stone (1.5 to 3.5-inch stone).
- B. Geotextile: The geotextile underliner must be placed the full length and width of the entrance. Geotextile selection shall be based on AASHTO M288-98 specification:
1. For subgrades with a CBR greater than or equal to 3 or shear strength greater than 90 kPa, geotextile must meet requirements of section AASHTO M288 Section 7.3, Separation Requirements.
  2. For subgrades with a CBR between 1 and 3 or sheer strength between 30 and

90 kPa, geotextile must meet requirements of AASHTO M288 Section 7.4, Stabilization Requirements.

## 2.04 Downdrain Structures

### A. Temporary Downdrain:

1. Pipe: Design the slope drain using heavy-duty, flexible materials such as non-perforated, corrugated plastic pipe or specially designed flexible tubing. Use reinforced, hold-down grommets or stakes to anchor the pipe at intervals not to exceed 10 feet with the outlet end securely fastened in place. The pipe must extend beyond the toe of the slope.
2. Filter Ring: A stone filter ring shall be placed at the inlet for added sediment filtering capacity.
3. Storm Drain Outlet Protection: Rock rip rap shall be placed at the outlet for energy dissipation. A Tee outlet, flared end section, or other suitable device may be used in conjunction with the rip rap for additional protection.

### B. Permanent Downdrain:

1. Pipe: Design the slope drain using heavy-duty, flexible materials such as non-perforated, corrugated plastic or steel pipe or specially designed flexible tubing. Use reinforced, hold-down grommets or stakes to anchor the pipe at intervals not to exceed 10 feet with the outlet end securely fastened in place. The pipe must extend beyond the toe of the slope.
2. Paved Flume: The paved flume may have a parabolic, rectangular or trapezoidal cross-section and shall consist of reinforced concrete or asphalt paving.
3. Filter Ring: A stone filter ring shall be placed at the inlet for added sediment filtering capacity.
4. Storm Drain Outlet Protection: Rock rip rap shall be placed at the outlet for energy dissipation. A Tee outlet, flared end section, or other suitable device may be used in conjunction with the rip rap for additional protection.

## 2.05 Temporary Mulching

- A. Dry straw or hay: Shall be applied at a depth of 2 to 4 inches providing complete soil coverage. Material shall be clean, seed-free cereal hay or straw.
- B. Wood waste (chips, sawdust or bark): Shall be applied at a depth of 2 to 3 inches. Organic material from the clearing stage of development should remain on site, be chipped, and applied as mulch.
- C. Mulch Binder: Mulch on slopes exceeding 3 (horizontal) to 1 (vertical) shall be held in



place by the use of a mulch binder, as approved by the Engineer. The mulch binder shall be non-toxic to plant and animal life and shall be approved by the Engineer.

## 2.06 Temporary Grassing

- A. Grassing materials shall meet the requirements of the Tennessee Erosion and Sediment Control Handbook, latest edition, section that includes "Disturbed Area Stabilization (With Temporary Vegetation)".
- B. Seed rate, fertilization, lime application and other requirements shall be provided as shown on the Drawings.
- C. Water: Water shall be free of excess and harmful chemicals, organisms and substances which may be harmful to plant growth or obnoxious to traffic. Salt or brackish water shall not be used. Water shall be furnished by the Contractor.

## 2.07 Permanent Grassing and Sodding

As specified elsewhere in these Specifications.

# Part 3 Execution

## 3.01 General

- A. Temporary and permanent erosion and sedimentation control measures shall prevent erosion and prevent sediment from exiting the site. If, in the opinion of the Engineer, the Contractor's temporary erosion and sedimentation control measures are inadequate, the Contractor shall provide additional maintenance for existing measures or additional devices to control erosion and sedimentation on the site at no additional cost to the Owner.
- B. All erosion and sedimentation control devices and structures shall be inspected by the Qualified Personnel at least once a week and within 24 hours of the end of a storm that is 0.5 inches or greater. Any device or structure found to be damaged will be repaired or replaced by the end of the day.
- C. All erosion and sedimentation control measures and devices shall be constructed and maintained as indicated on the Drawings or specified herein until adequate permanent disturbed area stabilization has been provided and accepted by the Engineer. Once adequate permanent stabilization has been provided and accepted by the Engineer, all temporary erosion and sedimentation control structures and devices shall be removed.

## 3.02 Installation and Maintenance of Erosion and Sediment Controls

- A. Sediment Barriers
  - 1. Sediment barriers shall include, but are not necessarily limited to silt fences and

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Erosion and Sedimentation Control

any device which prevents sediment from exiting the disturbed area.

2. Sediment barriers shall not be used in any flowing stream, creek or river.
3. Sediment barriers shall be installed as shown on the Drawings and as directed by the Engineer.
4. Along stream buffers and other sensitive areas, two rows of Type C silt fence or one row of Type C silt fence backed by hay bales shall be used.
5. Sediment barriers shall be maintained to ensure the depth of impounded sediment is no more than one-half of the original height of the barrier or as directed by the Engineer. Torn, damaged, destroyed or washed-out barriers shall be repaired, reinforced or replaced with new material and installed as shown on the Drawings and as directed by the Engineer.
6. Sediment Barrier Removal
  - a. Sediment barrier shall be removed once the disturbed area has been stabilized with a permanent vegetative cover and the sediment barrier is no longer required as directed by the Engineer.
  - b. Accumulated sediment shall be removed from the barrier and spread over the site.
  - c. All non-biodegradable parts of the barrier shall be disposed of properly.
  - d. The disturbed area created by barrier removal shall be permanently stabilized.

B. Storm Drain Inlet Protection

1. Inlet Sediment Traps shall include, but are not necessarily limited to, Silt Fence Inlet Protection, Baffle Box, Block and Gravel Inlet Protection, Gravel Inlet Protection, Sod Inlet Protection and any device which traps sediment and prevents it from exiting the disturbed area.
2. Inlet Sediment Traps shall be installed as shown on the Drawings and as directed by the Engineer.
3. For each Inlet Sediment Traps type the following installation guidelines shall be used:
  - a. Silt Fence Inlet Protection: Type C silt fence supported by steel posts shall be used. The stakes shall be spaced evenly around the perimeter of the inlet a maximum of 3 feet apart, and securely driven into the ground, approximately 18 inches deep. The fabric shall be entrenched 12 inches and backfilled with crushed stone or compacted soil. Fabric and wire shall be securely fastened to the posts, and fabric ends must be overlapped a minimum of 18 inches or wrapped together around a post to

provide a continuous fabric barrier around the inlet.

4. The trap shall be inspected daily and after each rain and repairs made as needed. Sediment shall be removed when the sediment has accumulated to one-half the height of the trap. Sediment shall be removed from curb inlet protection immediately. For excavated inlet sediment traps, sediment shall be removed when one-half of the sediment storage capacity has been lost to sediment accumulation. Sod inlet protection shall be maintained as specified for Permanent Sodding.

5. Sediment Barrier Removal

- a. Sediment barrier shall be removed once the disturbed area has been stabilized with a permanent vegetative cover and the sediment barrier is no longer required as directed by the Engineer.
- b. Accumulated sediment shall be removed from the barrier and removed from the site.
- c. All non-biodegradable parts of the barrier shall be disposed of properly.
- d. The disturbed area created by barrier removal shall be permanently stabilized.

C. Construction Exit

1. Construction exit(s) shall be placed as shown on the Drawings and as directed by the Engineer. A construction exit shall be located at any point traffic will be leaving a disturbed area to a public right-of-way, street, alley, sidewalk or parking area.
2. Placement of Construction Exit Material: The ground surface upon which the construction exit material is to be placed shall be prepared to a smooth condition free from obstructions, depressions or debris. The geotextile underliner shall be placed to provide a minimum number of overlaps and a minimum width of one foot of overlap at each joint. The stone shall be placed with its top elevation conforming to the surrounding roadway elevations. The stone shall be dropped no more than three feet during construction.
3. Construction Exit Maintenance: The Contractor shall regularly maintain the exit with the top dressing of stone to prevent tracking or flow of soil onto public rights-of-way and paved surfaces as directed by the Engineer. This shall require periodic top dressing with 1.5-3.5 inch stone, as conditions demand.
4. Construction Exit Removal: Construction exit(s) shall be removed and properly disposed of when the disturbed area has been properly stabilized, the tracking or flow of soil onto public rights-of-way or paved surfaces has ceased and as directed by the Engineer.

D. Downdrain Structures

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Erosion and Sedimentation Control

1. Place slope drains on undisturbed soil or well compacted fill at locations and elevations shown on the Drawings.
2. Slightly slope the section of pipe under the dike toward its outlet.
3. Hand tamp the soil under and around the entrance section in lifts not to exceed 6 inches.
4. Ensure that fill over the drain at the top of the slope has minimum dimensions of 1.5 ft. depth, 4 ft. top width, and 3:1 side slopes.
5. Ensure that all slope drain connections are watertight.
6. Ensure that all fill material is well-compacted. Securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet apart.
7. Place the drain slightly diagonally across the slope, extending the drain beyond the toe of the slope. Curve the outlet uphill and adequately protect the outlet from erosion.
8. If the drain is conveying sediment-laden runoff, direct all flows into a sediment trap or sediment basin.
9. Make the settled, compacted dike ridge no less than one foot above the top of the pipe at every point.
10. Immediately stabilize all disturbed areas following construction.
11. Install Storm Drain Outlet Protection as specified in this Part.
12. Maintenance: Inspect the slope drain and supporting diversion after every rainfall and promptly make necessary repairs. When the protected area has been permanently stabilized and the permanent stormwater disposal system is fully functional, temporary measures may be removed, materials disposed of properly, and all disturbed areas stabilized appropriately.

## E. Temporary Mulching

1. When mulch is used without seeding, mulch shall be applied to provide full coverage of the exposed area. Mulch shall be applied as follows:
  - a. Dry straw or hay mulch and wood chips shall be applied uniformly by hand or by mechanical equipment.
  - b. If the area will eventually be covered with perennial vegetation, 20-30 pounds of nitrogen per acre in addition to the normal amount shall be applied to offset the uptake of nitrogen caused by the decomposition of the organic mulches.

- c. Apply mulch binder on exposed areas, where indicated on the Drawings or as instructed by the Engineer.

2. Anchoring Mulch:

- a. Straw or hay mulch can be pressed into the soil with a disk harrow with the disk set straight or with a special "packer disk." Disks may be smooth or serrated and should be 20 inches or more in diameter and 8 to 12 inches apart. The edges of the disk should be dull enough not to cut the mulch but to press it into the soil leaving much of it in an erect position.
- b. Straw or hay mulch shall be anchored immediately after application.
- c. Straw or hay mulch spread with special blower-type equipment may be anchored with emulsified asphalt (Grade AE-5 or SS-1). The asphalt emulsion shall be sprayed onto the mulch as it is ejected from the machine. Use 100 gallons of emulsified asphalt and 100 gallons of water per ton of mulch.
- d. For straw or hay mulch, plastic mesh or netting with mesh no larger than one inch by one inch shall be installed according to manufacturer's specifications.
- e. Netting of the appropriate size shall be used to anchor wood waste. Openings of the netting shall not be larger than the average size of the wood waste chips.

- F. Temporary Grassing

1. Seed Bed Preparation:

- a. When a hydraulic seeder is used, seedbed preparation is not required.
- b. When using conventional or hand seeding, seedbed preparation is not required if the soil material is loose and not sealed by rainfall.
- c. When soil has been sealed by rainfall or consists of smooth cut slopes, the soil shall be pitted, trenched or otherwise scarified to provide a place for seed to lodge and germinate.

2. Select a grass or grass-legume mixture suitable to the area and season of the year.

3. Seed shall be applied uniformly by hand, cyclone seeder, drill, culti-packer-seeder, or hydraulic seeder (slurry including seed and fertilizer). Drill or cultipacker seeders should normally place seed one-quarter to one-half inch deep. Appropriate depth of planting is ten times the seed diameter.

4. Soil should be "raked" lightly to cover seed with soil if seeded by hand.

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Erosion and Sedimentation Control

5. Irrigation: During times of drought, water shall be applied at a rate not causing runoff and erosion. The soil shall be thoroughly wetted to a depth that will insure germination of the seed. Subsequent applications should be made when needed.
6. Temporary Stabilization: Temporary stabilization shall be provided as shown on the Drawings and conforming to these Specifications to control erosion on the site. Temporary stabilization shall be provided to any area which will not receive permanent stabilization within the next 7 calendar days.

G. Permanent Grassing and Sodding

1. Refer to Specifications 32 92 19 Permanent Seeding and 32 92 23 Permanent Sodding and the seeding table contain within the Drawings for installation and maintenance.
2. Permanent Stabilization:
  - a. Permanent stabilization shall be provided as shown on the Drawings and conforming to these Specifications to control erosion on the site. Permanent stabilization shall be provided to all areas of land disturbance within seven calendar days of the completion of land disturbance for any area greater than 0.25 acre.
  - b. Grass or sod removed or damaged in residential areas shall be replanted with the same variety within seven calendar days of the completion of work in any area.
  - c. Where permanent stabilization cannot be immediately established because of an inappropriate season, the Contractor shall provide temporary stabilization. The Contractor shall return to the site at the appropriate season to provide permanent stabilization in areas that received only temporary stabilization.

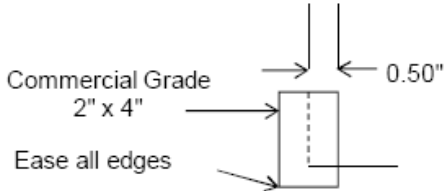
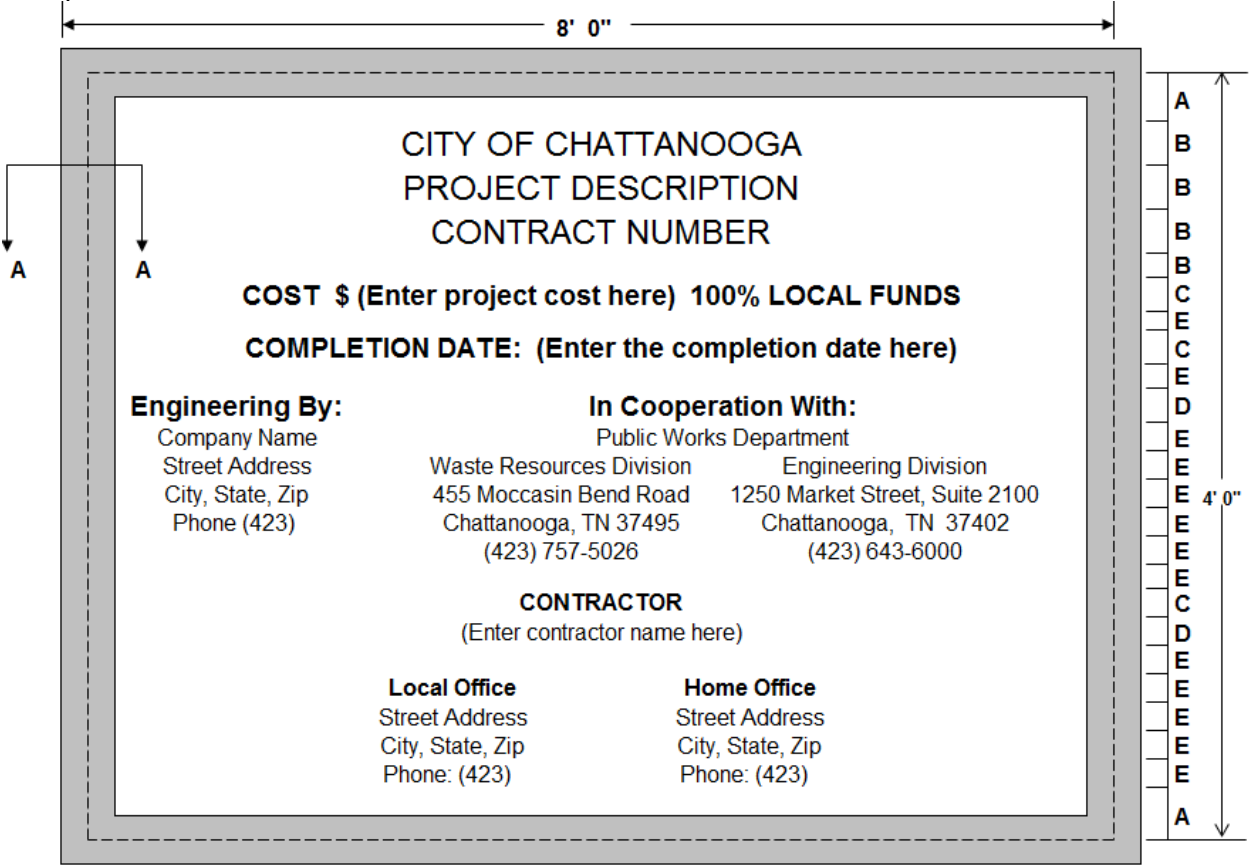
### 3.03 Clean-Up

- A. Dispose of all excess erosion and sedimentation control materials in a manner satisfactory to the Engineer.
- B. All temporary erosion control measures shall be removed after final stabilization of the site has occurred, unless otherwise noted on the Drawings or instructed by the Engineer.
- C. Final clean-up shall be performed in accordance with the requirements of Section 01 74 00 of these Specifications.

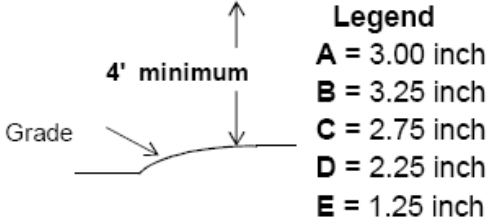
END OF SECTION

The Contractor shall erect two signs identifying the construction project at locations to be designated by the Engineer. The sign shall be substantially in accordance with the drawing below and shall be made of oil base paint on 3/4-inch exterior plywood and maintained in good conditions until completion of the work defined under these Contract Documents. The Contractor shall submit a layout of the sign for approval by the Engineer.

No separate payment will be made for the signs. Payment shall be included in the unit or lump sum prices bid for other sections of work.



**Section A - A**



**Notes:**

1. Sign to be 3/4 inch thick exterior grade plywood.
2. Provide adequate supports to keep sign above prevailing grade to permit public viewing.
3. Edge, trim, and letters shall be dark blue; background shall be white.





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## Part 1 General

### 1.01 Scope

These general equipment stipulations apply, in general, to all equipment and piping. They supplement the detailed equipment Specifications, but in case of conflict, the detailed equipment Specifications shall govern.

### 1.02 Coordination

The Contractor shall assume full responsibility for the coordination of the installation of all equipment, materials and products furnished under these Contract Documents. The Contractor shall be completely responsible for verification that all structures, piping and equipment components furnished by the Contractor and/or subcontractors and suppliers are compatible. The Contractor shall start-up each equipment system and shall make all necessary alterations. All such alterations shall be made at the Contractor's expense.

### 1.03 Unit Responsibility

Equipment manufacturers assigned unit responsibility for systems comprised of several components shall be responsible for furnishing a complete system in accordance with the requirements of these Specifications. The manufacturer shall be responsible for all coordination between component manufacturers and shall provide all submittals, installation and start-up services and certifications on the system as a unit.

### 1.04 Adaptation and Location of Equipment

- A. No responsibility for alteration of a planned structure to accommodate other types of equipment will be assumed by the Owner. Equipment which requires alteration of the structures will be considered only if the Contractor assumes all responsibility for making and coordinating all necessary alterations. All such alterations shall be made at the Contractor's expense.
- B. The Contractor shall install the work in such manner that the equipment, piping, vents, conduit, panels, ductwork and appurtenances be as neatly installed with adequate space for maintenance and passage of personnel.

### 1.05 Equipment Warranty

The Contractor shall warrant all equipment against faulty or inadequate design, improper assembly or erection, defective materials, breakage or other failure. The warranty period shall be defined in Section 01 78 36 of these Specifications.

### 1.06 Workmanship and Materials

- A. All equipment shall be designed, fabricated and assembled in accordance with the most modern engineering and shop practice. Individual parts shall be manufactured to

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**General Equipment Stipulations**

standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall be new and shall not have been in service at any time prior to delivery, except as required by tests.

- B. Materials shall be suitable for service conditions. Iron castings shall be tough, close grained, gray iron free from blowholes, flaws or excessive shrinkage and shall conform to ASTM A 48, Class 30 minimum. Plugging of defective castings shall not be permitted. Castings shall be annealed to remove internal stresses prior to machining and shall have the mark number and heat number cast on them.
- C. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads.
- D. All replaceable or expendable elements such as filters, screens, drive belts, fuses and lamps shall be easily accessible and replaceable without need of dismantling equipment or piping. All such items shall be of a standard type that is readily available from multiple suppliers.
- E. Threaded openings for drains or vents in pump volutes, compressor or fan scrolls, air receivers, and heat exchangers which are plugged during normal operation shall be provided with stainless steel plugs.
- F. All equipment delivered to the Project site shall include detailed installation instructions and a parts list.

### 1.07 Equipment Specifications

The use of singular or plural terminology in the Specifications is not intended to define the number of units required to fulfill Contract requirements. Bidders must consult the Drawings and Specifications to determine how many units of a particular piece of equipment are required. This does not relieve the Contractor of the responsibility to provide all equipment specified when multiple units are specifically required in the Specifications.

### 1.08 Seal Water Requirements

Where seal water is provided for flushing of mechanical shaft sleeves or sealing of shaft seal packing, provide equipment with drip pans fitted with drains to contain the leakage and convey it to the nearest suitable floor drain. Route drain piping to minimize obstructions to the movement of personnel. Seal water and drain piping may not be shown on the Contract Drawings, however no additional payment will be made for the performance of this work.

### 1.09 Operating Fluids and Gases

All operating fluids and gases recommended by the manufacturer and required for operation of the equipment shall be provided in sufficient quantity by the Contractor to

fill all equipment and to replace all fluids and gases consumed during testing and start-up.

### 1.10 Lubrication and Lubrication Fittings

- A. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during start-up or shutdown and shall not waste lubricants.
- B. Lubricants of the type recommended by the equipment manufacturer shall be provided in sufficient quantity by the Contractor to fill all lubricant reservoirs and to replace all lubricants consumed during testing, start-up and initial operation. The Contractor shall provide sufficient quantities of manufacturer-approved lubricants to lubricate all equipment for one year of normal service before final acceptance of the equipment will be made by the Owner.
- C. Where special run-in oil or storage lubricants are used, they shall be flushed out and replaced with the required service lubricant by the Contractor.
- D. Tag each piece of equipment with a cloth tag showing proper type lubricant, period between lubrications, date of lubrication and worker's initials. Provide space for 10 lubrication notations.
- E. Except for rotating shaft couplings, all lubrication fittings shall be brought to the outside of all equipment so that they are readily accessible from the outside without the necessity of removing covers, plates, housings or guards. Fittings shall be accessible from safe, permanent platforms or walk areas. Fittings shall be of the bull-neck, check type for use with a portable high pressure grease gun. Connection from a remote fitting to the point of use shall be with minimum 3/16-inch stainless steel tubing, securely mounted parallel to equipment lines and protected where exposed to damage.

### 1.11 Safety Guards

All belt or chain drives, fan blades, couplings and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gauge or heavier galvanized or aluminum-clad sheet steel or 1/2-inch mesh galvanized expanded metal. Expanded metal safety guards shall be banded to eliminate sharp edges. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water. All safety guards shall comply with OSHA General Industry Standards, Part 1910, Subpart O, Machinery and Machine Guarding. Provide tachometer access on shaft ends.

### 1.12 Equipment Bases

- A. Where shown on the Drawings, equipment shall be installed on a raised, reinforced concrete base. The base shall be a minimum of 4-inches in height and shall extend

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**General Equipment Stipulations**

- beyond the equipment baseplate approximately 2-inches on all sides. See Drawings for specific baseplate dimensions.
- B. The Engineer shall be consulted concerning electrical conduit locations prior to pouring the concrete base.
  - C. Unless otherwise specified, a cast iron or welded steel baseplate shall be provided for each pump, compressor and any other item of equipment which is to be installed on a concrete base. Each unit and drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components and adequate grout holes. Baseplates for pumps shall have a raised lip all around and a threaded drain connection. Baseplates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with epoxy or non-shrink grout as specified in the grouting section.
  - E. On direct coupled equipment, motor and driven equipment shall be doweled to a common base with a minimum of two dowels each.

### 1.13 Alignment of Motors and Equipment

- A. In every case where a drive motor is connected to a driven piece of equipment by a flexible coupling, the coupling halves shall be disconnected and the alignment between the motor and the equipment checked and corrected. Machinery shall first be properly aligned and leveled by means of steel wedges and shims or jacking screws near anchor bolts. Anchor bolts shall be tightened against the shims on wedges or jacking screws and the equipment shall again be checked for level and alignment before placing grout. Wedges shall not be placed between machined surfaces.
- B. In general, checking and correcting the alignment shall follow the procedures set up in the Standards of the Hydraulic Institute, Instructions for Installation, Operation, and Maintenance of Centrifugal Pumps. Equipment shall be properly leveled and brought into angular and parallel alignment.
- C. Equipment shall be installed in such a way that no strain is transmitted to the equipment by piping systems or adjacent equipment.
- D. Alignment shall be performed in the manufacturer's shop between drivers and driven equipment. After installation, a laser alignment shall be performed in the field by an independent testing laboratory acceptable to the Engineer and retained by the Contractor. The laser alignment shall be performed in the presence of a qualified manufacturer's field representative. The laser alignment system shall be either a combined laser emitter and laser target detector or separate units for the emitter and detector.
- E. The driven equipment shall be operated under load for at least 90 minutes prior to performing the field alignment. Alignment tolerance values shall be as recommended by the driven equipment manufacturer or as specified in the equipment specification section. Alignment procedures shall comply with the equipment manufacturer's recommendations. Alignment shall be rechecked after equipment has operated under load for a minimum of 24 hours.

- F. Either shims or factory installed adjusting bolts shall be used to level the equipment and correct a soft foot condition.
- G. Shims shall meet the following Specifications:
1. Commercially die-cut.
  2. Made of corrosion and crush resistant stainless steel, which is dimensionally stable when subjected to high compression over long periods of time.
  3. Consistent over the whole shim area, without seams or folds from bending.
  4. Clean, free from burrs, bumps, nicks, and dents of any kind.
  5. Size numbers or trademarks etched into the shim, not printed or stamped.
  6. The smallest commercial shim that will fit around the hold-down bolt without binding shall be used.
  7. The overall shim pack shall not exceed a total of three shims.
  8. Shims shall rest on bare metal, not paint or other coatings.
  9. Both driver and driven machines shall contain a minimum 0.125 inch shim ( $\pm 0.0003$  inch) between all machine feet and mounting base, excluding alignment shims.
  10. All shims shall be selected from the proper size pre-cut series (A, B, C, D, etc.) to match the machine mounting bolt size and to maximize coverage of the machine footprint being supported. Multiple or oversized shims shall be used where the area of the machine footprint is 150 percent or greater than the proper size pre-cut series shim footprint.
- H. Both a shop and a field alignment report shall be submitted and shall contain the following information:
1. Alignment tolerances used.
  2. Soft foot.
  3. Vertical angularity (pitch) at the coupling point.
  4. Vertical offset at the coupling point.
  5. Correct soft foot at all feet of both driver and driven machines. Actual allowable uncorrected soft foot measured at any machine foot shall be less than a maximum of 0.002 inch of required shim. This includes soft foot caused by angled foot or base conditions.
  6. Horizontal angularity (yaw) at the coupling point.

7. Horizontal offset at the coupling point.

## 1.14 Grouting

A special epoxy, non-shrink, or sand-cement grout shall be used in the placement of all pump, motor and equipment baseplates or bedplates, column baseplates, other miscellaneous baseplates and other grouting applications as shown on the Drawings.

## 1.15 Welding and Brazing

- A. All welds shall be sound and free from embedded scale and slag. All butt welds shall be continuous, and where exposed to view, shall be ground smooth. All continuous welds shall be gas and liquid-tight. Welds in piping shall have full penetration and shall be smooth on the inside of the pipe. Intermittent welds shall have an effective length of at least 2-inches and shall be spaced not more than 6-inches apart.
- B. All welding of steel and aluminum, including materials, welding techniques, general safety practices, appearance and quality of welds, and methods of correcting defective work, shall conform to the latest requirements of AWS Specifications. Structural steel welding shall conform to the requirements of the AWS Structural Welding Code. The general recommendations and requirements of the AWS Structural Welding Code shall also apply to welded aluminum structures. The welding process and welding operators shall meet qualification tests and welding performance tests in accordance with the latest provisions of ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications. Welding process and qualification procedures for welding of pipe shall conform to the latest requirements of ANSI B31.1, Section 327, Welding, and Section 328, Brazing and Soldering. All welding qualification tests shall be witnessed by the Engineer, except as provided herein. All costs associated with the qualification or testing of welders and welding operators shall be borne by the Contractor.
- C. Welding of stainless steels shall be performed by the MIG or TIG process, in accordance with ASME and AWS recommendations. After welding is completed, the welds shall be ground smooth, where required, and all welds shall be pickled and passivated such that the weld will be no less corrosion resistant than the base metal welded.
- D. Reports certifying that the welding procedures, welders and welding operators that the Contractor intends to use meet the requirements specified above. These reports shall be submitted to the Engineer prior to beginning the work. In the case of welder qualifications for shop welding and for carbon steel field welding, welders presenting certified qualification papers validated within the preceding 6-month period will not be required to take the qualification tests. In the case of field welding of stainless steel or aluminum, all welders shall be required to take the qualification tests regardless of past experience or availability of certified qualification papers.
- E. Field welding practices shall conform to OSHA construction standards, Part 1926, Subpart J, Welding and Cutting. Shop welding practices shall conform to OSHA General Industry Standards, Part 1910, Subpart Q, Welding, Cutting, and Brazing.

- F. Welding electrodes for structural steel shall conform to the standard recommendations of the AISC. Welding electrodes for stainless steel shall conform to applicable AWS Specifications and shall be as recommended by "Welded Austenitic Chromium-Nickel Stainless Steels, Techniques and Properties", published by the International Nickel Company, New York, New York. Welding electrodes for aluminum shall conform to applicable AWS Specifications.
- G. Each welder and welding operator must identify all welds with welder's assigned symbol.
- H. Welders performing unsatisfactory work shall be removed from the welding process.
- I. The Owner may inspect any weld by radiographic or other means. Welds not in accordance with the requirements specified herein shall be repaired or replaced at the Contractor's expense. Excessive porosity, nonmetallic inclusions, lack of fusion, incomplete penetration and cracking shall constitute grounds for rejection of welds.

## 1.16 Erection and Setting

- A. In the erection and setting of all fabricated equipment, the Contractor shall exercise care to ensure that each item of equipment is adequately supported so as not to bend or distort under its own weight until adequate foundation support and anchorage are provided. Where lifting lugs, angles or clips are provided on equipment, they shall be used in erecting and setting the equipment. Erection and setting of equipment and structural steel shall conform to the requirements of OSHA Construction Standards, Part 1926, Subpart R, Steel Erection, Subpart H, Material Handling, Storage, Use, and Disposal, and Subpart N, Cranes, Derricks, Hoists, and Conveyors. Erection of structural steel shall conform to the latest requirements of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.
- B. During placement and prior to any grouting or connection of adjacent piping, the equipment shall be leveled and aligned true to level, plumb, alignment and grade with all parts bearing or fitting the structure or equipment accurately and securely. It shall not be permitted to cock out of alignment, nor shall the Contractor redrill, reshape or force fit any fabricated items. Connections of process piping to mechanical equipment nozzles/fittings shall be brought into alignment, one to the other. When joints are made up, there shall be no force exerted on the equipment connection.
- C. The Contractor shall take all measurements necessary to properly fit Contractor's work in the field, and Contractor shall be governed by and responsible for these measurements and the proper working out of all details. The Contractor shall be responsible for the correct fitting of all work in the field and the accurate placement of all anchor bolts installed by Contractor.
- D. The Contractor shall bring all parts to be erected or assembled into close contact. Before assembly, all surfaces to be in contact with each other shall be thoroughly cleaned. Drift pins may be used only for bringing members into position, never to enlarge or distort holes. Torching or burning of holes or cutting of fabricated items to correct misalignment or shop errors shall not be permitted. Enlargement of holes

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**General Equipment Stipulations**

necessary to make field connections shall be done only with the Engineer's approval by reaming with twist drills and in a manner acceptable to Engineer.

- E. All equipment shall be furnished with suitable eyebolt lifting lugs or lifting angles to facilitate handling.
- F. All flanged piping connections shall be "Two-Holed" such that the two upper-most flange bolt holes are horizontal.

### 1.17 Special Tools and Accessories

Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments and accessories required for proper maintenance. Special tools and accessories shall include those tools and accessories not normally available in an industrial hardware or mill supply house. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

### 1.18 Shop Priming and Painting

All equipment shop priming and painting, including surface preparation, workmanship and materials, shall be as specified in Section 09 90 00 of these Specifications.

### 1.19 Field Priming

All iron and carbon steel surfaces not specified to be galvanized or shop primed and all ferrous or nonferrous surfaces specified to be field primed and painted shall be coated in the field with one or more coats of primer in accordance with the requirements of Section 09 90 00 of these Specifications.

### 1.20 Field Painting

Except for interior surfaces of vessels and enclosed equipment not specified to be field painted, all ferrous and nonferrous surfaces of equipment which have received one or more coats of shop or field applied primer shall be field painted after installation in accordance with the requirements of Section 09 90 00 of these Specifications.

### 1.21 Galvanizing

- A. All galvanizing shall be done by the hot-dip process after fabrication in conformity with requirements of ASTM A 123, Grade 100; ASTM A 153, ASTM A 384 and ASTM A 385. Articles to be galvanized shall be pickled before galvanizing. Articles to be painted shall not be quenched.
- B. Where galvanized bolts are specified or required by the Drawings, zinc plated bolts will be acceptable provided zinc plating conforms to ASTM B 633, Type II.
- C. Areas of galvanizing damaged at the factory by welding or burning or otherwise damaged shall be thoroughly stripped and cleaned and recoated with zinc to the required thickness by the hot dip process. Areas of galvanizing damaged in the field



during transportation, handling or installation shall be stripped, cleaned, and recoated with zinc to the required thickness in accordance with ASTM A 780, Annex A3.

- D. Galvanized articles shall be free from uncoated spots, blisters, flux, black spots, dross, projections and other defects not consistent with acceptable galvanizing practice.
- E. Zinc and cadmium plating shall be subject to visual examination to determine uniformity of coating. The Engineer may require that the coating uniformity be tested in accordance with ASTM A 239 or ASTM E 376.

## 1.22 Vibration Testing

- A. Unless specified otherwise in the Specifications, each pump having a rated power of 50 HP, or greater, shall be tested in the field for acceptable vibration levels. Vibration testing shall be performed by an experienced, factory-trained and authorized vibration analysis expert (not a sales representative) retained by the Contractor for this work. Each unit shall be tested separately without duplicate equipment running. All field testing shall be done in the presence of the Engineer. The Engineer shall be furnished with four certified copies of vibration test data for each test performed. For vertical turbine pumps, acceptable motor vibration, measured with the motor mounted on the pump, uncoupled, shall not exceed 1/3 of the Hydraulic Institute standard for the pump. Motor site vibration tests shall be performed with all piping and appurtenances connected to the pump, but with the motor mechanically uncoupled from the pump.
- B. Where specified in the Specifications, equipment which is assembled and tested on the manufacturer's floor shall also be checked triaxially for vibration by the manufacturer. The results of these tests, along with location of vibration check points, shall be submitted to the Engineer. All readings shall be made on an X-Y recorder with appropriate scales indicated and an explanation thereon of any recordings exceeding specified limits. The field tests shall include substantiation of the manufacturer's test data. Include in the vibration testing data the support condition of the equipment and a photo of the equipment mounted for vibration testing.
- C. For systems with variable speed drives, tests shall be conducted at various speeds between maximum and minimum speed, and at two speeds equally-spaced between minimum and maximum.
- D. Rotating equipment shall be tested for vibration in the field after installation by the following method. Equipment, complete with drive systems, in place at the job site, shall not vibrate more than the values allowed herein, unless otherwise specified in the detailed equipment specifications. All field tests shall be running tests with the equipment operating on the product for which it is intended or a substitute acceptable to the Engineer. The term displacement, as used herein, shall mean total peak-to-peak movement of vibrating equipment, in mils; velocity shall mean the peak velocity or speed of the vibrating equipment, in inches per second; acceleration shall mean the maximum acceleration which occurs during the vibration cycle, measured in Gs. Displacement and velocity shall be measured by a meter equal to IRD Balancing Vibration Analyzer Model 258, or Bently-Nevada Model TK-8. Acceleration shall be measured by suitable equipment equal to IRD Mechanalysis, Bently-Nevada, subject to approval of the Engineer. Frequency of vibration, in cycles per minute (cpm), shall

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**General Equipment Stipulations**

be determined when vibration exceeds specified levels or as otherwise necessary. Vibration shall be measured on the bearing housing, unless other locations are deemed necessary by the vibration analysis expert and Engineer.

- E. For all equipment tested, vibration shall be checked in the radial and axial directions. For pumps, vibration shall not exceed that permitted by the Hydraulic Institute.
- F. Critical speeds of all rotating equipment shall meet the following:
  - 1. For stiff shaft designs, the first critical speed of the rotating equipment shall be at least 25 percent above the maximum design operating speed.
  - 2. For flexible shaft designs, critical speeds shall be at least 2 percent above or below normal design operating speeds.
- G. The Contractor shall be responsible for unit and system assembly vibration testing and their results, which shall be within the specified limits. Copies of test results shall be submitted to the Engineer for review. Should the vibration field test results exceed shop test results or the limits specified herein, the Contractor shall correct the deficiencies within 30 days. After corrections have been completed, the vibration testing shall be rerun and the results resubmitted to the Engineer for review.

### 1.23 Hydraulic Systems

- A. All pipes, tubes and hoses for hydraulic fluid shall be securely restrained against movement. All tubing and hoses shall be routed, shielded and supported such that rubbing or abrasion of the jacket shall not occur.
- B. All hydraulic fluid reservoirs for hydraulic power packs shall be equipped with a low level shut-off mechanism which shall stop operation of the power pack when the level of fluid in the reservoir reaches a predetermined low level. Reservoirs shall have a sight glass or tube allowing visual inspection of level and lubricant appearance.
- C. All hydraulic systems shall be equipped with an alarm to notify the operator of system malfunction.

### 1.24 Noise Criteria

- A. Unless otherwise specified, noise levels for all operating equipment shall not exceed 90 dB at 5 feet from the equipment when measured on the A scale of a calibrated sound level meter at slow response.
- B. Noise criteria shall be met without the use of special external barriers or enclosures.

### 1.25 Identification of Piping and Equipment

- A. General: All equipment and piping specified to be painted shall be color coded as specified in Section 09 90 00 of these Specifications.

- B. Equipment: All major items of equipment shall have an identification nameplate and dataplate.
1. Nameplates: The Contractor shall submit a suitable list of all items of major equipment to the Engineer, who will furnish the Contractor with an identification numbering system. The nameplates shall be of Type 304 stainless steel, No. 6 finish, and not less than No. 16 gauge with indented stamped lettering. Nameplates shall be attached to equipment bases in easily visible and accessible locations. Nameplates shall be fastened in a permanent manner, arranged not to damage the equipment, with not less than four stainless steel fasteners.
  2. Dataplates: Each item of mechanical equipment shall be provided with a stainless steel dataplate. Separate dataplates shall be provided for motors, engines and driven equipment. Dataplates shall include the following minimum information:
    - a. Name of equipment (from equipment specifications)
    - b. Manufacturer
    - c. Model designation
    - d. Serial number
    - e. Rated horsepower
    - f. Service factor
    - g. Electrical and insulation data
    - h. Speed (rpm)
    - i. Capacity and head (discharge pressure)
    - j. Net weight
    - k. Lettering shall be upper case, block style in size and spacing to suit the nameplate. The identification nameplates shall not be painted.
- C. Valves: All valves shall be identified with a round stainless steel disc, approximately 1-1/2-inches in diameter and not less than No. 14 gauge, coated with a clear lacquer. Discs shall be fastened to valves in a permanent manner; attachment by chain to handwheels or other operators shall not be acceptable. Discs shall be stamped using indented numerals and/or letters with a valve number corresponding to its identification number in the valve schedule to be included in the operation and maintenance manual.
- D. All pushbutton stations, switches, motor controllers, transmitters and other control equipment shall have identification nameplates of the engraved, laminated plastic type affixed to or adjacent to the switch, pushbutton station, etc.

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General Equipment Stipulations

- E. All manufacturer's nameplates, identification nameplates and ASME code plates located on areas of equipment to be insulated shall be removed and reattached on uninsulated areas in a manner acceptable to the Engineer.

## 1.26 Safety Signs

- A. Permanent safety signs shall be furnished and installed on all mechanical and electrical equipment where a hazard may exist. Signs shall be made in accordance with current OSHA requirements and shall be suitable for exterior use. Mounting details shall be in accordance with manufacturer's recommendations; location in accordance with governing agency regulations. Fasteners shall be stainless steel.
- B. Safety signs shall be approximately 10-inches high by 14-inches wide, colored yellow and black on minimum 0.080-inch aluminum stock.
- C. Safety signs shall be furnished and will include, but not be limited to, the following:
  - 1. The following sign shall be affixed to all equipment which may be started automatically from a remote location:

CAUTION  
THIS EQUIPMENT MAY START AUTOMATICALLY BY REMOTE CONTROL

- 2. The following sign shall be affixed to all electrical equipment or instrument panels, as applicable:

CAUTION - SHOCK HAZARD  
THIS EQUIPMENT IS POWERED BY MULTIPLE SOURCES  
CONTACTS MAY BE ENERGIZED AFTER LOCAL POWER IS DISCONNECTED

- 3. The following sign shall be provided at all areas where oxygen or flammable materials are stored or used (colored red, white and black):

DANGER  
NO SMOKING, MATCHES, OR OPEN FLAMES

- 4. The following sign shall be affixed to all entrance hatches or access manways on covered tanks and vessels:

CAUTION  
OXYGEN DEFICIENT OR TOXIC CONDITIONS MAY EXIST  
FOLLOW PRESCRIBED PROCEDURES BEFORE ENTRY

- 5. The following sign shall be provided at all compressor vents and equipment blowoffs:

CAUTION  
LOUD BLOWDOWN MAY OCCUR WITHOUT WARNING

6. All chemical or hazardous material storage tanks containing flammable, toxic, reactive and otherwise unstable materials, or materials representing a personnel safety hazard shall be labeled in accordance with NFPA 704. Signage shall be applied to the tank exterior at all four architectural elevations (N, S, E & W) as well as the filling station. The NFPA signs shall have the color coded diamonds and shall indicate the actual chemical name and emergency response info.

END OF SECTION



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## Part 1 General

### 1.01 Scope

- A. The Contractor shall provide transportation of all equipment, materials and products furnished under these Contract Documents to the work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the work.
- B. All equipment, materials and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the work.

### 1.02 Transportation

- A. All equipment shall be suitably boxed, crated or otherwise protected during transportation.
- B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.
- C. Small items and appurtenances such as gauges, valves, switches, instruments and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

### 1.03 Handling

- A. All equipment, materials and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.
- B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.
- C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.
- D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

Transportation and Handling

**1.04 Owner Furnished Material**

- A. Owner furnished material shall mean any Owner material purchased and required by these Specifications to be installed by the Contractor.
- B. The Owner shall be responsible for transportation to the site of all Owner furnished material.
- C. The Contractor shall off load and store all Owner furnished material per this Section of these Specifications.

END OF SECTION



## Part 1 General

### 1.01 Scope

The work under this Section includes, but is not necessarily limited to, the furnishing of all labor, tools and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the work.

### 1.02 Storage and Protection

#### A. Storage

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the Engineer.
2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the Owner.
3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.
4. All materials shall meet the requirements of these Specifications at the time that they are used in the work.
5. Store products in accordance with manufacturer's instructions.

#### B. Protection

1. Use all means necessary to protect the materials, equipment and products of every section before, during and after installation and to protect the installed work and materials of all other trades.
2. All materials shall be delivered, stored and handled to prevent the inclusion of foreign materials and damage by water, breakage, vandalism or other causes.
3. Substantially constructed weathertight storage sheds, with raised floors, shall be provided and maintained as may be required to adequately protect those materials and products stored on the site which may require protection from damage by the elements.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Engineer and at no additional cost to the Owner.

D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending

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Storage and Protection

between supports. Items such as pipe, structural steel and sheet construction products shall be stored with one end elevated to facilitate drainage.

- E. Unless otherwise permitted in writing by the Engineer, building products and materials such as cement, grout, plaster, gypsumboard, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block and structural tile may be stored outdoors under a properly secured waterproof covering.
- F. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

### 1.03 Extended Storage

In the event that certain items of major equipment such as air compressors or pumps have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the Engineer. The Contractor shall provide all special packaging, protective coverings, protective coatings, power, nitrogen purge, desiccants, lubricants and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

### 1.04 Owner Furnished Equipment

The Contractor shall provide storage and protection for all Owner furnished equipment and materials, including extended storage as specified above.

END OF SECTION

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Part 1 General

1.01 Scope

- A. Construction staking shall include all of the surveying work required to layout the work and control the location of the finished Project. The Contractor shall have the full responsibility for constructing the Project to the correct horizontal and vertical alignment, as shown on the Drawings, as specified, or as ordered by the Engineer. The Contractor shall assume all costs associated with rectifying work constructed in the wrong location.
- B. From the information shown on the Drawings and the information to be provided as indicated under Project Conditions below, the Contractor shall:
  - 1. Be responsible for setting reference points and/or offsets, establishment of baselines, and all other layout, staking, and all other surveying required for the construction of the Project.
  - 2. Safeguard all reference points, stakes, grade marks, horizontal and vertical control points, and shall bear the cost of re-establishing same if disturbed.
  - 3. Stake out the permanent and temporary easements or the limits of construction to ensure that the work is not deviating from the indicated limits.
  - 4. Be responsible for all damage done to reference points, baselines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, baselines, center lines and temporary bench marks as a result of the operations.
- C. Baselines shall be defined as the line to which the location of the work is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or survey line.
- D. Record Drawing surveys shall be performed in accordance with Section 01 78 39 of these Specifications.

1.02 Project Conditions

- A. The Drawings provide the location and/or coordinates of principal components of the Project. The alignment of some components of the Project may be indicated in the Specifications. The Engineer may order changes to the location of some of the components of the Project or provide clarification to questions regarding the correct alignment.
- B. The survey points, control points, and baseline to be provided to the Contractor shall be limited to only that information which can be found on the Project site by the Contractor.

Construction Staking

- C. Additionally, the Engineer will provide the following:
  - 1. One vertical control point on the Project site with its elevation.
  - 2. A minimum of two horizontal control points on the Project site with their coordinates shown on the Drawings.
  - 3. A survey point at the centerline of each manhole.

### 1.03 Quality Assurance

- A. The Contractor shall furnish documentation, prepared by a surveyor currently registered in the State in which the Project is located, confirming that staking is being done to the horizontal and vertical alignment shown in the Contract Documents. This requires that the Contractor hire, at the Contractor's own expense, a currently registered surveyor, acceptable to the Owner, to provide ongoing construction staking or confirmation of such.
- B. Any deviations from the Drawings shall be confirmed by the Engineer prior to construction of that portion of the Project.
- C. Construction Surveying Cash Allowance
  - 1. This cash allowance is solely for the use of the Engineer for verification of the Contractor's reference points, centerlines and work performed and is not to be used by the Contractor to provide cut sheets.
  - 2. The presence of this cash allowance in no way relieves the Contractor of the responsibility of installing reference points, centerlines, temporary bench marks, verifying that the work has been performed accurately, and all other work covered by this Section.

### 1.04 Site Work

- A. Staking Precision: The precision of construction staking shall match the precision of a component's location indicated on the Drawings. Staking of utilities shall be done in accordance with generally accepted practice for the type of utility.
- B. Written certification, by a licensed surveyor, that structure base grade and structure corner locations match the locations shown on the Drawings is required prior to beginning construction of the structure.
- C. Paved Surfaces: The Contractor shall establish a reference point for establishing and verifying the paving subgrade and finished grade elevations. Any variance with plan grades shall be identified by the Contractor and confirmed by the Engineer prior to constructing the base.

END OF SECTION

## Part 1 General

### 1.01 Scope

- A. The work under this Section includes, but is not necessarily limited to, cutting and patching work as indicated on the Drawings, herein specified and as necessary for proper and complete performance of the work.
- B. Requirements for cutting and patching may be described in various sections of these Specifications.
- C. Execute cutting, including excavating and filling, or patching of work required to:
  - 1. Make several parts fit properly.
  - 2. Uncover work to provide for installation of ill-timed work.
  - 3. Remove and replace defective work.
  - 4. Remove and replace work not conforming to requirements of the Contract Documents.
  - 5. Remove samples of the installed work as specified for testing.
  - 6. Install specified work in existing construction.
- D. In addition, upon written instruction of the Engineer:
  - 1. Uncover work to provide for the Engineer's observation of covered work.
  - 2. Remove samples of the installed materials for testing.
  - 3. Remove work to provide for alteration of existing work.
- E. Protection of Work
  - 1. Do not endanger any work by cutting or altering the work or any part of it.
  - 2. Do not cut or alter the work of another contractor without written consent of the Engineer.

### 1.02 Submittals

- A. Prior to cutting which affects the structural safety of the Project or the work of another contractor, submit a written notice to the Engineer requesting consent to proceed with cutting. The notice shall include:

### Cutting and Patching

1. Identification of Project
  2. Description of defective work
  3. Necessity for cutting
  4. Effect on other work or on the structural integrity of the Project.
  5. Description of the proposed work including:
    - a. Scope of cutting and patching
    - b. Subcontractor and trades to execute work
    - c. Products proposed to be used
    - d. Extent of refinishing
  6. Alternatives to cutting and patching.
  7. Designation of party responsible for the cost of cutting and patching.
- B. Cost Estimate: Prior to cutting and patching performed on instruction of the Engineer, submit a cost estimate.
- C. Should conditions of the work or the schedule necessitate alternative materials or methods, submit a written recommendation to the Engineer that includes:
1. Compelling conditions for alternative materials or methods
  2. Recommended alternative materials or methods
  3. Submittals as required for substitutions
- D. Uncovered Work: Submit written notice to the Engineer designating the time the work will be uncovered for the Engineer's observation.

### 1.03 Payment for Cost

- A. Contractor's Costs: Costs caused by ill-timed or defective work or work not conforming to the Contract Documents, including costs for additional services of the Engineer, shall be paid by the Contractor.
- B. Owner's Costs: Cost of work done as the result of the Engineer's/Owner's instructions, which is not shown on the Drawings or specified, other than defective or non-conforming work, will be paid for by the Owner.

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## Part 2 Products

### 2.01 Materials

All products and materials shall conform to the requirements of the Specifications for the type of work being performed, except where no products are specified in these Specifications for the item being replaced; then the products and materials shall be of an equivalent type, quality, thickness and width of the item removed.

## Part 3 Execution

### 3.01 Inspection

- A. Inspect existing conditions of the work including elements subject to movement or damage during cutting and patching, or excavating and backfilling.
- B. After uncovering work, inspect conditions affecting the installation of new products.

### 3.02 Preparation

- A. Provide shoring, bracing and support as required to maintain structural integrity of the Project.
- B. Provide protection for other portions of the Project and provide protection from the elements.

### 3.03 Performance

- A. Execute fitting and adjustments of products to provide finished installation that complies with specified tolerances and finishes.
- B. Execute cutting and demolition by means that will prevent damage to other work and will provide proper surfaces to receive installation of repairs and new work.
- C. Execute excavating and backfilling as specified in Section 31 20 00 of these Specifications.
- D. Restore work which has been cut or removed and install new products to provide completed work in accordance with the requirements of the Contract Documents.
- E. Refinish entire surfaces as necessary to provide an even finish. Continuous surfaces shall be refinished to the nearest intersection and assemblies shall be entirely refinished.

END OF SECTION





**Part 1 General**

**1.01 Scope**

This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

**1.02 Quality Assurance**

- A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.
- B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

**1.03 Cleaning Materials and Equipment**

- A. Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.
- B. Use only the cleaning materials, methods and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

**1.04 Progress Cleaning**

- A. General
  - 1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this work.
  - 2. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
  - 3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.
- B. Site
  - 1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
  - 2. Weekly, and more often if necessary, restack materials stored on site.
  - 3. At all times maintain the site in a neat and orderly condition which meets the

approval of the Engineer.

C. Structures

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by using a hand-held broom.
3. As required preparatory to installation of successive materials, clean the structures or pertinent portions as recommended by the manufacturer of the successive material.
4. Following the installation of finish floor materials, clean the finish floor daily. "Clean", for the purpose of this paragraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Engineer, may be injurious to the finish floor material.
5. Schedule cleaning operation so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

## 1.05 Final Cleaning

- A. Definitions: Unless otherwise specifically specified, "clean" for the purpose of this Article shall be interpreted as the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.
- B. General: Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 1.04 above.
- C. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.
- D. Structures
  1. Remove all traces of soil, waste material, splashed material, and other foreign matter to provide a uniform degree of exterior cleanliness. Visually inspect all exterior surfaces and remove all traces of soil, waste material, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.

2. Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges and other foreign matter. Remove all paint droppings, spots, stains and dirt from finished surfaces.
  3. Clean all glass inside and outside.
  4. Polish all surfaces requiring the routine application of buffed polish. Provide and apply polish as recommended by the manufacturer of the material being polished.
- E. Post-Construction Cleanup: All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, shall be removed as directed by the Engineer.
- F. Restoration of Landscape Damage: Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. Restoration shall be performed to the satisfaction of the Engineer.
- G. Timing: Schedule final cleaning as approved by the Engineer to enable the Owner to accept the Project.

## 1.06 Cleaning During Owner's Occupancy

Should the Owner occupy the work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Engineer in accordance with the Supplementary Conditions of the Contract Documents.

## 1.07 Disposal of Waste

- A. Except for items or materials to be salvaged, recycled, or otherwise reused, and except for options available below for vegetative waste generated by clearing and grubbing operations, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
- B. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
- C. Remove and transport waste in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Vegetative waste generated by clearing and grubbing operations may be disposed of by mulching. Timber within the areas cleared shall become the property of the Contractor. The Contractor may cut, trim, hew, saw or otherwise dress felled timber within the limits of the work area, provided all timber and all waste materials are disposed of as specified. All residual matter from mulching operations shall be

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Cleaning and Waste Management

removed from the Project site as waste in accordance with the provisions of this section of the Specifications.

- D. Waste removed from the Project site shall be disposed of in sites permitted by the Tennessee Department of Environment and Conservation (TDEC) for the acceptance of type of waste being disposed in accordance with Rules of TDEC Solid Waste Management, including Chapter 0400-11-01. Landfill types include
1. Class I Landfills - municipal solid waste, household waste, shredded/waste tires
  2. Class II Landfills - industrial waste
  3. Class III Landfills - farming wastes, landscaping and land clearing wastes
  4. Class IV Landfills - construction and demolition waste
- E. Exceptions to Paragraph D are as follows:
1. Certain other wastes (such as medical/infectious waste, dead animals, sludges, pesticides wastes, hazardous wastes, asbestos) require special waste approval prior to disposal. See the TDEC Environmental Permitting Handbook for more information.
  2. Hazardous waste shall be disposed of in accordance with Rules of TDEC Solid Waste Management, including but not limited to Chapter 0400-12-01 and the rules and regulations of the United States Environment Protection Agency (EPA).
  2. Asbestos-containing waste shall also be handled and disposed in accordance with TCA 68-201-101 et seq, Rules of the Tennessee Department of Health, and TDEC Bureau of Environmental health Services, Division of Air Pollution, including Chapter 1200-3-11-.02 and 40 CFR 61.
  3. Excess earth material and excess excavated rock material may be placed on sites for which the Contractor provides to the Owner a signed affidavit from the property owner that the placement of such material is acceptable to the property owner. The Contractor and property owner shall be responsible for all permitting of such disposal.
- F. No waste shall be placed at a transfer station facility.
- G. The Contractor shall maintain records related to all waste removed from the Project site so as to allow the Owner or the Engineer to readily determine the following:
1. Date waste removed from Project site.
  2. Name of hauler (company and driver) transporting such waste.
  3. General description of waste transported.
  4. "Truck tickets" indicating the waste disposal site and amount of waste disposed

therein.

END OF SECTION



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Part 1 General

1.01 Scope

- A. The work under this Section includes, but is not necessarily limited to, the provision of all labor and material required to perform installation inspection and start-up of all equipment and mechanical systems installed under this Contract.
- B. The work defined under this Section includes providing the services of a trained factory representative in accordance with the requirements of Section 01 43 33 of these Specifications.
- C. Certification of start-up and full testing shall be performed by the manufacturer using the services of a factory representative trained in this type of service.
- D. Unless otherwise specified, the Contractor shall furnish all labor, materials, water, air, oil, power, fuel, chemicals, test equipment and other items required to conduct the field tests, including any retests.
- E. The cost of all field testing shall be included in the Contract Price and no separate payment will be made.

1.02 Coordination

The Contractor shall not proceed with any functional test or operating test until the operation and maintenance manuals for the equipment have been submitted and been designated "No Exceptions Taken". The Contractor shall coordinate all activities required for starting of systems including the visits by the factory representatives, particularly where an equipment item's operation is dependent on the operation of other equipment. Prior to calling the factory representative, the Contractor shall ensure that all necessary related equipment, structures, piping and electrical work is complete. Any required revisits to the site by the factory representative shall be provided by the Contractor.

1.03 Pre Start-Up Maintenance

After installation and prior to start-up, all grease-lubricated joints, shaft couplings and bearings shall be flushed out and re-greased. All oil reservoirs and sumps shall be completely drained and flushed and refilled with the proper lubricant. All operating fluid and gas reservoirs shall be filled with the proper fluid and gases. Screens and filters shall be checked for contamination and replaced if necessary. Belt drives shall be checked and tension adjusted, as needed. The equipment shall then be tagged, signed and dated, indicating that the equipment has been properly lubricated and prepared for start-up.

1.04 Installation Inspection

- A. Prior to energizing any piece of equipment or performing a functional test, a factory representative of the equipment manufacturer shall inspect the installation of the

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**Starting of Systems**

equipment. The factory representative shall determine if the equipment has been installed in accordance with the manufacturer's recommendations, pre-start-up maintenance has been performed, and is ready for start-up and the initiation of the functional test.

- B. Should the installation inspection indicate that the equipment has been improperly installed or prepared for start-up, the Contractor shall provide such modifications or adjustments as required for the equipment to operate properly.
- C. The factory representative shall certify that the equipment has been installed in accordance with the Drawings, Specifications, and the manufacturer's recommendations and that the equipment is ready for start-up and functional testing to be performed.

### 1.05 Functional Test

- A. Following the installation inspection by factory representative, perform a functional test on each piece of equipment. The functional test shall consist of operation of the equipment on a normal duty cycle for a sufficient period of time to determine satisfactory operation. Time required for functional testing shall be as specified in the equipment specifications or a minimum one continuous eight-hour period, whichever is longer. To the maximum extent practical, exercise the full capabilities of all equipment including remote operation, instrumented control schemes, alternate modes of operation and emergency operation. Equipment shall be checked for any abnormal noise or vibration as part of the functional test, and any observed abnormal conditions corrected prior to certification.
- B. Should the results of the functional test indicate that the equipment has failed to perform in accordance with the Specifications, the Contractor shall make, at no additional cost to the Owner, all modifications or adjustments as required for satisfactory operation, including replacement of any or all components, if necessary. Following the modifications or adjustments, the Contractor shall repeat the functional test. This procedure shall be repeated until the results of the test indicate that the equipment has satisfied the requirements of the applicable Specification Section.
- C. After the functional test is completed, each manufacturer shall certify, in writing, that tests were made in accordance with the Specifications and the manufacturer's recommendations, that the functional tests and start-up operation have been satisfactory, and that the equipment is fully operational and capable of meeting operating requirements.

### 1.06 Certification

Upon completion of start up, the Contractor shall provide written Installation and Start-Up Report from all equipment manufacturers' factory representatives. Report shall address the equipment installation's compliance with manufacturer's requirements and note any problems noted that may affect the warranty, operation or longevity of the equipment. Written certification shall indicate that tests were made in accordance with the manufacturer's recommendations, that the test and start-up operation has been satisfactory completed and that the equipment is fully operational under design



requirements. Written certification shall be filed with the Engineer on the manufacturer's stationary.

END OF SECTION

## Manufacturer's Installation and Start-up Report

<b><u>GENERAL INFORMATION:</u></b>		
Owner: _____	Contractor: _____	
Facility: _____	System: _____	
Location: _____	Specification Number: _____	
Tag: _____		
<b><u>MANUFACTURER:</u></b>		
Manufacturer Name: _____		
Address: _____		
City/State/Zip: _____		
Phone Number: _____	Fax Number: _____	
E-Mail: _____		
Manufacturer's Representative: _____		

- |  |                            |                            |                              |
|--|----------------------------|----------------------------|------------------------------|
| 1. Required safety equipment available?  | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 2. Are equipment tags correct and attached to equipment?                       | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 3. Are rotating equipment safety guards in place and secure?                   | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 4. Shaft and couplings aligned?  | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 5. Have belt drives been aligned?  | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 6. Bearings lubricated?  | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 7. Oil reservoirs filled with proper lubricant?                                | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 8. Rotation verified?  | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 9. Is equipment level?   | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 10. Equipment anchored properly?   | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 11. Equipment grouted properly?  | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 12. Required utilities available?  | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 13. Nozzles free from loads?   | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 14. Are required pressure and temperature gauges and sensors installed?        | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 15. Have any shipping coatings/sealants been removed?                          | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 16. Does any paint/coating damage need to be repaired?                         | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 17. Have moving parts been checked for proper running clearance?               | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 18. Is there any observed leakage of lubricants or fluids from equipment?      | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 19. Are all electrical power connections made and properly torqued?            | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 20. Are electrical overloads properly set?                                     | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 21. Are current transformers properly wired for polarity?                      | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |
| 22. Are control enclosures per the specified NEMA classification and material? | Y <input type="checkbox"/> | N <input type="checkbox"/> | N/A <input type="checkbox"/> |

Starting of Systems

- 23. Are instrumentation connections terminated? Y  N  N/A
- 24. Are signal cable shield leads grounded in accordance with Manufacturer's recommendations? Y  N  N/A
- 25. Are required spare parts on-site, inventoried and properly stored? Y  N  N/A
- 26. Are Operations and Maintenance Manuals on-site and complete? Y  N  N/A
- 27. Are all installation requirements of the O&M Manuals performed? Y  N  N/A
- 28. Does equipment have a record of maintenance and exercise as recommended by the manufacturer during storage? Y  N  N/A
- 29. Are there any observed installation issues that impact the equipment warranty? Y  N  N/A

Additional items noted during installation inspection by Manufacturer's Start-up Representative:

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I certify as an authorized Factory Representative, that the equipment is installed in accordance with the Manufacturer's recommendations, and is ready for start-up and initial operation.

Factory Representative: \_\_\_\_\_  
 Representing: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 E-mail Address: \_\_\_\_\_

Date: \_\_\_\_\_  
 (If employed by other than the Manufacturer)

Starting of Systems

**START-UP REPORT:**

- 1. Does equipment operate and perform in accordance with the specification? Y  N  N/A
- 2. Have all specified modes of operation been tested and verified? Y  N  N/A
- 3. Do all system indicators, readouts, controls and operator interfaces operate? Y  N  N/A
- 4. Have variable speed units been tested throughout the available speed range? Y  N  N/A
- 5. Have multi-speed motors been tested on all available speeds? Y  N  N/A
- 6. Did equipment exhibit any abnormal vibration during operation? Y  N  N/A
- 7. Did equipment exhibit any abnormal noise during operation? Y  N  N/A
- 8. Are bearings operating at normal temperature? Y  N  N/A
- 9. Do bearings display any roughness in operation? Y  N  N/A
- 10. Prior to start-up, or during initial operation, was any leakage of lubricant observed? Y  N  N/A
- 11. Was any leakage of process fluids observed during start-up? Y  N  N/A
- 12. Has operation of equipment protective systems been verified? Y  N  N/A
- 13. Is the equipment ready to place into operation? Y  N  N/A

Additional items noted during start-up by Manufacturer's Start-up Representative:

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I certify as an authorized Factory Representative, that the equipment has been properly started up in accordance with the Manufacturer's recommendations, and is ready for initial operation.

Factory Representative: \_\_\_\_\_

Date: \_\_\_\_\_

END OF SECTION

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## Part 1 General

### 1.01 Scope

- A. The Contractor shall provide five copies of a complete and comprehensive reference manual (Operating and Maintenance Manual) containing operating and maintenance data to enable operators and plant engineers to correctly operate, service and maintain all equipment and accessories covered by the Specifications and Drawings. The data contained in the manual shall explain and illustrate clearly and simply all principles and theory of operation, operating instructions, maintenance procedures, calibration procedures and safety precautions and procedures for the equipment involved.
- B. No separate payment will be made for the Operating and Maintenance Manual and the cost of said manual shall be included in the Contract Price.

### 1.02 Submittal Schedule

- A. The Contractor shall submit, for the Engineer's approval, three preliminary drafts of proposed formats and outlines of contents of manuals within 60 calendar days after the Notice to Proceed. The Engineer will notify the Contractor, in writing, of any deficiencies in the manual and will return one copy of the manual for completion and/or correction.
- B. Submit three preliminary copies of manuals before the work covered by the Contract Documents is 40 percent complete. The Contractor must also submit three copies of the manual in digital format as specified below. The Engineer will notify the Contractor, in writing, of any deficiencies in the manual and will return one copy of the manual for completion and/or correction.
- C. Resubmissions: Clearly identify each correction or change made. The resubmission shall be accompanied by a letter listing all comments made by the Engineer and the actions or response by the manufacturer or vendor to each comment. Where the Engineer's comment applies to multiple areas of the initial submittal the response shall address all areas. The response letter shall also address where supplemental information has been provided and where it is located within the resubmission.
- D. Before the work covered by the Contract Documents is 70 percent complete, the Contractor must submit six final copies of the revised and completed manual, complete in detail as specified below. The Contractor must also submit five copies of the manual in digital format as specified below.
- E. Digital Copies of Manuals: Operations and Maintenance Manuals shall be provided by the Contractor in digital format concurrently with both the preliminary and final hard copy submissions. Materials available in digital format shall be furnished in accordance with the following:
  - 1. All textual data shall be provided as an electronic file in searchable Adobe Acrobat Portable Document Format (PDF). The PDF file(s) shall be fully indexed using the Table of Contents, searchable with thumbnails generated. File(s) shall be identified by utilization of a "twelve dot three" convention

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**Operating and Maintenance Data**

(XXXXXX.XX.YY.pdf) where X is the eight digit number corresponding to the specification section, and YY is an identification number. All documents shall be scanned at 300dpi or greater utilizing optical character recognition (OCR) software. All text in the document must be text selectable with the exception of pages which are in their entirety drawings or diagrams. Word searches of the PDF document must function successfully. PDF files that fail to comply with the indexing and searchable features described above will not be acceptable. All drawing data shall be provided in digital format compatible with AutoCAD Version as designated by the Engineer.

2. Materials not available in original digital format (available only in paper format) shall be scanned as noted above into a PDF format and cleaned to remove smudges, fingerprints, artifacts, and other extraneous marks. All notes, version stamps, etc. shall be preserved. Color maps shall be scanned in not less than the number of colors of the document or 16 colors, whichever is greater. Color photographs shall be saved in not less than 256 colors. Black and white or monochrome scans (non-text) shall not be less than 16 gray scale levels. Color maps, color photographs, and black and white and gray scale photograph files shall be saved as GIF or JPG files, compatible with Adobe Photoshop Version 4.0. Documents shall be scanned in the existing color format of the document, i.e. color documents shall be scanned in color, and black and white or monochrome in gray scale.
3. After the documents are in correct digital format, they shall be furnished to the Engineer as a 120 mm, 680mb, 74-minute CD ROM. All media transmittals shall be accompanied by a detailed paper printout of the files on the media. This printout shall consist of a file name, file size, date of creation, submittal number, and a brief but accurate description of the file. Files shall not be transmitted electronically. Five copies of the CD for each Operation and Maintenance Manual shall be provided to the Engineer.
4. Electronic copy of O&M manuals shall be attached to the corresponding entry in Primavera Contract Manager.

### 1.03 Submittal Format

- A. Each hard copy of the manual shall be assembled in one or more loose leaf binders, each with title page, typed table of contents, typed list of tables, typed list of figures, and heavy section dividers with reinforced holes and numbered plastic index tabs. Binders shall be uniform for all manuals and shall be 3-ring, hardback type, with transparent vinyl pocket front cover suitable for inserting identifying cover and with a transparent vinyl pocket on the spine for label. All data shall be punched for binding. Composition and printing shall be arranged so that punching does not obliterate any data. The cover and binding edge of each manual shall have the project title, specification section number and title, and manual title printed thereon, all as approved by the Engineer.
- B. All copies of shop drawings, figures and diagrams shall be reduced to either 8-1/2 x 11-inches or to 11-inches in the vertical dimension and as near as practical to 17-inches in the horizontal dimensions. Such sheets shall be folded to 8-1/2 x

11-inches. The manual and other data shall be printed on first quality paper, 8-1/2 x 11-inch size with standard 3-hole punching. Binders shall be labeled Vol. 1 of "X", Vol. 2 of "X", etc., where "X" is the total number of volumes in the set where more than one is required. The table of contents for the entire set, identified by volume number, shall appear in each binder. Text, figures and drawings shall be clearly legible and suitable for dry process reproductions.

- C. Each submittal shall have a cover sheet that includes the following information:
1. The date of submittal and the dates of any previous submittals.
  2. The Project title.
  3. Submittal numbering shall be in accordance with Section 01 31 29 of these Specifications.
  4. The names of:
    - a. Contractor
    - b. Supplier
    - c. Manufacturer
  5. Identification of the product, with the Specification section number, permanent equipment tag numbers and applicable Drawing No.
- D. The Engineer will not recommend final acceptance of the Work until the Operating and Maintenance Manual is complete and satisfactory to Engineer.

#### 1.04 Contents of Operating and Maintenance Manual

- A. Each manual shall include a title page which includes all information specified in Article 1.03, paragraph C of this Section. In addition, the title page shall include manufacturer's address, phone number, facsimile number, and contact; manufacturer's equipment name and model number; supplier's address, phone number, facsimile number, and contact.
- B. Each manual shall include a table of contents identifying the location of each item listed below, for each component supplied. For items not applicable to a component, the table of contents shall list N/A for the page number.
- C. For all equipment, the Contractor shall furnish a complete, detailed listing of all equipment, components and accessories showing component name, manufacturer, model number and quantity information shall be furnished for each component as outlined below:
1. A summary page shall be provided for each piece of equipment detailing the following information:

Operating and Maintenance Data

- a. Equipment Number
  - b. Equipment Description
  - c. Serial Number
  - d. Model Number
  - e. Manufacturer
    - i. Address
    - ii. Phone
    - iii. Representative
  - f. Supplier
    - i. Address
    - ii. Phone
    - iii. Representative
  - g. Local Service Provider
    - i. Address
    - ii. Phone
    - iii. Representative
  - h. Location of Equipment
  - i. Equipment Design Criteria
    - i. HP
    - ii. Flow Rate, etc.
  - j. Performance Data
  - k. Normal Operating Characteristics
  - l. Limiting Conditions
2. Detailed disassembly, overhaul and reassembly, installation, alignment, adjustment and checking instructions.
  3. Detailed operating instructions for start-up, calibration, routine and normal operation, regulation and control, safety, shutdown and emergency conditions.



Detailed list of settings for relays, pressure switches, temperature switches, level switches, thermostats, alarms, relief valves, rupture discs, etc.

4. Detailed preventative maintenance procedures and schedules, including detailed lubrication instructions and schedules, identification of required lubricants and operating fluids (description, specification and trade name of at least two manufacturers), and diagrams illustrating lubrication points.
5. Detailed guide to equipment and/or process “troubleshooting”.
6. Detailed parts lists identified by title, materials of construction, manufacturer's part number, list of recommended spare parts identified as specified above, current cost list for recommended spare parts, predicted life of parts subject to wear, and an exploded or concise cut-away view of each equipment assembly. The manufacturer's part numbers must match those used for the spare parts, documentation, identification, and turn-over. Should no spare parts be required, state in the Table of Contents that “No spare parts are required”.
7. Electrical and instrumentation schematics, including motor control centers, control panels, wiring diagrams, instrument panels and analyzer panels. All panels must have as-built schematics inside them at contract close-out.
8. List of all special tools supplied and description of their use. Special tools include any tool not normally available in an industrial hardware or mill supply house. Should no special tools be required, state in the Table of Contents that “No special tools are required”.
9. List of names and addresses of nearest service centers for parts, overhaul and service.
10. Procedures for storing, handling and disposing of any chemicals or products used with the equipment or system.
11. For equipment and systems, also provide the following:
  - a. Control and wiring diagrams provided by the controls manufacturer.
  - b. Sequence of operations by the controls manufacturer.
  - c. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
12. The supplier's operation and maintenance information will address the particular equipment furnished, with specific details on operation and maintenance practices. General data is not acceptable. Information contained in the manual which is not appropriate to the Project shall be marked out and noted as “N/A”.

Part 2      Products (Not Used)

Part 3      Execution (Not Used)

**SAMPLE COVER PAGE**

**COMPLETE PROJECT TITLE**

**LOCATION OF PROJECT**

**OPERATING and MAINTENANCE DATA**

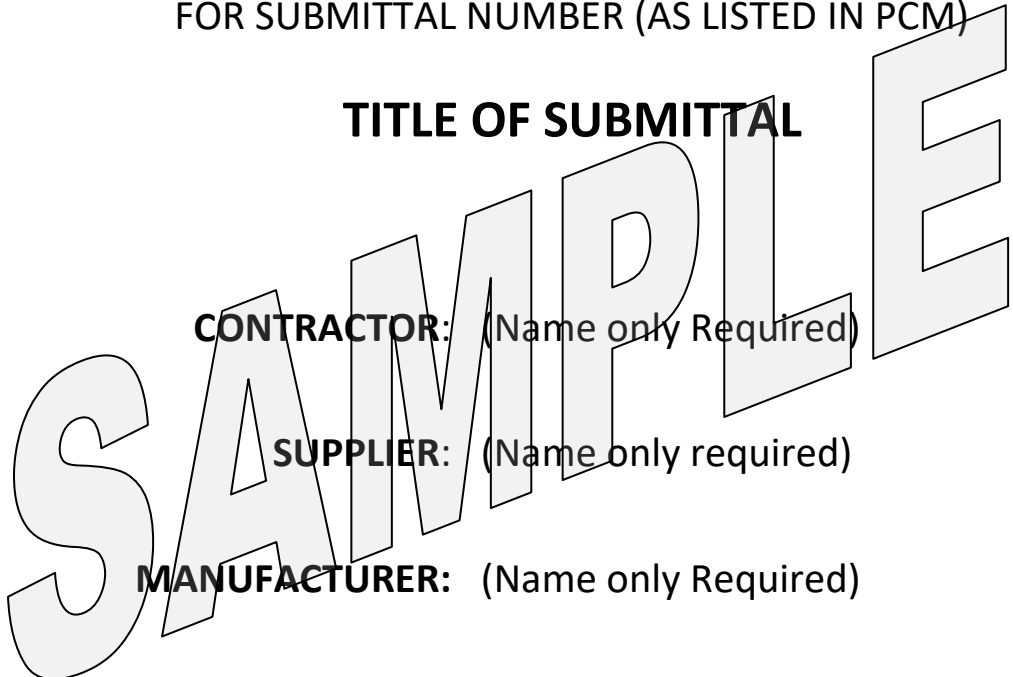
**FOR SUBMITTAL NUMBER (AS LISTED IN PCM)**

**TITLE OF SUBMITTAL**

**CONTRACTOR:** (Name only Required)

**SUPPLIER:** (Name only required)

**MANUFACTURER:** (Name only Required)



**SPECIFICATION SECTION:**

**EQUIPMENT TAG NUMBER:**

**DRAWING NUMBER:**

**DATE OF SUBMISSION**

**SAMPLE TITLE PAGE**

**COMPLETE PROJECT TITLE**

LOCATION OF PROJECT

**OPERATING and MAINTENANCE DATA**

FOR SUBMITTAL NUMBER (AS LISTED IN PCM)

**TITLE OF SUBMITTAL**

**CONTRACTOR:** (Complete Information Required)

**SUPPLIER:** (Complete Information Required)

**MANUFACTURER:** (Complete Information Required)

**SPECIFICATION SECTION:**

**EQUIPMENT TAG NUMBER:**

**DRAWING NUMBER:**

**DATE OF SUBMISSION**

**SAMPLE MANUAL REVIEW CHECK LIST****FINAL COPIES / PRELIMINARY COPIES  
OPERATION AND MAINTENANCE MANUAL CHECK LIST****PROJECT NUMBER:****PROJECT NAME:****SECTION:****SECTION Requirements**

- 1.03 - A \_\_\_ 3 ring loose leaf binder with transparent covers on binder and cover
- 1.03 - A \_\_\_ Title Page, Table of Contents, Section dividers and List of tables & figures
- 1.03 - B \_\_\_ Drawings and figures shall be legible and 11" in the vertical dimension
- 1.03 - C \_\_\_ Cover Page including: Date of Submittal & any previous submissions, Project & Manual Title, Names of Contractor, Supplier, Manufacturer, Spec. Section, Equip. Tag Number & Drawing No
- 1.04 - A \_\_\_ Title Page: All cover page information & manufacturers and suppliers address, phone & fax number and contact person; manufacturer's equipment name and model number
- 1.04 - B \_\_\_ Table of Contents identifying the location of each item listed
- 1.04 - C.1 \_\_\_ Provide equipment function, operating char., performance data, limiting cond. and pump curves
- 1.04 - C.2 \_\_\_ Detailed: disassembly, overhaul, reassemble, installation, alignment, adjusting & checking Instructions
- 1.04 - C.3 \_\_\_ Operating instructions for start up, calibration, normal operation, shutdown, etc.
- 1.04 - C.3 \_\_\_ List of settings for relays, pressure switch, temperature switch, level switch and alarms
- 1.04 - C.4 \_\_\_ Preventive maintenance procedures and diagrams illustrating lubrication points
- 1.04 - C.5 \_\_\_ Troubleshooting Guide
- 1.04 - C.6 \_\_\_ Detailed parts list, manufacturer's part number and exploded view
- 1.04 - C.6 \_\_\_ List of recommended spare parts and predicted life of parts subject to wear
- 1.04 - C.7 \_\_\_ Electrical and instrumentation schematics
- 1.04 - C.8 \_\_\_ Special tools list
- 1.04 - C.9 \_\_\_ Closest service centers, Contact person name and addresses
- 1.04 - C.10 \_\_\_ Procedure for storing, handling and disposing of any chemicals used
- 1.04 - C.11 \_\_\_ Equip & Systems provide Control & Wiring Diag., Sequence of Operations, Charts of tag numbers, location & function of each valve
- 1.04 - C.12 \_\_\_ Suppliers O&M information will address the particular equipment furnished, with specific details on operation and maintenance practices

**Remarks:**

END OF SECTION

## Part 1 General

### 1.01 Project Maintenance and Warranty

- A. Maintain and keep in good repair the work covered by these Drawings and Specifications until acceptance by the Owner.
- B. The Contractor shall warrant for a period of one year from the date of Owner's written final acceptance of the Project, as defined in the Contract Documents, that the completed work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.
- C. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.
- D. In the event of multiple failures of major consequences prior to the expiration of the one year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new 12 month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over- or under-lubrication and using maintenance procedures not conforming with published maintenance instructions, shall be exempted from the scope of the one year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be disassembled, inspected, modified or replaced as necessary and rewarranted for one year.
- E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any

Warranties and Bonds

part of the work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.

- F. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.
- G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.
- H. In the event the Contractor fails to proceed to remedy the defects upon notification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.
- I. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.
- J. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION



**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Sanitary Sewer Electronic Data Submittals  
Manhole Field Explanation**

Item Name	Units	Description	Drop-down Menu Options
LegacyID		ID from previous Source	
RimElevation	Feet	Elevation at Rim of Manhole	
BarrelDiameter	Feet	Barrel (riser) diameter (ft) - default is 4 / change to "riser diameter" on data entry	
AccessDiameter	Inches	Lid Diameter	18,24 Default, 30
ConeHeight	Feet	Height of Cone above Ground	
VentHeight	Feet	Vent Height Above Manhole cover	
Depth	Feet	Depth of Manhole	
HighPipeDepth1	Feet	Depth of Manhole	
HighPipeDepth2	Feet	Depth of Manhole	
HighPipeDepth3	Feet	Depth of Manhole	
VentDiameter	Inches	Diameter of Vent Pipe	3, 4, 6, other
VentElevation	Feet	Elevation of top of vent	
Elevation	Feet	Invert elevation of manhole (if more than one # is shown , invert is always lowest # (rim elevation - depth)	
HighPipeElevation1	Feet	Elevation of High Pipe	
HighPipeElevation2	Feet	Elevation of High Pipe	
HighPipeElevation3	Feet	Elevation of High Pipe	
InstallContractor	mm/dd/yyyy	Construction Contractor	
WarrantyDate	mm/dd/yyyy	Warranty expiration date	
Manufacturer	mm/dd/yyyy	Manhole Manufacturer	
InstallDate	mm/dd/yyyy	Approx. date of substantial completion or date S/D was released	
Subtype		Type of Manhole - Can have multiple types	Vented, Odor Control, Flow Measurement, Air Release Valve, Junction Structure, Lamp Hole, Regulating Chamber, T-Base, Drop Manhole, Siphon Chamber,Other,Unknown
BarrelMaterial		Manhole barrel (riser) material	Brick, Concrete, Concrete with Brick, Lined, Plastic, Other, Unknown
VentMaterial		Vent Material	Steel, Ductile Iron, PVC, Other
NoPipeinflow	#	Number of pipes that flow into the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
NoPipeoutflow	#	Number of pipes that flow out of the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
AboveGrade		Is structure above grade?	True, False
Step		Are steps present	Yes, No, Unknown
PavingRing		Is a paving ring present?	Yes, No
AccessMaterial		Lid material	Metal, Concrete, Missing, Other, Unknown
LidType		Type of lid on Manhole	Solid Lid, Grated Lid, Bolted lid, Watertight Lid, Unknown
FrameMaterial		Frame material for lid	Concrete, Metal, Other, Unknown
BarrellMaterial		Manhole cone material	Brick, Concrete, Concrete with Brick, Lined, Plastic, Other
ConeType		Manhole cone type	Eccentric, Concentric, Flat Top, Chimney, Unknown
AccessType		Type of access	Lid, Hatch, Other
WaterType		Type of water structure is carrying	Combined Waste Water, Sanitary Sewer, Storm Runoff, Reclaimed, Unknown
GroundType		Predominant surface cover type	Asphalt, Concrete, Gravel, Soil, Grass, Brick Pavers, Building, Other, Unknown
Northing	#	Auto Calculation from Latitude	
Easting	#	Auto Calculation from Longitude	
DataSource			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other

**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Sanitary Sewer Electronic Data Submittals  
Manhole Data Sheet**

<b>Item Name</b>	<b>Manhole 1</b>	<b>Manhole 2</b>	<b>Manhole 3</b>	<b>Manhole 4</b>	<b>Manhole 5</b>	<b>Manhole 6</b>	<b>Manhole 7</b>
LegacyID							
RimElevation							
BarrelDiameter							
AccessDiameter							
ConeHeight							
VentHeight							
Depth							
HighPipeDepth1							
HighPipeDepth2							
HighPipeDepth3							
VentDiameter							
VentElevation							
Elevation							
HighPipeElevation1							
HighPipeElevation2							
HighPipeElevation3							
InstallContractor							
WarrantyDate							
Manufacturer							
InstallDate							
Subtype							
BarrelMaterial							
VentMaterial							
NoPipeinflow							
NoPipeoutflow							
AboveGrade							
Step							
PavingRing							
AccessMaterial							
LidType							
FrameMaterial							
BarrellMaterial							
ConeType							
AccessType							
WaterType							
GroundType							
Northing							
Easting							
DataSource							

**SECTION 01720**  
**PROJECT RECORD DOCUMENTS**  
**Sanitary Sewer Electronic Data Submittals**  
**Conveyance Explanation**

Item Name	Units	Description	Drop-down Menu Options
WaterType		Type of water structure is carrying	Sanitary Sewer, Combined, Storm Runoff, Reclaimed, Unknown
WarrantyDate	mm/dd/yyyy	Warranty expiration date	
US_ID	#	ID of link or node immediately upstream of this link	
UpstreamInvert	Inches	Invert elevation at upstream end of pipe	
DownstreamInvert	Inches	Invert elevation at downstream end of pipe	
Subtype		Main type	Bypass, Collector, Combined Sewer, Force Main, Interconnect, Interceptor, Outfall, Outfall for Combined Sewer, Relief Main, Siphon
Slope	Feet	Actual slope (FT/FT) calculated as $(us\_elevation - ds\_elevation) / actual\_length$	
PipeWidth	Inches	Width of pipe if not round or width at maximum point if elliptical or egg shaped	
PipeLength	Feet	Measured length of the main (horizontal measure, in feet), system will automatically calculate the actual length of the line feature	
PipeHeight	Inches	Height of pipe if not round or Height at maximum point of pipe if elliptical or egg shaped	
PipeDiameter	Inches	Diameter of round pipe	6,8,10,12,15,16,18,21,24,30,36,42,48,60,66,72,84,96, other
PipeCount		# of pipes coming into Manhole	
OtherDiameter	Inches	Diameter of pipe if other defined on PipeDiameter, Manual Entry	
Material		Construction material	Clay, Concrete, PVC, DIP, Brick, HDPE, Lined, Unknown, Cast Iron, Asbestos Concrete
Location		Users' description of feature's location - appears on plan - if not a subdivision, put down nearest major road	
LegacyID		Microfilm Number	
JointType1		Type of joint used to join mains together	Ball, Bell and Spigot, Flanged, Mechanical, Push on, Sleeved, Threaded
InstallDate	mm/dd/yyyy	Approx. date of substantial completion or date S/D was released	
InstallContractor	mm/dd/yyyy	Construction Contractor	
GroundType		Predominant surface cover type	Asphalt, Concrete, Gravel, Soil, Grass, Brick Pavers, Building, Other, Unknown
DS_ID	#	ID of link or node immediately downstream of this link	
DataSource			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other
CrossSectionShape		Shape of the Main	Circular, Egg Shaped, Rectangular Channel, Elliptical, Other

**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Sanitary Sewer Electronic Data Submittals  
Conveyance Data Sheet**

<b>Item Name</b>	<b>Pipe1</b>	<b>Pipe2</b>	<b>Pipe3</b>	<b>Pipe4</b>	<b>Pipe5</b>	<b>Pipe6</b>	<b>Pipe7</b>
WaterType							
WarrantyDate							
US_ID							
UpstreamInvert							
Subtype							
Slope							
PipeWidth							
PipeLength							
PipeHeight							
PipeDiameter							
PipeCount							
OtherDiameter							
Material							
Location							
LegacyID							
JointType1							
InstallDate							
InstallContractor							
GroundType							
DS_ID							
DownstreamInvert							
DataSource							
CrossSectionShape							

**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Sanitary Sewer Electronic Data Submittals  
Pressurized Main Explanation**

<b>Item Name</b>	<b>Units</b>	<b>Description</b>	<b>Drop-down Menu Options</b>
Legacy_ID		Office Generation	
Originating PS		Originating Pump Station	
Discharge MH		Manhole that force main discharges to	
Recorded Length	Feet	Length of the Pressurized main	
Diameter	Feet	Diameter of main	
Depth	Feet	Depth of main	
Install Date	mm/dd/yyyy	Approx. date of substantial completion or date S/D was released	
Warranty Date	mm/dd/yyyy	Warranty expiration date	
Install Contractor	mm/dd/yyyy	Construction Contractor	
Water Type		Type of water structure is carrying	Sanitary, Combined, Storm Runoff
Force Main Material		Construction material	DIP, PVC, HDPE, RCPP, Steel, Other
Exterior Coating			Tar, Unknown, Other
JointType1		Type of joint used to join mains together	Ball, Bell and Spigot, Flanged, Mechanical, Push on, Sleeved, Threaded
Lining Type		Pipe Liner	Cement, PVC, HDPE, Teflon, Epoxy, Other
Location		Users' description of feature's location appears on plan - if not a subdivision, put down nearest major road	
Ground Type		Predominant surface cover type	Asphalt, Concrete, Gravel, Soil, Sand, Grass, Brick Pavers, Building, Other
Design Flow			
Data Source			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other
Surge ReliefValve		Is there a surge relief valve	Yes, No
Surge ReliefValve Size		Size of surge relief valve	
Air Release Valve			Yes, No
Vacume release valve			
Air release x Coord			
Air release y Coord			
Surge ReliefValve x Coord			
Surge ReliefValve y Coord			
Vacume release valve x coord			
Vacume release valve y coord			

SECTION 01720

PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals  
Pressurized Main Data Sheet

Item Name	Main1	Main2	Main3	Main4	Main5	Main6	Main7
Legacy_ID							
Originating PS							
Discharge MH							
Recorded Length							
Diameter							
Depth							
Install Date							
Warranty Date							
Install Contractor							
Water Type							
Force Main Material							
Exterior Coating							
JointType1							
Lining Type							
Location							
Ground Type							
Design Flow							
Data Source							

**SECTION 01720**  
**PROJECT RECORD DOCUMENTS**  
**Sanitary Sewer Electronic Data Submittals**  
**Lift Station Explananation**

Item Name	Units	Description	Drop-down Menu Options
LegacyID		Office Generation	
WetWellRimElevation	Feet	Elevation of rim on Wet Well	
WetWellDepth	Feet	Depth of wet well	
WetWellAccessDiameter	Feet	Diameter of Wet Well Access	
PumpCapacity		Capacity at given head	
ElevationAtBottom	Feet	Elevation at bottom of pump	
AverageFlow		Average flow through pump station	
PeakFlow		Peak flow through pump station	
WetWellCapacity	Gallons		
InstallDate	mm/dd/yyyy	Approx. date of construction or date S/D was released	
WarrantyDate	mm/dd/yyyy	Warranty date of the feature - Blank unless known	
InstallContractor	mm/dd/yyyy	Construction Contractor	
LiftStationName		Name of lift Station	
WasteWaterPumpSubtype		Type of pump in lift station	Standard Centrifugal, Submersible, Self-Priming Centrifugal, Dry Pit Vertical Centrifugal
OverflowAlarm		Verify if Alarm is present	True , False
LevelSensorType		Level Sensor type for pump station	Air Bubble, Enclosed Electrode, Electrode, Float, Micro Processor, Transducer, Ultrasonic, Unknown, Other
WetWellBarScreen		Bar Screen	True, False
WetWellMaterial		Material of wet well	Brick, Poured Concrete, Concrete and Brick, Fiberglass, Lined, Polyethylene, Precast concrete, Unknown, Other
WetWellStepMaterial		Material that steps are made of in wet well	PVC coated Cast Iron, Cast Iron, Other
WetWellAccessType		Type of access to wet well	Door, Grate, Hatch, Lid, Manhole Cover, Other, Unknown
NumberofPumps		Numbers of Pumps	
PumpSize1		Hp at given head	
PumpSize2		Hp at given head	
PumpSize3		Hp at given head	
PumpSize4		Hp at given head	
PumpSize5		Hp at given head	
PumpSize6		Hp at given head	
PumpSize7		Hp at given head	
WetWellAccessMaterial		Material that Wet Well Access is made of	Cast Iron, Aluminum, Concrete, Unknown, Other
WetWellLiner		Lining material of Wet Well	Tar, PVC, Unknown, Other
WaterType		Type of water structure is carrying	Combined Waste Water, Reclaimed, Sanitary Sewer, Storm Runoff
WetWellRingMaterial		Material of wet well ring	Brick, concrete, Reinforced Concrete, Unknown, Other
WetWellFrameMaterial		Frame material of wet well	Metal, Concrete, Other, Unknown
OperationalDate	mm/dd/yyyy	Date in which lift station became operational	
SecondaryPower		Source of Secondary Power	Dedicated Generator, Portable Generator, Dual Power Feed, Battery, Others
DataSource			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other
AutoLevelController			True, False
Agency		Indicator of who inventoried the pipe	City, CTI, AGM, Other,
SCADA		Type of SCADA connection	RTU, Telephone, Satellite, Wireless, Spread Spectrum, Other
Modem			True, False
PowerSupplier		Electrical Service Supplier	EPB, NWGA, Other

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PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals  
Lift Station Data Sheet

Item Name	LiftSatation1	LiftSatation2	LiftSatation3	LiftSatation4	LiftSatation5	LiftSatation6	LiftSatation7
LegacyID							
WetWellRimElevation							
WetWellDepth							
WetWellAccessDiameter							
PumpCapacity							
ElevationAtBottom							
AverageFlow							
PeakFlow							
WetWellCapacity							
InstallDate							
WarrantyDate							
InstallContractor							
LiftStationName							
WasteWaterPumpSubtype							
OverflowAlarm							
LevelSensorType							
WetWellBarScreen							
WetWellMaterial							
WetWellStepMaterial							
WetWellAccessType							
NumberofPumps							
PumpSize1							
PumpSize2							
PumpSize3							
PumpSize4							
PumpSize5							
PumpSize6							
PumpSize7							
WetWellAccessMaterial							
WetWellLiner							
WaterType							
WetWellRingMaterial							
WetWellFrameMaterial							
OperationalDate							
SecondaryPower							
DataSource							
AutoLevelController							
Agency							
SCADA							
Modem							
PowerSupplier							



SECTION 01720

PROJECT RECORD DOCUMENTS

Stormwater Electronic Data Submittals  
Conveyance Explanation

Item Name	Units	Description	Drop-down Menu Options
UpStreamID	#	ID of link or node immediately upstream of this link	
DownstreamID	#	ID of link or node immediately downstream of this link	
LegacyID	#	ID from previous source\office generated	
PipeDiameter	inches	Height or diameter of pipe	8,10,12,15,18,24,30,36,42,48,60,72,84,96,108,120
Measurement1	inches	Width at bottom of pipe if not round or width at center of pipe if elliptical	
Measurement2	inches	Width at top of pipe if not round or elliptical	
HighPipeDepth	Feet	Distance from rim to bottom of High Pipe if pipe is >12" above invert of bottom pipe	
HighPipeDepth1	Feet	Distance from rim to bottom of High Pipe if pipe is >12" above invert of bottom pipe	
Depth	feet		Depth of storm water structure
UpstreamInvert	Inches	Invert elevation at upstream end of pipe	
DownstreamInvert	Inches	Invert elevation at downstream end of pipe	
Slope		Actual slope FT/FT up_strm-dwn-strm/act_len	
FillHeight	feet	Amount of earth between top of surface and top of pipe, including inside or under buildings, etc	
PipeLength	feet	System generated	
InstallDate	mm/dd/yyyy	Approx. date of construction or date S/D was released	
WarrantyDate	mm/dd/yyyy	Warranty date of structure if available, blank if unknown	
InstallContractor		Construction contractor	
SubType		Conveyance Link Type	Pipe, Ditch, Swale, Paved Channel, Improved Channel, Natural Channel, Spillway, Drain, LakeLine, Assumed Conveyance,Bridge
Pipe Shape		Shape of pipe	Round, Oblong, Rectangular,Box, Trapezoid, Arched, Elliptical, Other, Unknown
Barrel Count	#	Number of side-by-side barrels	1,2,3,4,5,6
Material		Link material	Reinforced Concrete, Poly Vinyl Chloride, AsbestosConcrete, Clay, Aluminized Steel, Plain, Coated, Bituminous Coated Corrugated Metal, Cast Iron, Ductile Iron, High Definition Poly-Ethylene, Rock and Mortar, Earthen, Corrugated Metal, Cast Aluminum, RipRap, Cut Stone, Geotextile, Other, Unknown <b>DEFINITIONS</b> AS=Aluminized Steel, RC=Reinforced Concrete,CMP=Corrugated Metal Pipe, BCCMP=Bituminous Coated Corrugated Metal Pipe, DIP= Ductile Iron Pipe, HDPE-High Density Poly-Ethylene, PVC=Poly-Vinyl Chloride, CIP=Cast Iron Pipe
Joint Type		Type of joint used to join mains together, Default unknown	Flange, Weld, Bond, Gasketed, Butt, None, Unknown
GroundType		Predominant surface cover type / Worst Case Cover (i.e. Building)	Asphalt, Concrete, Gravel, Soil, Grass, Building, Brick Pavers,Sand, Other, Unknown
Development Name		Name of subdivision, development, if known	
Location		Users description of features' location-subdivision, nearest major road	
Data Source			Aerial Photography, GPS, Development Plans,Tax Maps , Traditional Survey, As-Built, Other

**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Stormwater Electronic Data Submittals  
Conveyance Data Sheet**

<b>Item Name</b>	<b>Conveyance1</b>	<b>Conveyance2</b>	<b>Conveyance3</b>	<b>Conveyance4</b>	<b>Conveyance5</b>	<b>Conveyance6</b>	<b>Conveyance7</b>
UpStreamID							
DownstreamID							
LegacyID							
PipeDiameter							
Measurement1							
Measurement2							
HighPipeDepth							
HighPipeDepth1							
Depth							
UpstreamInvert							
DownstreamInvert							
Slope							
FillHeight							
PipeLength							
InstallDate							
WarrantyDate							
InstallContractor							
SubType							
Pipe Shape							
Barrel Count							
Material							
Joint Type							
GroundType							
Development Name							
Location							
Data Source							

**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Stormwater Electronic Data Submittals  
Structure Explanation**

<b>Item Name</b>	<b>Units</b>	<b>Description</b>	<b>Drop-down Menu Options</b>
LegacyID		ID from previous source	
TopStructureElevation	Ft. above MSL	Auto input from GPS Elevation of Top of Structure	
MeasureDown	feet	Difference between top of structure and bottom of structure	
Structure Diameter2	inch	2nd dimension of structure (if not round)	12,18,24,30,36,42, 54, 60, 66,72, 78, 84, 96, 108, 120, 144, Other, Unknown
Lid Diameter	feet	Lid diameter	
Structure Diameter1		Diameter of structure	12,18,24,30,36,42, 54, 60, 66,72, 78, 84, 96, 108, 120, 144, Other, Unknown
Invert Elevation	Ft above MSL	Invert elevation of the manhole	
Install Contractor		Construction contractor	
Warranty Date	mm/dd/yyyy		
Manufacturer		Structure Manufacturer	
CastingManufacturer		Casting Manufacturer	
CastingModel		Model Number of Casting	
Install Date	mm/dd/yyyy	Approx. date of construction or date S/D was released	
NodeFunctionType			Inlet, Outlet, Junction
StructureType		Structure Node Types	Catch Basin, Curb Inlet, Junction Box, Headwall, Weir, Manhole, Trench Drain, Plain Pipe End, Check Dam, Flared End Structure, Raised Top Inlet, Flat Top Catch Basin, Control Structure, Culvert, Ditch Intersection, Pipe Intersection, Lake Intersection, Assumed Structure, Inaccessible Structure, Unknown
StructureMaterial			Brick, Concrete, Concrete with Brick, Block, Cut Stone, Lined, Plastic, Other
Skimmer		Is a skimmer present	Yes, No, Unknown
NoLinkInflow	#	Number of links that flow into the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
NoLinkOutflow	#	Number of links that flow out of the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
NoDropConnections	#	Number of drop connections if present	0, 1, 2, 3, 4, 5, 6, 7, 8
AccessType		Type of access	Lid, Door, Grate, Hand, Manhole Cover, Hatch, Other, None
CleanLidMaterial		Lid material	Metal, Concrete, Plastic, Missing, Other, Unknown
GroundType		Predominant surface cover type	Asphalt, Concrete, Dirt, Gravel, Soil, Sand, Grass, Building, Brick Pavers, Other
Step		Steps present	Yes, No
Frame Material		Frame material	
Development Name		Name of subdivision, development, if known	
Basin		Name	List all 8 basins *****
Northing	#	Auto Calculation from Latitude	
Easting	#	Auto Calculation from Longitude	

**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Stormwater Electronic Data Submittals  
Structure Data Sheet**

<b>Item Name</b>	<b>Structure1</b>	<b>Structure2</b>	<b>Structure3</b>	<b>Structure4</b>	<b>Structure5</b>	<b>Structure6</b>	<b>Structure7</b>
LegacyID							
TopStructureElevation							
MeasureDown							
Structure Diameter2							
Lid Diameter							
Structure Diameter1							
Invert Elevation							
Install Contractor							
Warranty Date							
Manufacturer							
CastingManufacturer							
CastingModel							
Install Date							
NodeFunctionType							
StructureType							
StructureMaterial							
Skimmer							
NoLinkInflow							
NoLinkOutflow							
NoDropConnections							
AccessType							
CleanLidMaterial							
GroundType							
Step							
Frame Material							
Development Name							
Basin							
Northing							
Easting							

**SECTION 01720**

**PROJECT RECORD DOCUMENTS**

**Stormwater Electronic Data Submittals  
Detention Explanation**

<b>Item Name</b>	<b>Units</b>	<b>Description</b>	<b>Drop-down Menu Options</b>
LegacyID	#	ID from previous source\office generated	
DepthMaximum	Ft above MSL	Difference between top of ground and bottom of pond	Pond Depth
Width	feet		
Length	feet		
Area	sq. feet	Automatically calculated from GPS of perimeter	
InstallContractor		Construction Contractor	
InstallDate	mm/dd/yyyy	Approx. date of construction or date S/D was released	
WarrantyDate	mm/dd/yyyy		
Contractor		Name of Contractor	
PondType		Type of pond	Dry Detention, Wet Detention, Underground Detention, Constructed Wetlands, Rooftop, Swale
FencedPond		Does pond have fence	Yes, No
PondClass			Residential, Commercial, Industrial, Public
WeirType		Type of outlet structure	V-notch, Rectangular, Orifice, Riser pipe, Open pipe, Other, Unknown
PermitType		Does pond have Discharge permit?	Waste water, Stormwater, none
OutletPipeSize	inches	Size of main outlet pipe, not emergency spillway	<12,12,16,18,24,30,36,42,48,54,60, Other
GroundCover		Type of pond surface	Asphalt, Concrete, Dirt, Gravel, Soil, Sand, Grass, Building, Brick Pavers, Other
DevelopmentName		Name of subdivision, development, if known	
rghcoeff	#	Roughness coefficient of the conduit	
Northing			
Easting			

SECTION 01720

PROJECT RECORD DOCUMENTS

Stormwater Electronic Data Submittals  
Detention Data Sheet

Item Name	Pond1	Pond2	Pond3	Pond4	Pond5	Pond6	Pond7
LegacyID							
DepthMaximum							
Width							
Length							
Area							
InstallContractor							
InstallDate							
WarrantyDate							
Contractor							
PondType							
FencedPond							
PondClass							
WeirType							
PermitType							
OutletPipeSize							
GroundCover							
DevelopmentName							
rghcoeff							
Northing							
Easting							

## Part 1 General

### 1.01 Scope

- A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording and submitting of Project record documents as herein specified.
- B. Record documents include, but are not limited to:
  - 1. Drawings;
  - 2. Specifications;
  - 3. Change orders and other modifications to the Contract;
  - 4. Engineer field orders or written instructions, including Requests for Information (RFI) and Clarification Memorandums;
  - 5. Reviewed shop drawings, product data and samples;
  - 6. Test records.
- C. The Contractor shall maintain on the Project site throughout the Contract Time and up to date set of Record Drawings.

### 1.02 Maintenance of Documents and Samples

- A. Storage
  - 1. Store documents and samples in the Contractor's field office, apart from documents used for construction.
  - 2. Provide files and racks for storage of documents.
  - 3. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with format of these Specifications.
- C. Maintenance
  - 1. Maintain documents in a clean, dry, legible condition and in good order.
  - 2. Do not use record documents for construction purposes.
  - 3. Maintain at the site for the Owner one copy of all record documents.
- D. Make documents and samples available at all times for inspection by Engineer.

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Record Documents

- E. Failure to maintain the Record Documents in a satisfactory manner may be cause for withholding of a certificate for payment.

### 1.03 Quality Assurance

- A. Unless noted otherwise, Record Drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.
- B. Unless noted otherwise, Record Drawings shall provide elevations to the nearest 0.01 foot for all pertinent items constructed by the Contractor.
- C. For sanitary sewer construction, the Contractor shall employ a currently registered surveyor to prepare the Record Drawings from a post-construction, field run survey. The Record Drawings shall provide elevations to the nearest 0.01 foot for all manhole inverts, manhole frames and other pertinent items constructed by the Contractor. The Record Drawings shall provide dimensions, distances, and coordinates to the nearest 0.01 foot and horizontal angles to the nearest 10 seconds.

### 1.04 Recording

- A. Label each document "Project Record" in neat, large printed letters.
- B. Recording
  - 1. Record information concurrently with construction progress.
  - 2. Do not conceal any work until required information is recorded.

### 1.05 Record Drawings

- A. Record Drawings shall be reproducible, shall have a title block indicating that the drawings are Record Drawings, the name of the company preparing the Record Drawings, and the date the Record Drawings were prepared.
- B. Legibly mark drawings to record actual construction, including:
  - 1. All Construction
    - a. Changes of dimension and detail.
    - b. Changes made by Requests for Information (RFI), field order, clarification memorandums or by change order.
    - c. Details not on original Drawings.
  - 2. Site Improvements, Including Underground Utilities
    - a. Horizontal and vertical locations of all exposed and underground utilities



and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.

- b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.
  - c. The locations shall be referenced to at least two easily identifiable, permanent landmarks (e.g., power poles, valve markers, etc.) or benchmarks.
3. Structures
- a. Depths of various elements of foundation in relation to finish first floor datum or top of wall.
  - b. Location of internal and buried utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

## 1.06 Specifications

- A. Legibly mark each section to record:
1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
  2. Changes made by Requests for Information (RFI), field order, clarification memorandums, or by change order.

## 1.07 Submittal

- A. At contract closeout, deliver Record Documents to the Engineer for the Owner.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
1. Date
  2. Project title and number
  3. Contractor's name and address
  4. Title and number of each record document
  5. Signature of Contractor or Contractor's authorized representative

Record Documents

**1.08 Electronic Data Submittal Forms**

- A. Project record document forms 01720-3 through 01720-16 are attached to the end of the section.

END OF SECTION

## PART 1 - General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 Summary

- A. Provide all labor, equipment, and materials to construct 4 pilot test boring(s), and perform all tests and associated work as specified.
- B. Subsurface information obtained from the test boring(s) will be used as an aid in determining the suitability of water bearing formation for a water supply well. In the event the test hole log indicates the specified well site is not feasible, additional test boring(s) shall be provided for as outlined in the Contract.

### 1.03 Related Requirements

- A. Piezometer Construction: Section 02 32 23.
- B. Temporary Construction Dewatering: Section 31 23 19.

### 1.04 Submittals

- A. Submit as specified in Division 01.
- B. Type and capabilities of drill rig and tools proposed for use on Contract.
- C. Sieve analysis of collected lithologic samples.
- D. Electric log(s) of boring(s).

## PART 2 - Products

### 2.01 Methods and Equipment

- A. Drill by hydraulic rotary or hollow stem auger method at a rate which will permit collection of representative samples. Other drilling methods may only be used with the approval of Engineer.
- B. Construct test boring(s) plumb with a minimum diameter of 4 inches.
- C. Test borings shall be completed to the depth indicated on the approved temporary dewatering plan, to be submitted by the Contractor in accordance with Section 31 23 19.

Test Boring

- D. Circulating drilling fluids shall be fresh water or drilling mud only, approved by Engineer.

## PART 3 - Execution

### 3.01 Geologic Sampling

- A. Obtain cutting samples at 5-ft. intervals and at each change of material encountered in the test hole.
- B. The lithologic sampling interval may be changed at the discretion of Engineer.
- C. Collect samples from the return fluids discharging to the mud discharge pit and not from the pit itself.
- D. Stop drill bit and circulate the hole clean of cuttings at the discretion of Engineer.
- E. Place cuttings in sample containers and label with the following information:
  - 1. Boring number or designation.
  - 2. Depth of sample.
  - 3. Date of drilling.
  - 4. Job name.
  - 5. Project No.
- F. Complete sieve analysis of selected lithologic samples.
- G. Provide Owner with one digital copy and Engineer with one digital copy of sieve analyses tests of collected samples.

### 3.02 Test Hold Abandonment

- A. Abandon all borings immediately after completion of drilling unless otherwise directed by the Engineer.
- B. Abandon all borings after completion of all water level measurements, except those borings selected for continued water level determinations and/or installation of piezometers.
- C. Test hole abandonment shall be completed in compliance with all applicable local, state and federal regulations.

END OF SECTION

## PART 1 - General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 Summary

- A. Provide all labor, equipment, and materials to install piezometer(s) in each test boring.
- B. Design the piezometer(s) on the basis of the test boring(s).

### 1.03 Related Requirements

- A. Test Boring Construction: Section 02 32 13.

### 1.04 References

- A. ASTM International (ASTM):
  1. A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  2. A139 - Electric-Fusion (Arc)-Welded Steel Pipe (NPS-4 and Over).
  3. A333/A333M - Seamless and Welded Steel Pipe for Low-Temperature Service.
  4. D5092 - Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers.
  5. D5521 - Guide for Development of Ground Water Monitoring Wells in Granular Aquifers.
  6. F480 - Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), Schedule 40 and Schedule 80.

### 1.05 Submittals

- A. Submit as specified in Division 01.
- B. Prior to construction of piezometer, submit drawings with details and dimensions of proposed construction, including but not limited to:
  1. Proposed diameter, length, and depth of casing slotted screen, and blank(s).
  2. Screen type, slot size, and screen connection details.

Piezometers

- C. After construction, submit "as-constructed" information including the length and depth(s) of installed casing, slotted screen, gravel pack(s), and grout plug(s).
- D. Submit a daily report of the work performed including depth drilled, amount of casing set, nature of material encountered, and other pertinent data as requested by Engineer.

## PART 2 - Products

### 2.01 Casing

- A. Casing pipe shall be not less than 2 inches in diameter of sufficient strength to withstand natural and construction stresses:
  - 1. PVC: ASTM F480.
- B. Casing joints shall be flush-threaded with O-ring seals. Connections to well screens shall be according to manufacturer's recommendations.
- C. Complete piezometer(s) with protective steel casing that extends a minimum of 1 ft. above the ground surface.
  - 1. Protective casing shall be fitted with a threaded removal cap having a small vent hole.

### 2.02 Well Screen or Slotted Casing

- A. Design the screen or slot type, size of screen opening, spacing, location, and placement of screens or slotted casing with respect to the water bearing formations and submit to Engineer prior to the piezometer construction.
- B. Design piezometer(s) following ASTM D5092 to accurately reflect the properties of the aquifer in which the piezometer is completed.

### 2.03 Gravel Packing

- A. After the casing has been installed for the full depth of the piezometer and the screen or slots have been placed in proper position, place gravel between the wall of the drilled hole and the screen.
- B. Gravel used for this purpose shall be clean washed gravel composed of well-rounded particles in compliance with ASTM D5092.

### 2.04 Grouting

- A. Place grout or pellet bentonite in the annular space between the bore hole walls and the casing at depths indicated or specified.

- 
- B. Install grout plugs in the annular space between the bore hole walls and the casing at depths required to isolate the aquifer from the surface and comply with state regulations. Place grout to surface level.

## PART 3 - Execution

### 3.01 Development and Water Sampling

- A. Furnish all pumps, compressors, and other required equipment and develop the piezometer(s) by approved methods necessary to remove the effects of any drilling mud in the formation and establish a satisfactory hydraulic connection with the aquifer in which the piezometer is developed.
- B. Piezometers shall be developed until discharged water is visibly clear 15 min. after pump startup.

### 3.02 Disinfection

- A. Disinfect the piezometer(s) after the water samples have been obtained.
- B. Disinfect piezometer(s) with a chlorine solution using a calcium or sodium hypochlorite compound with 70% available chlorine. Dissolve the hypochlorite in a solution at the ground surface and apply so that a concentration of at least 100 ppm of available chlorine is available in all parts of the piezometer.
- C. Engineer will consider alternative methods such as the use of chlorine tablets if details of the process are submitted in advance of disinfection.
- D. Allow the disinfecting solution to stand in the piezometer for at least one hour and then pump until a distinct chlorine odor is detected at the pump discharge.

### 3.03 Abandonment

- A. If a piezometer must be abandoned during construction because of faulty construction or other causes within the control of the Contractor, fill abandoned hole as required by state regulations and using drill cuttings, a suitable clay, or expansive grout to the ground surface. Filling of piezometer boring and additional drilling required to reach the same depth in a new hole that was penetrated in the abandoned hole, shall be at no additional cost to Owner.

END OF SECTION





## Part 1 General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 Scope

- A. This Section includes:
  - 1. Demolition and removal of selected site elements.
  - 2. Salvage of existing items to be reused or recycled.

### 1.03 Related Requirements

- A. Section 01 11 00 - Summary of Work for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
- B. Section 01 73 29 – Cutting and patching.
- C. Section 31 20 00 – Site Preparation and Earthwork for site clearing and removal of above- and below-grade improvements not part of selective demolition.

### 1.04 Reference Standards

- A. The American Society of Safety Engineers:
  - 1. ASSE A10.6-2006: Safety Requirements for Demolition Operations (ANSI).
- B. NFPA:
  - 1. NFPA 241-2013: Safeguarding Construction, Alteration, and Demolition Operations.

### 1.05 Definitions

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

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Selective Demolition

- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be removed and salvaged or removed and reinstalled.

## 1.06 Materials Ownership

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

## 1.07 Submittals

- A. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of utility services.
    - a. Wastewater Interceptors: Conveyance of wastewater flow to the Citico Pump Station shall be maintained without interruption at all times.
    - b. Wastewater Force Mains: Conveyance of pumped wastewater flow from Citico Pump Station to Moccasin Bend Wastewater Treatment Plant shall be maintained without interruption at all times.
    - c. Potable Water Service: Water service to Citico Pump Station and the Citico Combined Sewer Overflow Treatment Facilities shall be maintained at all times.
    - d. Primary Electric Service to Citico Pump Station shall be maintained except when on-site power generation is provided.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
  - 5. Means of protection for items to remain and items in path of waste removal.
  - 6. Point of disposal of demolition waste.
  - 7. Description of all items to be salvaged.
- B. Pre-demolition Photographs or Video: Show existing conditions, and of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 - Construction Videos and Photographs. Submit before Work begins.

## 1.08 Quality Assurance

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

## 1.09 Field Conditions

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. If suspected hazardous materials (such as lead or asbestos) are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract, as necessary.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

## 1.10 Coordination

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

## Part 2 Products (Not Used)

## Part 3 Execution

### 3.01 Examination

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs or video.
  - 1. Comply with requirements specified in Section 01 32 33 - Construction Videos and Photographs.
  - 2. 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, if required.
  - 2. Disconnect, demolish, and remove process piping, structures, pavement, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - b. Equipment to Be Removed and Salvaged: Submit plan to Engineer for approval after coordination with Owner.

### 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.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 10 - Temporary Facilities.
- 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.
  - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

### 3.04 Selective Demolition, General

- 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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each tier before disturbing supporting members on the next lower level.
  2. 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.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. 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.
  5. Maintain fire watch during and for at least 24 hours after flame-cutting operations.
  6. Maintain adequate ventilation when using cutting torches.
  7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  8. Remove structural members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 00 - Cleaning and Waste Management.
- 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. Coordinate with Owner.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

### 3.05 Selective Demolition Procedures for Specific Materials

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Asphalt Pavement: Using power-driven saw, cut asphalt pavement in locations indicated as limits of pavement to remain to a depth of at least 1 inch.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

### 3.06 Disposal of Demolished Materials

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 74 00 - Cleaning and Waste Management.
  - 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.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

### 3.07 Cleaning

- A. 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

## PART 1 - General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 Summary

- A. This Section includes formwork for cast-in-place concrete.

### 1.03 Related Requirements

- A. Section 03 23 00 - Concrete Reinforcement.
- B. Section 03 30 00 – Concrete.

### 1.04 Reference Standards

- A. Applicable Standards:
  - 1. American Concrete Institute (ACI):
    - a. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
    - b. ACI 301 - Specifications for Structural Concrete.
    - c. ACI 318 - Building Code Requirements for Reinforced Concrete.
    - d. ACI 347R - Guide to Formwork for Concrete.
  - 2. ASTM International (ASTM):
    - a. ASTM C31/C31M REV A – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
    - b. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
    - c. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

### 1.05 Submittals

- A. Layout drawings and design calculations of all formwork, stamped by Professional Engineer licensed in the state of Tennessee.

- B. Layout drawings and design calculations of all shoring and reshoring, stamped by Professional Engineer licensed in the state of Tennessee.

## PART 2 - Products

### 2.01 Materials For Facing

- A. Where concrete will be exposed to view after construction:
  - 1. Use exterior grade plywood at least 5/8 inch thick or steel forms capable of producing a smooth, uniform appearance.
  - 2. Do not use form-facing materials with raised grain, torn surfaces, worn edges, dents, or other defects that will impair the texture of concrete surfaces.
- B. Where concrete will not be exposed to view after construction:
  - 1. Exterior grade plywood at least 5/8 inch thick.
  - 2. Steel.
  - 3. Wood fiberboard.
  - 4. Dressed lumber free of loose knots.
- C. Treat forms with commercially available form releasing agents that will not bond with, stain, or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion, nor shall it impede the wetting of surfaces to be cured with water or curing compounds. Form releasing agents shall be VOC compliant with a maximum VOC content of 3.8 lbs./gal. (450 g/L), or less where area restrictions are more stringent.
- D. Clean forms of sawdust, dust, dirt, and other foreign materials.

### 2.02 Form Ties

- A. Break back, coil, or screw type, except where otherwise specified.
- B. Use water-seal coil type in walls below grade and in walls of water bearing structures. Removable through-wall tapered ties shall not be used.
- C. Coil type shall leave conical depression in concrete.
- D. Space as required against pressure of fresh concrete.
- E. The portion of the form tie remaining in place shall provide for a clearance of two times the minimum dimension of the tie, but not less than 3/4 inch, from the formed surface.



## 2.03 Chamfer Strips

- A. Chamfer: 3/4 inch except where otherwise indicated.
- B. Place in all forms to provide chamfer where concrete will have exposed projecting corners.

## PART 3 - Execution

### 3.01 Form Construction

- A. Conform to ACI 301, 318, and 347R, except Shop Drawings for formwork, shoring, and reshoring shall not be submitted for approval.
- B. Adequately brace, stiffen, and support forms to prevent perceptible deflection or settlement, and to hold plumb, level, and true to line.
- C. Construct and maintain forms to the tolerances given in ACI 117.
- D. Construct sufficiently tight to prevent mortar leakage.
- E. Avoid offsets between adjacent forms and construct so that shores, braces, and stiffening members are in line with those below.
- F. Space studs and stringers as required to support facing against concrete pressure, but not more than 12 inches for 5/8-inch plywood or 16 inches for 3/4-inch plywood. Maximum deflection of facing materials reflected on concrete surfaces exposed to view shall be 1/240 of the span between structural members of the formwork.
- G. Use wales, strongbacks, shores, and bracing as required.
- H. Form all necessary openings or chases for piping, ductwork, and similar items where indicated or as required for the Work.
- I. Construct forms to be removable in sections without marring concrete surface.
- J. Surface of forms shall provide a smooth, dense, plane surface to finished concrete where exposed to view.
- K. Contractor shall be responsible for structural adequacy, design, engineering, and construction of the formwork.
- L. Stay-in-place metal forms shall not be used.

### 3.02 Time-In-Place For Forms

- A. It is the responsibility of Contractor to consider all applicable factors and leave the formwork in place until it is safe to remove them.

## Concrete Formwork

- B. All removal shall be performed in a manner which will prevent damage to the concrete and ensure the complete safety of the structure.
- C. Where forms support more than one element, the forms shall not be removed until the form removal criteria are met by all supported elements.
- D. Evidence that concrete has gained sufficient strength to permit removal of forms shall be determined by tests on control cylinders. All control cylinders shall be stored in the structure or as near the structure as possible so they receive the same curing conditions and protection methods as given those portions of the structure they represent. Control cylinders shall be removed from the molds at an age of no more than 24 hours. All control cylinders shall be prepared and tested in accordance with ASTM C31/C31M REV A and ASTM C39/C39M at the expense of Contractor by an independent laboratory that complies with ASTM C1077. Control cylinders shall be tested within 4 hours after removal from the Site.
- E. Forms shall not be removed unless the minimum time or minimum compressive strength requirements below are met.
1. Formwork Not Supporting Weight of Concrete:
    - a. Formwork for walls, columns, sides of beams, gravity structures, slabs-on-ground and other vertical type formwork not supporting the weight of concrete shall remain in place 24-hours minimum after concrete placement is completed.
  2. Formwork Supporting Weight of Concrete:
    - a. Formwork supporting weight of concrete and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction or other superimposed loads to which the supported concrete may be subjected. As a minimum, no forms or shoring shall be loosened or removed until control concrete test cylinders indicate the concrete has attained the following compressive strengths for the respective structural members:

<u>Structural Member</u>	<u>Percent of Design Compressive Strength</u>
Unshored slab and beam forms or forms which can be removed without disturbing shores	70
Slab or beam shoring	85

END OF SECTION

## PART 1 - General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and DIVISION 01 Specification Sections, apply to this Section.

### 1.02 Summary

- A. This Section includes steel reinforcement bars, ties, welded wire fabric, bolsters, chair supports, and accessories.

### 1.03 Related Work Specified Elsewhere

- A. Section 03 10 00 - Concrete Formwork.
- B. Section 03 30 00 - Concrete.

### 1.04 Reference Standards

- A. Applicable Standards:
  - 1. American Society for Testing and Materials (ASTM):
    - a. A82 - Steel Wire, Plain, for Concrete Reinforcement.
    - b. A185 - Steel Welded Wire Reinforcement, Plain, for Concrete.
    - c. A615/A615M - Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
    - d. A706/A706M - Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
  - 2. American Concrete Institute (ACI):
    - a. 301 - Specifications for Structural Concrete.
    - b. SP 66 - Detailing Manual.
    - c. 318 - Building Code Requirements for Structural Concrete.
    - d. 117 - Specifications for Tolerances for Concrete Construction and Materials.
  - 3. American Welding Society (AWS):
    - a. A5.5 - Low Alloy Steel Electrodes for Shielded Metal Arc Welding.

- b. B2.1 - Welding Procedure and Performance Qualification.
- c. D1.4 - Structural Welding Code Reinforcing Steel.
- 4. Concrete Reinforcing Steel Institute (CRSI):
  - a. Manual of Standard Practice.

### 1.05 Submittals

- A. Submit as specified in DIVISION 01.
- B. Include, but not limited to, the following:
  - 1. Complete bar schedule, bar details, and erection drawings to conform to ACI SP 66.
  - 2. Drawing with each type of bent bar marked with identification mark. Straight bars shall have mark number or be identified by size and length.
  - 3. Erection drawings shall be clear, easily legible, and to a minimum scale of:
    - a. 1/4 inch = 1 foot (1:50).
    - b. 1/8 inch = 1 foot (1:100) if bars in each face are shown in separate views.
  - 4. Size and location of all openings.
  - 5. Concrete protective cover.
  - 6. Grade of steel.
  - 7. Lap splice lengths.

### 1.06 Delivery, Storage, And Handling

- A. Store steel reinforcement blocked up off the ground and in orderly stacks.
- B. Store only bars with the same identifying label in the same stack.

### 1.07 Testing

- A. Perform at the mill for each heat.
- B. Submit certified test results upon request.

## PART 2 - Products

## 2.01 Reinforcement Bars, Ties, And Stirrups

### A. Materials:

1. Conform to ASTM A615, Grade 60, except as otherwise specified.
2. Cold-drawn wire for spiral column ties shall conform to ASTM A82.
3. Reinforcement indicated or specified to be welded shall conform to ASTM A706.

### B. Fabrication of Bars:

1. Fabricate with cold bends conforming to the recommended dimensions shown in ACI 318.
2. Fabricate bars according to the tolerances given in ACI 117.
3. Field fabrication will be allowed only if Contractor has equipment to properly fabricate steel.
4. Attach metal or plastic tags with identifying mark or length corresponding to mark number or length on Drawing. Straight bars shall have mark number or size and length. Bent bars shall have mark number.
5. Contractor may, at his option, continue steel reinforcement through openings in walls and slabs, then field-cut the opening so that there will be the required concrete cover between ends of bars and edge of opening.

## 2.02 Welded Wire Reinforcement

- A. Conform to ASTM A185 using bright basic wire conforming to ASTM A82.
- B. Wire sizes W1.4 and smaller shall be galvanized.
- C. Provide mats only. Rolled fabric is not acceptable.

## 2.03 Bolsters, Chairs, And Accessories

- A. Conform to ACI SP 66 and the CRSI Manual of Standard Practice.
- B. Provide all spacers, bolsters, chairs, ties, and other devices necessary to properly space, place, support, and fasten steel reinforcement in place during the concrete placement.
- C. Metal accessories shall be galvanized or plastic-coated where legs will be exposed in finished concrete surfaces.
- D. Do not use rocks, broken bricks, wood blocks, or concrete fragments for support of steel reinforcement.

## 2.04 Precast Concrete Block Bar Supports

- A. May be used only for bar supports in slabs on ground.
- B. Conform to ACI SP-66 and the CRSI Manual of Standard Practice.
- C. Each block shall have a minimum of 9 square inches (5800 square millimeters) of bearing area. Space as required by the particular condition of weight, bearing surface, and rigidity of the steel reinforcement.

## PART 3 - Execution

### 3.01 Placement Of Steel Reinforcement

- A. Place all steel reinforcement before concrete is cast in accordance with approved erection drawings, ACI 117, Chapters 7 and 12 of ACI 318, and the CRSI Manual of Standard Practice.
- B. Remove oil, mill scale, pitting, mud, loose rust, ice, and other materials that would reduce bond from bars before placing.
- C. Tie securely with 16 gage (1.6 mm) or larger annealed iron wire.
- D. Place to maintain concrete cover to conform to ACI 117 and Chapter 7 of ACI 318, unless otherwise indicated.
- E. Splice steel where indicated. Splices shall be in full contact and shall conform to Chapter 12 of ACI 318.
  - 1. Unless otherwise indicated, lap splices shall be Class B as defined by ACI 318.
  - 2. Splice steel using Cadweld Series T-splices where indicated or approved.
    - a. Provide a manufacturer's representative to give on site instructions to all welders who will perform the splices in the field.
    - b. Contractor shall have the manufacturer's representative instruct, observe, and approve in writing those persons doing the welding.
    - c. Contractor shall arrange for the manufacturer's representative to return at the request of the Engineer.
  - 3. Any additional Contractor-proposed splice shall be submitted for acceptance of location and splice length.
- F. Lap welded wire reinforcement in accordance with Section 12.19 of ACI 318, but not less than the length of one mesh plus 2 inches (50 mm).

- G. Connection of reinforcement bars to steel shapes or plate shall be with a Cadweld Series B-splice.
- H. Do not bend bars embedded in hardened or partially hardened concrete without approval from Engineer. If bending is permitted, conform to procedures of ACI 301 unless otherwise prescribed by the governing building code.
- I. Do not weld reinforcing bars unless specifically indicated. Where welding is indicated, provide bars conforming to ASTM A706/A706M and comply with AWS D1.4.

END OF SECTION





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## PART 1 - General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 Summary

- A. This Section includes concrete and related items.

### 1.03 Related Requirements

- A. Section 03 10 00 - Concrete Formwork.
- B. Section 03 20 00 - Concrete Reinforcement.
- C. Section 05 12 00 - Embedded Steel.
- D. Section 09 90 00 - Protective Coatings.

### 1.04 Reference Standards

- A. Comply with the provisions of the following codes, specifications, and standards, except as otherwise indicated.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
  - 1. American Concrete Institute (ACI):
    - a. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
    - b. ACI 301 - Specifications for Structural Concrete.
    - c. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
    - d. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
    - e. ACI 305R – Guide to Hot Weather Concreting.
    - f. ACI 306R – Guide to Cold Weather Concreting.
    - g. ACI 308.1 - Specification for Curing Concrete.
    - h. ACI 309R - Guide for Consolidation of Concrete.

- i. ACI 313 - Standard Practice for Design and Construction of Concrete Silos and Stacking Tubes for Storing Granular Materials.
  - j. ACI 318 - Building Code Requirements for Structural Concrete.
  - k. ACI 506R - Guide to Shotcrete.
  - l. ACI 506.2 - Specification for Shotcrete.
2. ASTM International (ASTM):
- a. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
  - b. ASTM C31/C31M REV A – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  - c. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
  - d. ASTM C39/C39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  - e. ASTM C40/C40M – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
  - f. ASTM C42/C42M – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
  - g. ASTM C78/C78M REV B - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).
  - h. ASTM C88 – Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  - i. ASTM C94/C94M – Standard Specification for Ready-Mixed Concrete.
  - j. ASTM C114 – Standard Test Methods for Chemical Analysis of Hydraulic Cement.
  - k. ASTM C117 – Standard Test Method for Material Finer than 75 $\mu$  (No. 200) Sieve in Mineral Aggregates by Washing.
  - l. ASTM C136/C136M – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - m. ASTM C142/C142M – Standard Test Method for Clay Lumps and Friable Particles in Aggregates.
  - n. ASTM C143/C143M REV A – Standard Test Method for Slump of Hydraulic Cement Concrete.

- o. ASTM C150/C150M – Standard Specification for Portland Cement.
- p. ASTM C172/AC172M REV A – Standard Practice for Sampling Freshly Mixed Concrete.
- q. ASTM C192/C192M – Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
- r. ASTM C231/C231M – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- s. ASTM C233/C233M - Standard Test Methods for Air-Entraining Admixtures for Concrete.
- t. ASTM C260/C260M REVA – Standard Specification for Air-Entraining Admixtures for Concrete.
- u. ASTM C295/C295M – Standard Guide for Petrographic Examination of Aggregates for Concrete.
- v. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- w. ASTM C430 – Standard Test Method for Fineness of Hydraulic Cement by the 45 $\mu$  (No. 325) Sieve.
- x. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
- y. ASTM C566 –Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying.
- z. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements.
- aa. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- bb. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- cc. ASTM C1107/C1107M REVA - Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink).
- dd. ASTM C1193 – Standard Guide for Use of Joint Sealants.
- ee. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.

- ff. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
  - gg. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction. (Nonextruding and Resilient Bituminous Types).
  - hh. ASTM D1752 REVA - Standard Specification for Standard Specification for - Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
  - ii. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
  - jj. ASTM E1155M – Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers (Metric).
- 3. Concrete Plant Manufacturers Bureau (CPMB):
    - a. 100 - Concrete Plant Standards.
    - b. 102 - Recommended Guide Specifications for Batching Equipment and Control Systems in Concrete Batch Plants.
  - 4. Plant Mixer Manufacturers Division (PMMD):
    - a. 100 - Concrete Plant Mixer Standards.
  - 5. Federal Specification (FS):
    - a. SS-S-200 - Sealants, Joint: Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement.
    - b. TT-S-227 - Sealing Compound: Elastomeric Type, Multi-Component (for Calking, Sealing, and Glazing in Buildings and Other Structures).
  - 6. National Bureau of Standards (NBS) Specifications for Scales.
  - 7. Truck Mixer Manufacturers Bureau (TMMB):
    - a. Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards.

## 1.05 Submittals

- A. Submit as specified in Division 01.
- B. Include, but not limited to, product data and Shop Drawings of the following:
  - 1. Nonshrink grouts.

2. Admixtures.
  3. Bonding agents.
  4. Curing agents.
  5. Joint sealants.
  6. Waterstops.
- C. Mill Certificates:
1. Submit to Engineer a minimum of one copy for each cement shipment.
- D. Concrete Mix Design Proportions:
1. Submit as specified in PART 2, Paragraph 2.01.D. - Mix Proportions, this Section.
  2. Submit for each mix design, including aggregate gradation data.
  3. Resubmit for any change in each mix design.
- E. Production Test Reports: Submit as specified in Division 01 and PART 2, Paragraph 2.01.E. - Measurement of Materials, this Section.
- F. Laboratory Test Reports: Submit as specified in Division 01 and PART 2, Paragraph 3.09.C – Laboratory Testing of Aggregates and Concrete During Construction, this Section.

## 1.06 Quality Assurance

- A. Field Testing: Shall be performed by an ACI Concrete Field Testing Technician Grade 1.
- B. Submit qualification records of field testing and finishing technicians prior to placing concrete.

## PART 2 - Products

### 2.01 Concrete

- A. Materials:
1. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
    - a. Portland cement: ASTM C150, Type II. Supplement with the following:
      - (1) Fly ash: ASTM C618, Class F.

- (2) Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.
  - b. Blended Hydraulic Cement: ASTM C595/C595M, Type IP or Type IP (MS) cement. Type IP (MS) shall not contain more than 25% pozzolan.
  - c. The maximum amount retained on the No. 325 sieve shall be 10% as determined in accordance with ASTM C430.
  - d. The maximum amount of alkalis ( $Na_2O + 0.658 K_2O$ ) shall be 0.60% determined in accordance with ASTM C114. A running average of three Samples shall not exceed a maximum of 0.50%.
2. Fine Aggregate:
- a. Conform to ASTM C33.
  - b. Approved service record of 3 years with a history indicating that the fine aggregate is not chemically reactive.
  - c. For a new fine aggregate source, or when 3 years' approved service records are not available, or when the service records are unacceptable; the aggregate shall be evaluated for potential reactivity. Aggregate must be considered innocuous in accordance with petrographic examination by ASTM C295.
  - d. Fine aggregate considered deleterious or potentially deleterious shall not be used without approval.
  - e. Maintain fine aggregate free of ice and frozen lumps.
  - f. Fineness modulus shall be between 2.3 and 3.1.
3. Coarse Aggregate:
- a. Conform to ASTM C33.
    - (1) Limits for deleterious substances and physical property requirements shall conform to Table 3 and applicable class designation 5S, 5M, or 1N.
  - b. Approved service record of 3 years with a history indicating that the coarse aggregate is not chemically reactive.
  - c. For a new coarse-aggregate source, when 3 years' approved service records are not available, or when the service records are unacceptable; the aggregate shall be evaluated for potential reactivity. Aggregate must be considered innocuous in accordance with petrographic examination by ASTM C295 and tests conforming to ASTM C289.

- d. Coarse aggregate considered deleterious or potentially deleterious shall not be used without approval.
  - e. Blast furnace slag will not be permitted.
  - f. Maintain coarse aggregate free of ice and frozen lumps.
  - g. Grading Requirements:
    - (1) Size No. 67, from 3/4-inch (19-mm) to No. 4 (4.75-mm) sieve for all concrete unless otherwise specified.
    - (2) Size No. 57, from 1-inch (25-mm) to No. 4 (4.75-mm) sieve for all concrete unless otherwise specified.
4. Mixing Water:
- a. Only potable water will be acceptable.
5. Admixtures:
- a. Water-Reducing Type:
    - (1) Conform to ASTM C494, Type A.
    - (2) Conform to manufacturer's recommendations for use.
    - (3) Technical assistance of the manufacturer's field representative shall be furnished upon request.
  - b. Air-Entraining Type:
    - (1) Conform to ASTM C260.
    - (2) Conform to manufacturer's recommendations for use.
    - (3) Technical assistance of the manufacturer's field representative shall be furnished upon request.
    - (4) Testing of air-entraining admixtures shall conform to ASTM C233.
  - c. Other Admixtures: Use only with Engineer's written concurrence.
    - (1) Water-Reducing, Retarding Type: Conform to ASTM C494, Type D.
  - d. Admixtures shall not contain any chloride ions.
  - e. Storage: Admixtures shall be stored in such a manner as to avoid contamination, evaporation, freezing, temperature changes, settling, or any damage which would adversely affect their characteristics.

B. Laboratory Testing of Materials for Use in Concrete:

1. An approved independent testing laboratory shall be selected and paid by Contractor to perform all required laboratory tests of materials proposed for use in the production of concrete and to determine mix proportions when laboratory trial batches are required.
2. Contractor shall deliver representative Samples of all proposed concrete materials to the laboratory for the following testing:
  - a. Fine Aggregate:
    - (1) ASTM C33.
    - (2) ASTM C40.
    - (3) ASTM C88.
    - (4) ASTM C117.
    - (5) ASTM C136.
    - (6) ASTM C142.
    - (7) Fineness modulus.
    - (8) ASTM C295 and ASTM C289 or approved service records.
  - b. Coarse Aggregate:
    - (1) ASTM C33
    - (2) ASTM C88.
    - (3) ASTM C136.
    - (4) ASTM C142.
    - (5) ASTM C295 and ASTM C289 or approved service records.
  - c. Air-entraining admixture shall be tested conforming to ASTM C233.
3. The laboratory test results shall be part of the design mix submittal specified in this PART 2, Paragraph 2.01.D. - Mix Proportions.

C. Concrete Qualities Required:

1. Compressive Strength:
  - a. Minimum 28-day compressive strength = 4,500 psi (31 026 kPa) for all construction unless otherwise indicated.



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- b. Compressive-strength determinations shall be made from 6-inch (150-mm) diameter by 12-inch (300-mm) long concrete cylinders tested in accordance with ASTM C39.
  2. Slump of concrete shall be between 2 inches (50 mm) and 4 inches (100 mm) as tested in accordance with ASTM C143. Slump of concrete shall not exceed 8 inches (200 mm) if a high-range water reducer is used.
  3. Air Content:
    - a. 6%  $\pm$ 1.5% unless otherwise indicated or specified.
    - b. 3% maximum for all concrete receiving steel-troweled finish.
    - c. Per manufacturer's recommendations for concrete receiving a topping, coloring, coating, or surface hardener.
    - d. 4% minimum for concrete using light weight aggregate.
    - e. Testing shall be in accordance with ASTM C231.
  4. Water-Cementitious Materials Ratio:
    - a. In addition to the aforementioned requirements, maximum water-cementitious materials ratio shall be limited as follows:
      - (1) 0.40 for all concrete unless otherwise specified.
  5. Chloride Ion Content:
    - a. Maximum water-soluble chloride ion content, in percent by weight of cement:
      - (1) 0.30 for all concrete unless otherwise specified.
    - b. Testing shall be in accordance with ASTM C1218.
- D. Mix Proportions:
1. Concrete shall be homogeneous, readily placeable, uniformly workable, and finishable; proportioned to conform to ACI 211.1.
  2. Mix proportions for all concrete, unless otherwise specified, shall be selected preferably on the basis of field experience; but in the case where sufficient or suitable strength test data is not available, concrete shall be proportioned on the basis of laboratory trial mix design.
    - a. Field experience using test results within the preceding year, with the materials and plant to be employed may be the basis of mix proportioning, provided that not less than 30 consecutive satisfactory compressive-strength tests on concrete using the proposed materials

with a similar mix are available. A compressive-strength test is defined as the average 28-day compressive strength of two companion cylinders made conforming to ASTM C172 and ASTM C31 and tested conforming to ASTM C39.

- (1) The standard deviation of compressive-strength tests shall be computed as a basis for design of the mix. The design average compressive strength shall exceed the specified strength by at least:
  - (a) 400 psi (2760 kPa) if standard deviation is less than 300 psi (2070 kPa).
  - (b) 550 psi (3800 kPa) if standard deviation is 300 to 400 psi (2070 to 2760 kPa).
  - (c) 700 psi (4830 kPa) if standard deviation is 400 to 500 psi (2760 to 3450 kPa).
  - (d) 900 psi (6200 kPa) if standard deviation is 500 to 600 psi (3450 to 4140 kPa).
  - (e) 1,200 psi (8275 kPa) if standard deviation is greater than 600 psi (4140 kPa).
- (2) Submit the following test data to Engineer for approval prior to placing concrete:
  - (a) Fine Aggregate:
    - 1). ASTM C33.
    - 2). ASTM C40.
    - 3). ASTM C88.
    - 4). ASTM C117.
    - 5). ASTM C136.
    - 6). ASTM C142.
    - 7). Fineness modulus.
    - 8). ASTM C295 and ASTM C289 or approved service records.
  - (b) Coarse Aggregate:
    - 1). ASTM C33.

- 2). ASTM C88.
  - 3). ASTM C136.
  - 4). ASTM C142.
  - 5). ASTM C295 and ASTM C289 or approved service records.
- (c) Cement:
- 1). Mill certificate.
  - 2). ASTM C430.
- (d) Concrete:
- 1). Fine and coarse aggregate, water and cement sources.
  - 2). Mix proportions, slump and air content.
  - 3). Data on 30 consecutive satisfactory compressive strength tests and standard deviation calculations.
- b. Laboratory Trial Batch: When laboratory trial batches are used as a basis for determining mix proportions, all such Work shall be performed by the laboratory as specified in PART 2, Paragraph 2.01.B. - Laboratory Testing of Materials for Use in Concrete, this Section.
- (1) Laboratory trial batches shall be used to establish a water-cement ratio, compression-strength curve with at least three points, each representing the strength of a separate trial batch. At least one point shall be above and one below the strength required. Each point on the curve shall represent the average of at least three cylinders tested at 28 days or an earlier age when approved by Engineer. The slump and air content shall be at the maximum limits specified in PART 2, Paragraph 2.01.C. - Concrete Qualities Required, this Section.
  - (2) A point on the water-cement ratio, compressive-strength curve shall be selected that will provide an average compressive strength at least 1,200 psi (8275 kPa) greater than the specified minimum strength.
  - (3) Submit the following test data to Engineer for approval prior to placing concrete.
    - (a) Fine Aggregate:
      - 1). ASTM C33.

- 2). ASTM C40.
  - 3). ASTM C88.
  - 4). ASTM C117.
  - 5). ASTM C136.
  - 6). ASTM C142.
  - 7). Fineness modulus.
  - 8). ASTM C295 and ASTM C289 or approved service records.
- (b) Coarse Aggregate:
- 1). ASTM C33.
  - 2). ASTM C88.
  - 3). ASTM C136.
  - 4). ASTM C142.
  - 5). ASTM C295 and ASTM C289 or approved service records.
- (c) Cement:
- 1). Mill certificate.
  - 2). ASTM C430.
- (d) Concrete:
- 1). Fine and coarse aggregate, water and cement sources.
  - 2). Laboratory mix proportions, slump and air content.
  - 3). Water-cement ratio, compressive-strength curve.
  - 4). ASTM C1218.
3. Prior to placing any concrete, the laboratory selected by Contractor shall report the results of the testing and mix designs to the following:
- a. Engineer, Kansas City Office (one copy).
  - b. Resident Project Representative, Field Office (one copy).

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- c. Contractor (copies as required).
  - d. Concrete Supplier (copies as required).
- E. Measurement of Materials:
- 1. General Requirements:
    - a. Conform to ACI 304R.
    - b. Beam or springless dial-type scale conforming with NBS - "Specifications for Scales."
    - c. Volumetric measurement of water shall be performed with an approved automatic valve.
  - 2. Concrete Plant Scale Accuracy and Calibration Frequency:
    - a. The concrete plant scales shall be accurate to  $\pm 0.4\%$  of the capacity of the scale.
    - b. The scales shall be calibrated at intervals as specified in PART 3, Article 3.09 -Testing, this Section.
  - 3. Individual Batch Accuracy:
    - a. Cement:  $\pm 1.0\%$ .
    - b. Water:  $\pm 1.0\%$  by volume or weight.
    - c. Aggregates:  $\pm 2.0\%$ .
    - d. Admixtures:  $\pm 3.0\%$  by volume or weight.
    - e. Fly Ash:  $\pm 1.0\%$ .
- F. Mixing and Delivery:
- 1. Conform to ACI 304R.
  - 2. Cement temperature, when added to mix, shall not exceed 170°F (77°C).
  - 3. Adjust the amount of mix water to compensate for the moisture content of the aggregates.
  - 4. Concrete Plant:
    - a. Conform to "Concrete Plant Mixer Standards" of the Plant Mixer Manufacturers Division, Concrete Plant Manufacturers Bureau, and "Concrete Plant Standards" of the Concrete Plant Manufacturers Bureau.

- b. Charge with 5% to 10% of the mixing water both in advance and after the addition of aggregates and cement.
- c. Charge with remaining water uniformly with the other materials.
- d. Avoid charging in excess of manufacturer's rating.
- e. Discharge mixed concrete completely prior to recharging.
- f. Mixing Time:
  - (1) Start immediately when all ingredients, except the last of the water, are in the mixer.
  - (2) Minimum mixing time shall conform with mixer manufacturer's instructions, but not be less than the following:

Capacity of Mixer	Minimum Time
<u>Cubic Yards</u>	<u>of Mixing</u>
1 or less.....	1 minute
2.....	1 minute, 15 seconds
3.....	1 minute, 30 seconds
4.....	1 minute, 45 seconds
5.....	2 minutes
6.....	2 minutes, 15 seconds

Add 15 seconds' mixing time for each additional cubic yard of concrete.

- 5. Mixing of Concrete at Plant Off Jobsite:
  - a. Mix concrete in central mixer or truck mixer. Transport in truck mixer turning at agitation speeds only.
  - b. Water added to concrete having a slump below the specified minimum shall be at Contractor's risk. If the water added produces a slump greater than the specified maximum, the concrete will be rejected. If water is added, the concrete shall be remixed for a minimum of 25

revolutions. Water shall not be added after the truck mixer has begun to discharge concrete.

- c. Truck mixer shall conform to "Truck Mixer, Agitator, and Front Discharge Concrete Carrier Standards" of the Truck Mixer Manufacturers Bureau.
  - d. Ready-mixed concrete shall be produced and delivered conforming to ASTM C94 as applicable.
  - e. Contractor shall furnish Owner with a concrete delivery ticket for each load of concrete. The ticket shall have the following information recorded:
    - (1) Serial number of ticket.
    - (2) Time batched.
    - (3) Time arrived on jobsite.
    - (4) Amount of concrete (by volume).
    - (5) Mix number.
    - (6) Amount of all water added at jobsite by Contractor.
    - (7) Name of ready-mix batch plant.
    - (8) Date.
    - (9) Truck number.
    - (10) Name of purchaser.
6. Plant and truck mixer uniformity shall be tested according to ASTM C94. Frequency of tests shall be as specified in PART 3, this Section.

## 2.02 Grout

- A. Grout for Dry Packing:
  1. Volume: 1 part Portland cement to 2 parts sand.
  2. Keep water to a minimum as required for placing by the dry packing method.
  3. Place after the mixed grout has been allowed to stand for 2 hours.
  4. The sand and cement shall be as specified for concrete.
- B. Flowable Nonshrinking Grout:

1. Required for setting handrail posts, for setting equipment recommended by the manufacturer to be set with nonshrinking grout, and in other places indicated.
2. Grout shall be nonmetallic and conform to ASTM C1107.
3. Prepare and place conforming to manufacturer's printed instructions.
4. For equipment bases, the concrete surfaces shall be grit blasted or roughened with a chipping hammer prior to grouting. The foundation plates shall be cleaned of any grease, oil, paint, primers, or epoxy coatings.

C. Grout for Bonding:

1. Proportion (by weight): 1 part cement to 1-1/2 parts sand.
2. Keep water to a minimum.

## 2.03 Bonding Agent

- A. Provide moisture-insensitive, epoxy-resin bonding agent conforming to ASTM C881, Type V.

## 2.04 Concrete Accessories

A. PVC Waterstops:

1. 6-inch ribbed serrated virgin polyvinyl chloride equal to one of the following:
  - a. Greenstreak, Inc. - Greenstreak Style 679.
  - b. Vinylex Corporation - R6-38.
  - c. Southern Metals - 17FR.
2. Base Seal: Virgin polyvinyl chloride equal to one of the following:
  - a. Nonexpansion Joints:
    - (1) Greenstreak, Inc. - Greenstreak Style 771.
    - (2) Vinylex Corporation - BS9-532.
  - b. Expansion Joints:
    - (1) Greenstreak, Inc. - Greenstreak Style 772.
    - (2) Vinylex Corporation - BSE9-532.
3. Provide factory fabricated waterstop corner transitions and intersections leaving only straight butt joint splices for the field.



4. Waterstops shall be provided with factory-installed hog rings at 12-inch centers along each flange.
5. Use for all locations unless otherwise specified.

B. Plastic Waterstops:

1. Swellable, Chloroprene Rubber Waterstop:
  - a. Greenstreak, Inc. - Hydrotite Product N. CJ-1020-2K-ADH.
  - b. Adeka - Ultra Seal MC-2010MN.
2. Provide all accessories as recommended by the manufacturer including, but not limited to, primers, adhesives, and sealants to ensure watertight construction. Install per manufacturer's written instructions and recommendations.

C. Expansion Joints:

1. Expansion Joint Filler: Premolded cork of thickness indicated and conforming to ASTM D1752, Type II, cork. Unless indicated to be asphalt-impregnated fiber.
2. Bond Breaker: Polyethylene tape or other plastic tape as recommended by sealant manufacturer.
3. Sealant Backer Rod: Provide closed cell backer rod or other backing material as recommended by sealant manufacturer.
4. Joint Sealants:
  - a. Multi-component sealant as follows:
    - (1) Joint Sealant - General Use:
      - (a) BASF Building Systems: Sonneborn Sonolastic NP 2 (vertical use) and Sonolastic SL 2 (horizontal use).
      - (b) Epoxy Systems Products Company: Product #11.
      - (c) Euclid Chemical Company: Eucolastic II.
      - (d) Pecora Corporation: NR-200, Dynatred.
    - (2) Joint Sealant - Traffic Grade (conforming to FS TT-S-227):
      - (a) BASF Building Systems: Sonneborn Sonolastic SL 2.
      - (b) Epoxy Systems Products Company: Product #913.

- (c) Pecora Corporation: Dynatrol II SG.
    - (d) Sika Corporation: Sikaflex-2c NS TG.
  - (3) Joint Sealant - Wastewater Treatment and Storage Facilities:
    - (a) BASF Building Systems: Sonneborn Polysulfide Sealant.
    - (b) Pecora Corporation: Synthacalc GC2+.
    - (c) Sika Corporation: Sikaflex-2c NS.
- D. Preformed Contraction Joints: Zip Joint T-shaped plastic strip as manufactured by BoMetals, Inc., Powder Springs, Georgia. Depth of preformed construction joint shall exceed 1/4 of the slab thickness.
- E. Flashing Reglets:
  - 1. Fabricate of sheet metal, open-type with continuous groove 1-1/8 inches (30 mm) deep minimum by 3/16 inch (5 mm) wide at opening and sloped upward at 45 degrees. Top surface shall have toothed lip section to anchor upturned edge of metal snap-lock counter flashing when inserted. Sheet metal shall be stainless steel, 0.011-inch (0.28-mm) minimum thickness, Type 302 or Type 304, Number 2D finish, soft temper.
- F. Dovetail Anchor Slots:
  - 1. Preformed metal slot approximately 1 by 1 inch (25 by 25 mm) of not less than 22 gage galvanized steel cast in concrete. Coordination actual size and throat opening with dovetail anchors and provide with removable filler material.

## 2.05 CURING AGENT:

- A. Apply to all concrete surfaces unless otherwise indicated or specified.
- B. Curing agent shall conform as follows:
  - 1. ASTM C309, Type 1: Use where concrete surface is not exposed to direct sunlight after placement.
  - 2. ASTM C309, Type 1-D: Use where slabs are exposed to direct sunlight for a period of seven days minimum after placement. Curing and sealing agent with fugitive dye shall be readily distinguishable upon the concrete surface for at least four hours after application but shall be inconspicuous within seven days after application.
  - 3. ASTM C309, Type 2: Use as specified in PART 3, Article 3.05 - Hot Weather Concreting, this Section.

- C. Curing compound used on floors to be sealed, painted, tiled, topped, dampproofed, waterproofed, or covered with resilient floor covering shall be guaranteed not to interfere with application of sealer, paint, tile mortar, or tile adhesive after a 28-day curing period.
- D. Curing compound shall be VOC compliant with a maximum VOC content of 2.9 lbs./gal (350 g/L), or less where Project location regulations are more stringent.

## PART 3 - Execution

### 3.01 Preparation For Concrete Placement

- A. Openings Through Concrete: Provide openings through concrete as indicated and for the proper installation of all equipment, piping, wiring, ductwork and similar items, installed under this Contract.
- B. Installation of Embedded Items:
  - 1. Provide for accurate installation of embedded items installed under this Contract.
  - 2. Securely fix floor drains in place to prevent flotation while placing concrete. Uniformly and accurately slope finish floor slab toward the drains.
  - 3. Embedded items shall be as indicated or specified, or as selected by Contractor and approved by Engineer.
  - 4. During cold weather, protect pipe sleeves, shear pockets, and blockouts from moisture which may freeze, expand, and crack the sleeve, pocket or blockout and concrete structure.
  - 5. Grease or tape anchor bolt threads to protect from concrete splatter.
- C. Installation of Joints:
  - 1. Construction Joints:
    - a. Location:
      - (1) Locate joints, which are not indicated or specified, in conformance with ACI 318.
      - (2) Locate joints to limit the length of all concrete placements to not more than 25 feet.
      - (3) Obtain Engineer's approval of joints located by Contractor prior to preparation of reinforcing steel drawings.
    - b. Preparation and Installation:

- (1) Clean and break laitance or other foreign material from bonding surface.
  - (2) Tighten forms remaining in place (where applicable) to prevent seepage between forms and hardened concrete.
  - (3) Provide waterstops and shear keys as indicated or specified and as required in any new construction joint requested by Contractor.
- c. Waterstops:
- (1) Install in all construction joints where indicated.
  - (2) Install conforming to manufacturer's printed instructions. All joints and splices of PVC waterstop shall be 100% fused. Use thermostatically controlled splicing iron as recommended by manufacturer.
  - (3) Metal waterstops shall be welded with a continuous watertight weld or bolted with a minimum contact lap of 12 inches (300 mm).
2. Expansion Joints:
- a. Install filler, backer rod and sealant in strict conformance with manufacturer's written instructions.
  - b. Reinforcing steel shall not extend through expansion joints unless indicated otherwise.
  - c. Attach rigid joint filler to the face of the joint prior to placing adjacent concrete. The filler shall occupy the entire width of the joint.
  - d. Install sealant backer rod for sealant except where indicated to be omitted. Install bond breaker where indicated.
  - e. Clean joints surfaces immediately before application of sealant.
  - f. Install joint sealants to conform to ASTM C1193. Tool sealants to provide smooth, uniform bead with a slightly concave surface, eliminate air pockets, and insure sealant contact and adhesion with sides of joint.
  - g. Protect joints from moisture and ice during freezing.
3. Contraction Joints: As specified in this PART 3, Article 3.03 - Finishing, this Section.
- D. Cutting and Bonding to Existing Concrete:
1. Cutting Existing Concrete:

- a. Use methods and equipment that will avoid damage to adjacent parts of the structure from heavy blows or vibration.
  - b. Cut existing concrete with power concrete saw where possible to prevent spalling and chipping and to form neat, straight edge.
  - c. Remove all loose or cracked concrete resulting from cutting existing concrete, leaving only sound, undamaged concrete adjacent to new Work.
  - d. Leave access opening edges with a neat, true grout surface to the opening size indicated.
  - e. Cut reinforcing steel with sufficient length remaining (approximately 38 bar diameters) for bending and lapping into new construction.
2. Bonding to Existing Concrete:
    - a. Roughen concrete to 1/4-inch (6-mm) amplitude by use of a pneumatic chipping hammer or other approved means.
    - b. Thoroughly clean the concrete surface and apply the bonding agent in accordance with manufacturer's written instructions.

### 3.02 Placing Of Concrete

- A. Conventional Placing:
  1. General Requirements:
    - a. Conform to ACI 304R.
    - b. Bonding surfaces, including reinforcement, shall be clean, free of laitance and foreign materials.
    - c. Face horizontal bonding surfaces with 1-inch (25-mm) thick coat of fresh "grout for bonding." Wet all other surfaces.
    - d. Place concrete on properly prepared and unfrozen subgrade and only in dewatered excavation and forms.
    - e. Use forms for all concrete except where otherwise indicated or specified.
    - f. Do not place concrete that has partially hardened or has been contaminated by foreign materials.
    - g. Prevent mud or foreign materials from entering the concrete or forms during placement operations.
  2. Conveying:

- a. Convey concrete from the mixer and deposit in place by methods which will prevent the segregation or loss of materials.
  - b. Equipment for chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to provide a practically continuous flow of concrete at the delivery end.
  - c. Aluminum conveying equipment shall not be used.
3. Depositing:
- a. Place concrete in continuous horizontal lifts not to exceed 2 feet (600 mm), and place concrete against bulkheads and keyways at vertical joints.
  - b. Maximum free drop of concrete and grout for bonding shall be 5 feet (1.5 meters), in walls 10 inches (250 mm) or less in thickness, with 1-foot (300-mm) additional drop allowed for each inch (25 mm) of wall thickness over 10 inches (250 mm), with a maximum drop of 10 feet (3 meters).
  - c. When vapor barrier is used, keep lapped joints closed and take precautions to avoid puncturing the barrier.
4. Consolidation of Concrete:
- a. Consolidate concrete in conformance with ACI 309R. Characteristics and application of concrete vibrators shall be as set forth in Table 5.1.5.
  - b. Provide an adequate number of vibrators of sufficient capacity to keep up with the maximum rate of concrete placement. Keep on hand adequate standby equipment in good operating condition.
  - c. Vibrate concrete only until the concrete is thoroughly consolidated and the voids filled, as evidenced by the leveled appearance of the concrete at the exposed surface and the embedment of the surface aggregate.
  - d. Insert internal vibrators vertically to the full depth of the layer being placed and into the previous layer. Do not drag vibrators through the concrete. Insert and withdraw vibrator slowly with the vibrator running continuously so that no hole will be left in the concrete. Do not flow concrete from one location to another by use of a vibrator.
  - e. Consolidate concrete layer to full depth when using a surface vibrator. Use thinner layers or a more powerful vibrator if necessary to achieve complete consolidation.
  - f. Use form vibrators only where sections are too thin or where sections are inaccessible for internal vibrators.
5. Time Requirements:

- a. Place concrete at a sufficient rate to assure that lifts below have not taken initial set before fresh concrete is deposited.
  - b. Place concrete within 45 minutes after mixing. This period may be extended to 1 hour and 30 minutes provided that the combined air temperature, relative humidity, and wind velocity are such that the plasticity of the fresh concrete is satisfactory for placement and consolidation, and that the specified mixing water is not exceeded. Concrete which has partially set shall not be retempered but shall be discarded.
- B. Placing Concrete at Joints:
1. Bed horizontal joints with 1 inch (25 mm) of grout for bonding.
  2. Take precautions to ensure tight, well-bonded construction joints with no air pockets or voids.
  3. Take special precautions to avoid bending or displacing waterstop while placing concrete around it.
  4. Delay construction at a joint a minimum of 16 hours where placement is continued past joint, except where otherwise indicated.

### 3.03 Finishing

- A. Unformed Surfaces:
1. Screed Finish:
    - a. Use as first stage for all concrete finishes.
    - b. Use as final finish on surfaces that will be covered by additional concrete, grout placement, or mortar setting bed except as otherwise specified.
    - c. Immediately after screeding, use a wood float, darby, or bullfloat to eliminate high and low spots and to embed large aggregate. This shall be done in a manner to produce even, uniform surfaces so that surface irregularities do not exceed 3/8 inch in 10 feet (9 mm in 3 meters) when used as final finish.
    - d. Finish screeded base slab with coarse broom or rake in areas to receive 2-course floor finish.
  2. Floated Finish:
    - a. Use as second stage of broomed, troweled, or magnesium-troweled finish.
  3. Troweled Finish:

- a. Use as final finish on inside floors and on all other unformed surfaces not otherwise indicated or specified.
  - b. Trowel with mechanical steel trowel to obtain a smooth, dense finish. Hand steel trowel shall be used in areas not accessible by mechanical trowel. The final troweling shall be done after the concrete has become hard enough so that no mortar adheres to the edge of trowel and a ringing sound is produced as the trowel passes over the surface.
  - c. Do not trowel before surface water has evaporated or has been removed with a squeegee.
  - d. Finish to a true uniform surface so that surface irregularities do not exceed 1/8 inch in 10 feet (3 mm in 3 meters), except at floor drains.
  - e. Do not add sand or cement to the floor surface.
4. Magnesium-Troweled Finish:
- a. Perform as specified in PART 3, Paragraph 3.03.A.4. - Troweled Finish, this Section, except use a magnesium trowel by hand instead of a steel trowel to obtain a dense, but not slick, finish.
  - b. Use where floor will receive protective coating after curing.
5. Two-Course Floor Finish:
- a. Use on floor areas indicated.
  - b. Topping mix shall be as specified in PART 2, Paragraph 2.01.D. - Mix Proportions, this Section.
  - c. Clean the rough surface of the base slab of all mud, oil, grease, or any material that would prevent proper bonding of the topping course.
  - d. Thoroughly saturate base slab with water prior to placing topping course.
  - e. Finish topping with troweled finish unless otherwise indicated.
6. Contraction Joints:
- a. Locate as indicated.
  - b. Maintain true alignment with straightedge.
  - c. Joints shall be grooved except where sawed joints are indicated.
    - (1) Slab on grade joints shall be sawed.
  - d. Grooved Joints:



- (1) Perform during the finishing process.
  - (2) Width of groove shall not exceed 1/4 inch (6 mm).
  - (3) Depth of groove shall be at least 1 inch (25 mm).
- e. Sawed Joints:
- (1) Cut joints with power blade as soon as concrete surface is firm enough to resist tearing or damage by the blade and before random shrinkage cracks can occur. (Usually required 4 to 12 hours after finishing.)
  - (2) Make joints approximately 1/8 inch (3 mm) wide with depth equal to 1/4 the slab thickness unless otherwise indicated.
  - (3) Seal where indicated with the same type sealant specified for expansion joint sealant.
7. Floor Flatness and Levelness:
- a. Finish to a true uniform surface so that surface irregularities do not exceed 1/8 inch in 10 feet except at floor drains.
  - b. All slabs on grade not meeting the above minimum tolerance tests shall be removed and replaced at Contractor's expense.
  - c. All elevated floors not meeting the above minimum tolerance tests shall be ground and retopped at the Contractor's expense.
- B. Formed Surfaces:
1. Repair surface defects as specified in PART 3, Paragraph 3.03.C. - Repair of Defective Surfaces, this Section.
    - a. To obtain surface finish, patch defective surfaces immediately upon removal of forms with mortar as specified in PART 3, Paragraph 3.03.C. - Repair of Defective Surfaces, this Section.
    - b. Immediately before starting this Work, keep concrete thoroughly saturated with water for a minimum period of 3 hours.
    - c. Rub surfaces to be finished with a medium-coarse carborundum stone, using a small amount of mortar on its face. The mortar shall be composed of cement and fine sand mixed in proportions used in the concrete being finished. Continue rubbing until all form marks, projections, and irregularities have been removed, all voids filled, and a uniform surface has been obtained. Leave paste produced by this rubbing in place at this time.

- d. After all concrete above the surface being treated has been cast, obtain final finish by rubbing with a fine carborundum stone and water. Continue rubbing until the entire surface is of a smooth texture and uniform color.
- e. After the final rubbing is completed and the surface has dried, rub with burlap to remove loose powder and unsound patches, paste, and objectionable marks.
- f. Cure as specified in PART 3, Article 3.04 - Curing, this Section.

2. Burlap Finish:

- a. Apply burlap surface treatment to the following formed surfaces:
  - (1) Concrete exposed to public view.
  - (2) Concrete that is to be painted.
- b. Remove forms as soon as permitted in accordance with Section 03 10 00.
- c. Wet and fill all voids using mortar with the same sand-cement ratio as original concrete. Blend with white cement to match concrete color.
- d. Strike off all excess mortar flush with the surface using a burlap or canvas cloth with a circular motion.
- e. Remove all rough spots and rub with cloth to leave a surface of uniform texture and appearance.
- f. Finish shall result in a coating of mortar that will fill all small voids and air holes, leaving a smooth surface.
- g. Cure as specified in this PART 3, Article 3.04 - Curing, this Section.

C. Repair of Defective Surfaces:

- 1. Defined as any concrete surface showing misalignment, rock pockets, poor joints, holes from ties, voids, honeycomb, or any other defective area.
- 2. Repairing:
  - a. Repair as soon as forms have been removed.
  - b. Chip surface back to minimum depth of 1/2 inch (13 mm), chip edges perpendicular to surface, prewet depression and brush with neat cement immediately before patching.

- c. Patch surfaces using stiff mortar with same sand-cement ratio as original concrete and with minimum water for placing. Blend with white cement to match concrete color.
- d. Compact mortar into depressions so that after curing, hole is filled and mortar is flush with surface. Use hammer and ramming rod for compacting the holes.
- e. Moist-cure for 3 days or use curing compound.
- f. Engineer shall be notified of areas containing defects or where reinforcing steel is exposed, prior to determination of repair method.

### 3.04 Curing

- A. Cure concrete by one of the following methods in accordance with ACI 308.1:
  1. Leaving in forms for a minimum of 7 days. Keep formwork wet to prevent drying of concrete surfaces.
  2. Use of saturated bats, soaker hoses, or sprinkler for a minimum of 7 days. Keep concrete continuously wet.
  3. Using polyethylene sheets applied in full contact with surfaces.
  4. Using one coat of a liquid membrane forming compound as specified. Apply immediately after removal of forms (which have been continuously wet); or in case of a slab, after the concrete has been finished and is hardened sufficiently to walk on.
  5. Curing of concrete during hot or cold weather shall conform to PART 3 - Hot Weather Concreting and Cold Weather Concreting, this Section.

### 3.05 Hot Weather Concreting

- A. Follow the recommendations of ACI 305R if any of the following conditions occur:
  1. When the temperature is 90°F (32°C) or above.
  2. When the temperature is likely to rise above 90°F (32°C) within the 24-hour period after concrete placement.
  3. When there is any combination of high air temperature, low relative humidity, and wind velocity which would impair either concrete strength or quality.
- B. Concrete shall have a maximum temperature of 85°F (29°C) during placement.
- C. Dampen subgrade and forms with cool water immediately prior to placement of concrete.

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Concrete

- D. Protect freshly placed concrete immediately after placement so that the rate of evaporation as determined by ACI 305R (Figure 4.2) does not exceed 0.2 pound per square foot (1.0 kg per square meter) per hour.
- E. Protect concrete with suitable insulation if rapidly decreasing nighttime temperatures occur, which would cause thermal shock to concrete placed during warm daytime temperatures.
- F. Protect the concrete with temporary wet covering during any appreciable delay between placement and finishing.
- G. Begin curing unformed surfaces immediately after finishing and continue for 24 hours. Curing shall consist of application and maintenance of water-saturated material to all exposed surfaces; horizontal, vertical, and otherwise. After the 24-hour interval, continue curing using one of the following methods:
  - 1. Moist curing for 6 days.
  - 2. Application of one coat of curing compound as specified.
  - 3. Application and maintenance of curing paper or heat-reflecting plastic sheets for 6 more days.
- H. Begin curing formed concrete immediately after placing. Curing shall consist of keeping forms continuously wet for 24 hours. Thereafter, continue curing using one of the following methods:
  - 1. Loosen forms and position soaker hose so that water runs down along concrete surfaces. Continue for 6 days.
  - 2. Strip forms and apply curing compound as specified. Do not allow concrete surfaces to dry prior to application of curing compound.

### 3.06 Cold Weather Concreting

- A. When the temperature is 40°F (4.4°C) or is likely to fall below 40°F (4.4°C) during the 24-hour period after concrete placement, follow the recommendations of ACI 306R to prevent loss of concrete strength or quality.
- B. Minimum temperature for concrete as mixed shall be as indicated on lines 2, 3, and 4 of Table 5.1 of ACI 306R. Maximum temperature for concrete as mixed shall be 10°F (5.6°C) greater than the corresponding minimum temperature.
- C. Place and maintain concrete so that its temperature is never less than the temperature indicated on line 1 of Table 5.1 of ACI 306R. Maintain the required temperature for the time duration indicated on Tables 5.1 and 7.1 of ACI 306R.
- D. Monitor temperature of concrete in place at corners or edges of formwork as applicable.
- E. Air Heaters:

1. Do not expose concrete to carbon monoxide or carbon dioxide fumes from heaters or engines.
  2. Oil- or coke-burning salamanders will not be permitted.
  3. Heaters shall be ultramatic portable heaters made by the Union Chill Mat Company or Engineer approved equal.
  4. Personnel shall be present at all times to maintain safe, continuous operation of heating system.
- F. Control temperature and humidity of protected concrete so that excessive drying of concrete surfaces does not occur.
- G. Calcium chloride will not be permitted as a concrete accelerator or to thaw frozen subgrade prior to concrete placement.
- H. The maximum allowable temperature drop during the first 24-hour period after protection is discontinued shall be as indicated on line 1 of Table 5.1 of ACI 306R.
- I. Cure the concrete in accordance with Chapter 10 of ACI 306R.

### 3.07 Low-Strength Concrete

- A. Low-Strength Concrete:
1. Defined as either:
    - a. Concrete whose average, of any sets of three consecutive 28-day compressive strength tests, is below the required 28-day strength.
    - b. Concrete whose individual 28-day strength test (average of two cylinders) is more than 500 psi (3450 kPa) below the required 28-day strength.
  2. Should concrete meet either definition of low-strength concrete as a minimum, the Contractor shall take the following steps:
    - a. Increase the cement content. The increase shall be based on a statistical evaluation of the strength data, the design water-cement ratio, compressive-strength curve, and acceptable mix-design literature as follows:
      - (1) If sufficient concrete has been furnished to accumulate 30 tests, these should be used to establish a new target average strength in accordance with ACI 318, Section 5.3.
      - (2) If less than 30 tests have been made, the new target average strength should be at least as great as the average strength used in the initial selection of the mix proportions. Increase the target average strength based on a statistical evaluation of the available

strength data, the design water-cement ratio, compressive-strength curve, and acceptable mix-design literature. If the statistical average equals or exceeds the initial mix-design level, a further increase in the average level is required.

- b. Remove and replace with acceptable concrete when the quality and location of the low-strength concrete is such that Engineer considers the strength or durability of the structure is impaired and so orders.
  3. Low-strength concrete shall be considered defective Work as defined in General Conditions.
- B. Potentially Low-Strength Concrete: Defined as concrete whose 7-day test (average of two cylinders) is less than 70% of the specified minimum 28-day compressive strength.
- C. Construction delays caused by low-strength or potentially low-strength concrete shall not relieve Contractor from responsibility for late completion even though extensions of time may be granted.

### 3.08 Miscellaneous Concrete Items

- A. Equipment Bases:
1. Construct equipment bases, pads, and foundations as indicated or, when not indicated, conforming to equipment manufacturer's requirements.
  2. Reinforce conforming to typical detail unless otherwise indicated.
  3. Equipment bases shall include concrete, reinforcing steel, formwork as required, and anchor bolts. Place grout for equipment installed under this Contract.
  4. Finish top area of bases between anchor bolts and forms with a troweled finish.

### 3.09 Testing

- A. Field Testing of Concrete Plant and Mixing Trucks:
1. The concrete plant shall be inspected and tested to ensure conformance with ACI 304R and the "Concrete Plant Standards of the Concrete Plant Manufacturers Bureau." The scales shall be calibrated at the initial setup and at 3-month intervals thereafter.
  2. Mixing trucks shall be inspected and tested to ensure conformance with ACI 304R and "Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers Bureau" of the National Ready-Mix Concrete Association. Tests shall be done at initial setup and every 3 months thereafter.

3. Submit test reports when requested.

B. Field Testing of Concrete and Making of Concrete Test Cylinders:

1. Contractor shall furnish test equipment, test cylinder molds, and certified personnel to perform all required field tests, make the required concrete test cylinders (and beams), and deliver test cylinders (and beams) to the testing laboratory. The prescribed tests shall be made in the presence of or with the concurrence of the Owner.
2. Field testing personnel shall be on Site throughout placement of concrete.
3. Concrete sampling for tests and cylinder (and beam) making shall be done conforming to ASTM C172. Samples shall be taken at random and at the point of truck discharge.
4. Perform the following tests:
  - a. Moisture content, ASTM C566. Perform this test a minimum of twice a day and adjust the amount of mix water to compensate for the moisture content of the aggregates.
  - b. Prepare test cylinders conforming to ASTM C31, with not less than one set of cylinders (four cylinders) from each day's placement for each 100 cubic yards (75 cubic meters) or fraction thereof.
  - c. Slump test conforming to ASTM C143. Perform tests on the first batch produced each day, for every 50 cubic yards (38 cubic meters) or fraction thereafter, and with every set of test cylinders. Additional tests shall be run when directed by Engineer.
  - d. Air content test conforming to ASTM C231. Perform for first batch of day and with each set of test cylinders.
  - e. The batch of concrete being tested for slump or air content shall not be placed until acceptable results are obtained.
  - f. Discard concrete used for slump and air tests.
  - g. Perform concrete and air temperature tests for first batch of day and with each set of test cylinders. Additional readings shall be taken when directed by Engineer.
  - h. Any batch of concrete with slump or air content not in conformance with Specifications shall be rejected.
  - i. Furnish slump, air content, and temperature test results to the testing laboratory for inclusion in the cylinder test reports.

C. Laboratory Testing of Aggregates and Concrete During Construction:

1. An independent testing laboratory will be selected and paid by Owner to perform the required laboratory tests and statistical evaluations of aggregates and concrete being used in the Work.
  - a. Laboratory will cure and test concrete cylinders conforming to ASTM C192 and C39, testing two cylinders at 7 days of age and two at 28 days of age.
  - b. Contractor shall have the right to observe all phases of concrete cylinder curing and testing. Should Contractor observe any deviations from the prescribed testing procedures that he considers detrimental to concrete strength test results, he shall immediately notify Owner in writing.
  - c. Contractor shall assist laboratory in obtaining Samples of fine and coarse aggregate for testing.
  - d. Contractor shall make arrangements with the testing laboratory to receive copies of test reports. The cost of providing a maximum of two copies of each report to the Contractor will be paid by Owner.
  - e. Should the test results indicate low strength concrete as defined in PART 3, Article 3.07 - Low-Strength Concrete, this Section, Contractor shall take immediate corrective action.
  - f. Should the statistical data indicate an excessive margin of safety, the concrete mix may be modified subject to Engineer's approval.
  - g. Should the material tests taken during construction indicate nonconformance with the Specifications, Contractor shall take immediate corrective action.
  
2. An independent testing laboratory shall be selected and paid by Contractor to perform the required laboratory tests and statistical evaluations of aggregates and concrete being used in the Work.
  - a. Laboratory shall cure and test concrete cylinders conforming to ASTM C192 and C39, testing two cylinders at 7 days of age and two at 28 days of age.
  - b. Engineer shall have the right to observe all phases of concrete cylinder curing and testing.
  - c. Should the test results indicate low strength concrete as defined in PART 3, Article 3.07 - Low-Strength Concrete, this Section, Contractor shall take immediate corrective action.
  - d. Should the material tests taken during construction indicate nonconformance with the Specifications, Contractor shall take immediate corrective action.



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### 3.10 Repair, Replacement, And Field Modifications

- A. Embedded items and concrete that are misplaced or damaged during construction shall not be repaired, replaced, or field-modified without approval of Engineer.

END OF SECTION



## PART 1 - General

### 1.01 Summary

- A. This Section includes unit masonry assemblies consisting of the following:
  - 1. Concrete masonry units.
  - 2. Mortar and grout.
  - 3. Reinforcing steel.
  - 4. Masonry joint reinforcement.
  - 5. Ties and anchors.
  - 6. Miscellaneous masonry accessories.
  
- B. Products installed, but not furnished, under this Section include the following:
  - 1. Steel lintels for unit masonry, furnished under SECTION 051200 - STRUCTURAL STEEL FRAMING.
  - 2. Manufactured reglets in masonry joints for metal flashing, furnished under SECTION 076200 - SHEET METAL FLASHING AND TRIM.

### 1.02 References

- A. American Concrete Institute (ACI):
  - 1. 315 - Details and Detailing of Concrete Reinforcement.
  - 2. 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures.
  
- B. American Society for Testing and Materials (ASTM):
  - 1. A36/A36M - Carbon Structural Steel.
  - 2. A82 - Steel Wire, Plain, for Concrete Reinforcement.
  - 3. A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 4. A307 - Carbon Steel Bolts and Studs, 6,000 psi Tensile Strength.
  - 5. A325/A325M - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - 6. A366/A366M - Steel Sheet, Carbon, Cold-Rolled, Commercial Quality.
  - 7. A563/A563M - Carbon and Alloy Steel Nuts.

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Unit Masonry Assemblies

8. A615/A615M - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
9. A616/A616M - Rail-Steel Deformed and Plain Bars for Concrete Reinforcement.
10. A617/A617M - Axle-Steel Deformed and Plain Bars for Concrete Reinforcement.
11. A653/A653M - Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
12. A767/A767M - Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
13. A951 - Masonry Joint Reinforcement.
14. C90 - Loadbearing Concrete Masonry Units.
15. C129 - Nonload-Bearing Concrete Masonry Units.
16. C140 - Test Methods of Sampling and Testing Concrete Masonry Units.
17. C143 - Test Method for Slump of Hydraulic Cement Concrete.
18. C144 - Aggregate for Masonry Mortar.
19. C150 - Portland Cement.
20. C207 - Hydrated Lime for Masonry Purposes.
21. C270 - Mortar for Unit Masonry.
22. C404 - Aggregates for Masonry Grout.
23. C476 - Grout for Masonry.
24. C494 - Chemical Admixtures in Concrete.
25. C578 - Rigid, Cellular Polystyrene Thermal Insulation.
26. C780 - Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
27. C1019 - Test Method of Sampling and Testing Grout.
28. C1093 - Practice for Accreditation of Testing Agencies for Unit Masonry.
29. C1289 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
30. C1314 - Test Method for Constructing and Testing Masonry Prisms Used to Determine Compliance with Specified Compressive Strength of Masonry.

- 31. C1329 - Mortar Cement.
- 32. D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- 33. D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- C. Code of Federal Regulations (CFR):
  - 1. 29 CFR 1926 - Standards for the Construction Industry (OSHA).
- D. International Building Code (IBC - 2012).
- E. National Concrete Masonry Association (NCMA):
  - 1. TEK 8-2 - Removal of Stains from Concrete Masonry Walls.

### 1.03 Definitions

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

### 1.04 Performance Requirements

- A. Provide unit masonry that develops the following net-area compressive strengths ( $f'_m$ ) at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to Tables 2105.2.2.1.1 and 2105.2.2.1.2 in IBC.
  - 1. For Concrete Unit Masonry:  $f'_m = 2000$  psi.

### 1.05 Submittals

- A. Submit as specified in DIVISION 01.
- B. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- C. Shop Drawings: Show fabrication and installation details for the following:
  - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
- D. Samples for Initial Selection: For the following:
  - 1. Unit masonry Samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.
  - 2. Colored mortar Samples showing the full range of colors available.
- E. Samples for Verification: For the following:

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Unit Masonry Assemblies

1. Accessories embedded in the masonry.
  2. Colored mortar Samples for each color required, showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
- F. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Engineer and approved in writing.
- G. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- H. Material Test Reports: From a qualified testing agency employed and paid by Contractor or manufacturer indicating and interpreting test results of the following for compliance with requirements indicated:
1. Each type of masonry unit required.
    - a. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.
  2. Mortar complying with property requirements of ASTM C270.
  3. Grout mixes complying with compressive strength requirements of ASTM C476. Include description of type and proportions of grout ingredients.
- I. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Each type of masonry unit required.
    - a. Include test data, measurements, and calculations establishing net-area compressive strength of masonry units.
  2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
  3. Each combination of masonry unit type and mortar type. Include statement of net-area compressive strength of masonry units, mortar type, and net-area compressive strength of masonry determined according to Tables 2105.2.2.1.1 and 2105.2.2.1.2 in IBC.
  4. Each material and grade indicated for reinforcing bars.

5. Each type and size of joint reinforcement.
  6. Each type and size of anchor, tie, and metal accessory.
- J. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

## 1.06 Quality Assurance

- A. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Engineer/Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM C1093, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Preconstruction Testing: Employ and pay a qualified independent testing agency to determine the compressive strength of unit masonry assembly by the prism test method in accordance with ASTM C1314.
- E. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.
- F. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality from one manufacturer for each cementitious component and from one source or producer for each aggregate.

## 1.07 Delivery, Storage, And Handling

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
1. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.08 Project Conditions

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
  - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from mortar splatter by coverings spread on ground and over wall surface.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Cold weather requirements become mandatory when the unit temperature or the air temperature on site falls below 40°F.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40°F and above and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.



1. When ambient temperature exceeds 100°F, or 90°F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

## PART 2 - Products

### 2.01 Concrete Masonry Units

- A. General: Provide shapes indicated and as follows:
  1. Provide special shapes for corners, jambs, sash, control joints, headers, bonding, and other special conditions.
  2. Provide square-edged units for outside corners.
- B. Concrete Masonry Units: ASTM C90 and as follows:
  1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
  2. Weight Classification: Normal weight.
  3. Provide Type I, moisture-controlled units.
  4. Size (Width): Manufactured to the following dimensions:
    - a. 8 inches nominal; 7-5/8 inches actual.
  5. Exposed Faces: Manufacturer's standard color and texture.

### 2.02 Split Face Masonry Units:

- A. General: Provide shapes indicated and as follows for each form of split face masonry unit required.
  1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
  2. Provide square-edged units for outside corners.
- B. Concrete block, conforming to ASTM C90, Type 1.
  1. Size: Nominal face dimensions of 16-inch length x 8-inch height x 8-inch thick.
  2. Color and Pattern: Split face masonry units. Color as selected by Engineer from manufacturer's full range of colors to match/complement the existing plant.
- C. Integral Water Repellent: Provide units made with liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing

integral water-repellent manufacturer's mortar additive according to ASTM E514, with test period extended to 24 hours, show no visible water or leaks on the back of the test specimen.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Addiment Inc.: Block Plus W-10.
  - b. W. R. Grace & Co., Construction Products Division: Dry-Block.
  - c. Master Builders: Rheopel.
- D. Efflorescence: Provide block that has been tested according to ASTM C67 and is rated "not effloresced."

## 2.03 Mortar And Grout Materials

- A. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C150, Type I, or Type III, and hydrated lime complying with ASTM C207.
- D. Mortar Cement: ASTM C1329.
  1. For pigmented mortar, use a colored cement formulation as required to produce the color indicated or, if not indicated, as selected from manufacturer's standard formulations.
    - a. Pigments shall not exceed 10% of Portland cement by weight for mineral oxides or 2% for carbon black.
- E. Aggregate for Mortar: ASTM C144; except for joints less than 1/4 inch thick, use aggregate graded with 100% passing the No. 16 sieve.
- F. Aggregate for Grout: ASTM C404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
- H. Water: Potable.
- I. Products: Subject to compliance with requirements, provide one of the following:
  1. Mortar Cement:
    - a. Blue Circle Cement: Magnolia Superbond Mortar Cement.

- b. Lafarge Corporation: Lafarge Mortar Cement.
- 2. Cold-Weather Admixture:
  - a. Euclid Chemical Co.: Accelguard 80.
  - b. W. R. Grace & Co., Construction Products Division: Morseled.
  - c. Sonneborn, div. of ChemRex, Inc.: Trimix-NCA.
- J. Preblended mortar and grout mixes that meet the criteria above are acceptable.

## 2.04 Reinforcing Steel

- A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M; ASTM A616/A616M, including Supplement 1; or ASTM A617/A617M, Grade 60 (Grade 400).
- B. Deformed Reinforcing Wire: ASTM A496, with ASTM A153 Class B2 zinc coating.
- C. Welded-Wire Fabric: ASTM A185.

## 2.05 Masonry Joint Reinforcement

- A. General: ASTM A951 and as follows:
  - 1. Hot-dip galvanized, carbon-steel wire for both interior and exterior walls.
  - 2. Wire Size for Side Rods: 9 gage.
  - 3. Wire Size for Cross Rods: 9 gage.
  - 4. Provide in lengths of not less than 10 ft., with prefabricated corner and tee units where indicated.
- B. For single-wythe masonry, provide ladder type with single pair of side rods and cross rods spaced not more than 16 inches o.c.
- C. For multi-wythe masonry, provide type as follows:
  - 1. Ladder-eye design with perpendicular cross rods and adjustable wall tie spaced not more than 16 inches o.c.

## 2.06 Ties And Anchors, General

- A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.
- B. Wire Ties: 26-gage stainless-steel corrugated wall ties.
- C. Galvanized Steel Sheet: ASTM A653/A653M, G60 (Z180), commercial-quality, steel sheet zinc coated by hot-dip process on continuous lines before fabrication.

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Unit Masonry Assemblies

- D. Steel Sheet, Galvanized after Fabrication: ASTM A366/A366M cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A153.
- E. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

## 2.07 Miscellaneous Ties

- A. Metal Lath Wall Ties:
  - 1. 3.4-lb. galvanized diamond-mesh lath width shall be 1 inch less than wall thickness by length as required by specific requirement but not less than 16 inches.
  - 2. Use in following locations:
    - a. Under masonry cores to be filled with grout.

## 2.08 Miscellaneous Anchors

- A. Anchor Bolts: Steel bolts complying with ASTM A307, Grade A (ASTM F568, Property Class 4.6); with ASTM A563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A153, Class C; of diameter and length indicated and in the following configurations:
  - 1. Headed bolts.
  - 2. Nonheaded bolts, straight or bent in manner indicated.

## 2.09 Miscellaneous Masonry Accessories:

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35%; of width and thickness indicated; formulated from neoprene or PVC.
- B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).
- C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.
  - 1. Provide units with either two loops or four loops as needed for number of bars indicated.
- D. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Reinforcing Bar Positioners:
    - a. Dur-O-Wal, Inc.: D/A 811.

- b. Dur-O-Wal, Inc.: D/A 816.
- c. Heckman Building Products, Inc.: No. 376 Rebar Positioner.
- d. Hohmann & Barnard, Inc.: #RB Rebar Positioner.
- e. Hohmann & Barnard, Inc.: #RB-Twin Rebar Positioner.

## 2.10 Masonry Cleaners

- A. Use ProSoCo, Inc. or approved equal masonry cleaners as recommended by manufacturer.

## 2.11 Mortar And Grout Mixes

- A. General: Do not use admixtures, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry:
  - 1. Comply with ASTM C270, Proportion Specification, for types of mortar indicated below.
    - a. Limit cementitious materials in mortar to Portland cement and lime. Masonry cement will not be acceptable.
    - b. For all masonry:
      - (1) Type: S.
- C. Grout for Unit Masonry: Comply with ASTM C476. Use grout of consistency at time of placement that will completely fill spaces intended to receive grout.
  - 1. Use fine grout in grout spaces less than 2 inches in horizontal dimension, unless otherwise indicated.
  - 2. Use coarse grout in grout spaces 2 inches or more in least horizontal dimension, unless otherwise indicated.

## PART 3 - Execution

### 3.01 Examination

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Verify that foundations are within tolerances specified.
  - 2. Verify that reinforcing dowels are properly placed.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

### 3.02 Installation, General

- A. Thickness: Build walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.

### 3.03 Construction Tolerances

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 ft., nor 1/2 inch maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft., or 1/2 inch maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 ft., nor 1/2 inch maximum.

- E. For exposed bed joints, do not vary from thickness indicated by more than  $\pm 1/8$  inch, with a maximum thickness limited to  $1/2$  inch. Do not vary from bed-joint thickness of adjacent courses by more than  $1/8$  inch.
- F. For exposed head joints, do not vary from thickness indicated by more than  $\pm 1/8$  inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than  $1/8$  inch.

### 3.04 Laying Masonry Walls

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
  - 1. One-half running bond with vertical joint in each course centered on units in courses above and below.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions as indicated.

### 3.05 Mortar Bedding And Jointing

- A. Lay hollow masonry units as follows:

1. Lay vertical-cell units with full head joints. Provide bed joints with full mortar coverage on face shells and webs.
  2. Lay horizontal-cell units with full bed joints. Keep drainage channels free of mortar. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit in place and one side of unit to be placed.
  3. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 1/4- to 3/8-inch joints.
  4. Bed webs in mortar in starting course on footings and where adjacent to cells or cavities to be filled with grout.
  5. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B. Tool exposed joints when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
1. Slightly concave at all CMU joints.

### 3.06 Masonry Joint Reinforcement

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 16 inches o.c.
  2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
  3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
    - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, and other special conditions.

### 3.07 Control And Expansion Joints

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span



through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

- B. Form control joints in concrete masonry as follows:
  - 1. Install preformed control-joint gaskets designed to fit standard sash block.

### 3.08 Lintels

- A. Install steel angles where indicated.
- B. Provide minimum bearing of 16 inches at each jamb, unless otherwise indicated.

### 3.09 Reinforced Unit Masonry Installation

- A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
  - 1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
  - 1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

### 3.10 Field Quality Control

- A. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.
- B. Determine the compressive strength of unit masonry assembly by the prism test method in accordance with ASTM C1314.

### 3.11 Repairing, Pointing, And Cleaning

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

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**Unit Masonry Assemblies**

- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C. In-Progress Cleaning: Clean unit masonry as Work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry and mortar joints by methods and products as recommended by brick manufacturer.
  - 1. Remove large mortar particles with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Design Engineer's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering surfaces with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
  - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
  - 6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.
- E. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

### 3.12 Masonry Waste Disposal

- A. Excess Masonry Waste: Remove excess masonry waste and legally dispose of off Owner's property.

END OF SECTION

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## PART 1 - General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 Summary

- A. This Section includes fabrication and erection of the structural steel and other steel or metal items as defined in AISC Manual, Code of Standard Practice.

### 1.03 Related Requirements

- A. Concrete: Division 03.
- B. Section 09 90 00 - Protective Coatings.

### 1.04 Reference Standards

- A. American Institute of Steel Construction (AISC):
  - 1. Steel Construction Manual.
  - 2. 303 - Code of Standard Practice for Steel Buildings and Bridges.
- B. American Welding Society (AWS):
  - 1. A4.3 - Standard Methods for Determination of the Diffusible Hydrogen Content of Martensitic, Bainitic, and Ferritic Steel Weld Metal Produced by Arc Welding.
  - 2. A5.1 - Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
  - 3. A5.4 - Specification for Stainless-Steel Electrodes for Shielded Metal Arc Welding.
  - 4. A5.5 - Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding.
  - 5. B4.0 - Standard Methods for Mechanical Testing of Welds.
  - 6. B5.1 - Specification for the Qualification of Welding Inspectors.
  - 7. C4.1 - Oxygen Cutting Surface Roughness Gauge and Chart for Criteria Describing Oxygen Cut Surfaces.

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Steel

8. C5.4 - Recommended Practices for Stud Welding.
9. D1.1 - Structural Welding Code - Steel.
10. D1.6 - Structural Welding Code - Stainless Steel.
11. QC1 - Standard for AWS Certification of Welding Inspectors.

C. ASTM International:

1. A1 - Carbon Steel Tee Rails.
2. A6 - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
3. A36 - Carbon Structural Steel.
4. A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
5. A106 - Seamless Carbon Steel Pipe for High-Temperature Service.
6. A108 - Steel Bar, Carbon and Alloy, Cold-Finished.
7. A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
8. A143 - Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
9. A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware - AASHTO No.: M232.
10. A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
11. A193 - Alloy-Steel and Stainless-Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
12. A240 - Chromium and Chromium-Nickel Stainless-Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
13. A264 - Stainless Chromium-Nickel Steel-Clad Plate.
14. A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
15. A312 - Seamless, Welded, and Heavily Cold Worked Austenitic Stainless-Steel Pipes.
16. A325 -Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

17. A384 - Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
18. A385 - Providing High-Quality Zinc Coatings (Hot-Dip)
19. A449 - Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use.
20. A490 - Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
21. A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
22. A563 - Carbon and Alloy Steel Nuts.
23. A572 - High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
24. A588 - High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance - AASHTO No.: M222.
25. A673 - Sampling Procedure for Impact Testing of Structural Steel.
26. A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
27. A786 - Hot-Rolled Carbon Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
28. A992 - Structural Steel Shapes.
29. A1011/A1011M - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
30. B695 - Coatings of Zinc Mechanically Deposited on Iron and Steel.
31. C1107 - Packaged, Dry Hydraulic Cement Grout (Nonshrink).
32. F436 - Hardened Steel Washers.
33. F593 - Stainless-Steel Bolts, Hex Cap Screws, and Studs.
34. F594 - Stainless-Steel Nuts.
35. F959 - Compressible-Washer-Type Direct Tension Indicator for Use with Structural Fasteners.
36. F1554 - Anchor Bolts, Steel, 36-, 55-, and 105-ksi Yield Strength.

37. F2329 - Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
- D. The National Association of Architectural Metal Manufacturers (NAAMM):
1. MBG 531 - Metal Bar Grating Manual.
  2. MBG 532 - Heavy Duty Metal Bar Grating Manual.
  3. MBG 533 - Welding Specifications for Fabrication of Steel, Aluminum and Stainless-Steel Bar Grating.
- E. Research Council on Structural Connections (RCSC):
1. Specification for Structural Joints Using High-Strength Bolts.
- F. Society for Protective Coatings (SSPC) Surface Preparation Specifications:
1. SP1 - Solvent Cleaning.
  2. SP3 - Power Tool Cleaning.
  3. SP5 - White Metal Blast Cleaning.
  4. SP6 - Commercial Blast Cleaning.
  5. SP10 - Near-White Blast Cleaning.
  6. SP11 - Power Tool Cleaning to Bare Metal.
- G. Occupational Safety and Health Administration (OSHA) - All applicable OSHA regulations, including, but not limited to 29 CFR Part 1910 and Part 1926 Subpart R - Steel Erection.

## 1.05 Submittals

- A. Submit as specified in Division 01.
- B. Includes, but not limited to, the following:
1. Fabrication and erection drawings for all Work. A reproduction of Engineer-prepared Contract Drawings may be used for erection drawings such as to indicate information on erection or to identify detail drawing references. Where the drawings are revised to show this additional information, Engineer's title block and professional seal shall be removed from the drawing. These erection drawings shall be revised for subsequent Engineer revisions to the Contract Drawings.
  2. Fabrication and erection drawings shall be grouped in sets or sequences and shall be identified separately for each building, structure, or area.

3. Fabrication and erection drawings shall be prepared using a three dimensional steel modeling and detailing software system. All miscellaneous steel items such as guardrail, handrail, stairs, and ladders shall be included in the same three dimensional model as main structural steel and detailed using the same system.
  4. In the event that drawing revisions are necessary, fabrication and erection drawings shall be clearly clouded showing all changes from the previous revision.
  5. All necessary information for the fabrication, including connection material specifications and sizes as well as filler metal for welds, of the component part of the structure, presented on drawings to conform to recognized standard practice, AISC Manual and AWS Code.
  6. Drawings indicating stud shear connector spacing regardless of whether connectors are shop-applied or field-applied.
  7. Drawings showing each piece including anchor bolts marked for identification to correspond to erection drawings.
  8. Proposed method and location for erection piece mark numbering.
  9. Manufacturer's literature on products including, but not limited to, grating, stair treads, stair nosings, stud shear connectors, grout, concrete anchors, and protective coatings.
  10. AWS Certified Welding Inspector Certificates.
  11. Welder qualification records.
  12. Qualified welding procedure specifications and procedure qualification test results if welding processes differ from those prequalified by AWS.
- C. High-Strength Connection Bolt and Nut Manufacturer's Inspections Certificate:
1. Certify that bolts, nuts, and washers furnished comply with all of the requirements of these Specifications, and shall provide complete manufacturer's mill test reports (Manufacturer's Inspections Certificate).
  2. Certificate numbers shall appear on the product containers and correspond to the identification numbers on the mill test reports.
  3. Manufacturer's symbol and grade markings shall appear on all bolts and nuts.

## 1.06 Quality Assurance

- A. Each piece of mill material shall be legibly marked with the heat number, size of section, length, and mill identification marks in accordance with ASTM A6 plus the

fabrication mill order number. Alternate material tracking procedures may be used when approved by Engineer.

- B. For material other than ASTM A36/A36M, the appropriate specification number, grade, heat number and fabrication mill order number shall be transferred to the remnant.
- C. Mill material with specified minimum yield strength higher than 36 ksi (250 MPa) shall be marked with the color designated in ASTM A6/A6M. Alternate material tracking procedures may be used if approved by the purchaser.
- D. Welder Qualifications:
  - 1. Welders shall be previously qualified by passing the tests prescribed in the AWS D1.1 or by passing such other tests as Engineer may accept. Welders of stainless steel shall be previously qualified in accordance with AWS D1.6.
  - 2. Welders shall have been tested within the past 12 months, and their qualification shall be considered as remaining in effect unless the welder is not engaged in a given process of welding for a period exceeding 6 months.
- E. Inspection: Material or workmanship may be subject to inspection in the shop and field. Engineer shall have unrestricted entry to fabrication facilities and erection site at all times while work is being performed.

### 1.07 Delivery, Storage, And Handling

- A. Handle and store all steel and appurtenances as specified in Division 01.
- B. Deliver steel in the order needed for erection as follows:
  - 1. Loose base plates.
  - 2. Steel embedded in concrete.
  - 3. Erection bolts.
  - 4. First tier columns and framing for all its levels (including stairs, ladders, and guardrail).
  - 5. Columns and framing for remaining tiers in order.
- C. Railcars and/or trucks shall be loaded and cribbed so they can be readily unloaded.
- D. All steel and its coatings shall be protected from damage caused by handling, storage, and shipping.



- E. All materials and documentation shall be inspected immediately upon receipt at the erection site to determine that all items in the bill of material have been supplied, to assure that all documentation has been received, and to check for any damage.
- F. Store all steel and appurtenances blocked-up off the ground and in orderly stacks.
- G. Protect all items with shop applied protective coatings from corrosion. Store in an environment and manner consistent with type of coating.

## PART 2 - Products

### 2.01 Basic Materials

- A. Steel: Conform to the following unless otherwise indicated or specified.
  - 1. Wide flange (WF) shapes and tees cut from WF: ASTM A992 (50 ksi yield strength) or ASTM A572, Grade 50.
  - 2. M shapes, S shapes, HP (bearing piles), channels, and angles: ASTM A36.
  - 3. Structural plates and bars: ASTM A36.
- B. Corrosion-Resistant Steel: Conform to ASTM A588, Grade 50.
- C. Rail Steel: Conform to No. 1 rail, ASTM A1 of the weight indicated or specified.
- D. Stainless or Heat-Resisting Chromium-Nickel Steel: Conform to ASTM A167 and A240.
- E. Connection Bolts, Nuts, Washers, and Compressible Washer-Type, Direct Tension Indicators:
  - 1. Conform to ASTM A325, Type 1, unless otherwise indicated or specified.
  - 2. Be galvanized when connecting galvanized steel.
  - 3. Conform to A325, Type 3, for use with A588, Grade 50.
  - 4. Compressible Washer-Type, Direct-Tension Indicators:
    - a. ASTM F959 Type 325 for use with A325 bolts.
    - b. ASTM F959 Type 490 for use with A490 bolts.
    - c. Galvanized for use with galvanized bolts.
  - 5. Nuts: Heavy Hex conforming to ASTM A563 Grade DH.
  - 6. Flat and beveled washers: Conform to ASTM F436.

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- F. Anchor Bolts:
1. Conform to ASTM F1554, Grade 36, unless otherwise indicated to be stainless steel or high strength.
  2. Machine Bolts: Conform to ASTM F1554, Grade 36.
  3. Stainless Steel: Conform to ASTM F593, Type 304, with nuts conforming to ASTM F594. Sleeves shall conform to ASTM A312.
  4. High Strength: Conform to ASTM A449 with nuts conforming to ASTM A563.
  5. Washers:
    - a. For ASTM F1554 and A449 Bolts: Conform to F436.
    - b. For Stainless-Steel Bolts: Conform to ASTM A167, Type 304, and dimensional tolerances of F436.
  6. Galvanize all anchor bolts, nuts, and washers except stainless steel.
- G. Pipe for Structural Uses, Guardrail, and Handrail: Conform to ASTM A53, Type E or S, Grade B, or ASTM A106, Grade B.
- H. Square and Rectangular Tubing Hollow Structural Sections (HSS): Conform to ASTM A500, Grade B.
- I. Grating:
1. Main Bars: Conform to ASTM A1011, Commercial Steel (Type B).
  2. Cross Bars: Same as main bars.
- J. Threaded Rods: Conform to ASTM A36.
- K. Welding:
1. For ASTM A36 steel, use E70 electrodes for shielded metal arc welding, F7 series electrodes for submerged arc welding, E70T series electrodes for flux-cored arc welding, and ER70S series electrodes for gas metal arc welding. Select "matching" electrodes in accordance with Table 3.1 AWS D1.1.
  2. For ASTM A588 steel, use E70 low-hydrogen electrodes for shielded metal arc welding, F7 series electrodes for submerged arc welding, E70T series electrodes for flux-cored arc welding, and ER70S series electrodes for gas metal arc welding. Select "matching" electrodes in accordance with Tables 3.1 and 3.3, AWS D1.1.
  3. For ASTM A572, Grade 50 steel or ASTM A992 steel, use E70 low-hydrogen electrodes for shielded metal arc welding, F7 series electrodes for submerged arc welding, E70T series electrodes for flux-cored arc welding,

and ER70S series electrodes for gas metal arc welding. Select "matching" electrodes in accordance with Table 3.1, AWS D1.1.

4. For ASTM A167 or ASTM A312 stainless steel, use shielded metal arc welding, gas metal arc welding, gas tungsten arc welding, or flux-cored arc welding. Select "matching" electrodes in accordance with Table 3.3 of AWS D1.6.

L. Galvanizing:

1. Conform to ASTM A123.
2. Nuts, bolts, and washers shall be hot-dip galvanized to conform to ASTM F2329 or mechanically galvanized to conform to ASTM B695.

## 2.02 Steel Fabrication

- A. Fabricate all steel to conform to AISC Code of Standard Practice for Structural Steel Buildings and Bridges, AISC 360, and applicable portions of OSHA 29 CFR Part 1910 and Part 1926.
- B. Permissible variations for sweep, camber, length, and cross section of all steel members shall conform to ASTM A6, AISC Manual, Part 1 and AISC Code of Standard Practice unless indicated otherwise.
- C. Field-measure existing steel and structures where necessary to ensure fabrication fit-up of new steel.
- D. All pieces shall be clearly marked with a permanent identifying erection mark number. Method and location of marking shall be approved by Engineer. Erection markings for galvanized steel shall be mechanically stamped on steel tags with 1/8-inch minimum thickness. Tags shall be bent to provide clearance for galvanizing between the member and the tag, except at the tag ends. Tag ends shall be welded to the member.
- E. Fabricator shall mark all shear connector locations (if field-applied) for composite beams by means of center punch and paint circle or other approved means so that field layout of shear connectors is not required. Do not paint shear connector contact surface.
- F. Provide grout holes in base plates having the least dimension greater than 24 inches. Holes shall be as close to center as practicable and minimum of 2 inches in diameter.
- G. Shop Milling:
  1. Perform at the base of columns and at the top of column base plates, except that rolled-steel bearing plates of 4-inch thickness or less may be straightened by pressing.

2. Perform on butted ends for bolted or partial penetration-welded column splices. Shop milling is not required for welded column splices with full penetration welds.
3. Perform at ends of columns which butt against a plate.

H. Welding:

1. All welding shall be shielded metal arc, submerged arc, or flux-cored arc, or gas metal arc. For gas metal arc welding, the short-circuiting mode of filler metal transfer is not permitted. Other welding processes may be used provided they are qualified by applicable tests as prescribed in the AWS D1.1 (AWS D1.6 for stainless steel) and approved by Engineer prior to use. For the use of any other welding process, submit a qualified welding procedure specification and the procedure qualification test results. Welding processes shall be approved for use only after receipt of specific written approval from the Engineer.
2. Conform to AWS Code and AISC Manual.

I. Shop Connections:

1. Weld or bolt except when otherwise indicated or specified.
2. Shop portions of connections may be welded equivalent to any bolted connection specified if Engineer concurs.
3. Welded connections shall be as indicated or in accordance with acceptable alternative designs:
  - a. Welds of connection angles to beam webs shall conform to AISC Manual, Part 10, Table 10-2 with particular regard for minimum web thickness. Provide longer connection angles or reinforce web as required.
  - b. All butt-joint groove welds shall be complete penetration welds unless otherwise indicated and shall conform to the applicable standards in AISC Manual, Part 8, with special emphasis on maintaining root opening. Accomplish this for single-bevel, butt-joint welds by using backup plates or by chipping out and welding on the opposite side.
  - c. Prepare weld bevels with a mechanically guided cutting torch or by grinding.
  - d. Remove all run-out tabs.
4. Bolted connections shall conform to AISC Manual, Parts 9 and 10.

- a. All bolted connections shall be made with Bearing Type connections using 3/4-inch bolts, nuts, and washers unless otherwise indicated or specified.
  - b. Bearing Type Connections: Capacity of beam connections shall have a minimum capacity of that specified in AISC Manual, Part 10, Table 10.1 for "Standard Holes" in bearing type connections (thread condition N) with the number of bolt rows indicated. A minimum of one hardened washer shall be supplied with each bolt.
  - c. Use the minimum number of rows of bolts for beam connections so that bottom row is at or below the centerline of the beam.
  - d. Bolts to be installed in the shop shall be tightened in accordance with the provisions for field connections in PART 3.
- J. Provisions for Field Connections:
1. Provide with bolted connections unless otherwise indicated or specified. The number of rows and number of bolts indicated on the Drawings or stated in the Specifications is the minimum number of rows or bolts. Provide additional bolts or connection devices, if necessary, to comply with OSHA regulation 29 CFR 1926, Subpart R - Steel Erection.
  2. Provide for field welding only when so indicated or where approved by Engineer.
  3. Provide all members to be field-welded with bolted erection connections adequate to resist erection stresses prior to field welding.
- K. Comply with OSHA 29 CFR 1926, Subpart R - Steel Erection.

## 2.03 Column Base and Equipment Anchor Bolts

- A. Furnish for all columns and equipment furnished and installed under this Contract, (and as required to install all equipment furnished by others for installation under this Contract unless otherwise indicated).

## 2.04 Guardrail and Handrail

- A. Where indicated as pipe: 1-1/2-inch nominal (1.9-inch OD) round, black standard-weight pipe.
- B. Where indicated as angle: angle sizes for posts and railing as indicated.
- C. Post spacing shall not exceed 6 feet from center-to-center.
- D. Form and weld all pipe railing. Grind all welds smooth and even with the surface of the pipe, including field welds required for erection.

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- E. Carefully form all pipe railing where change of direction or elevation occurs.
- F. Guardrail posts shall be vertical (plumb) unless otherwise indicated.

## 2.05 Edge Angles, Plates, And Lintels

- A. Furnish around and over openings as indicated.
- B. Keep plates and edge angles flush at intersections and fillet-weld to give a neat appearance at the exposed intersecting surfaces.
- C. Provide lintel length of opening width +1 foot 4 inches unless otherwise indicated.
- D. Properly align, level, and plumb edge angles and plates before concrete is placed.

## 2.06 Kick Plates

- A. Furnish at the edge of uncovered openings and at the edge of walkways and platforms, except as otherwise indicated.

## 2.07 Steel Floor Grating

- A. One-piece, resistance-welded, carbon-steel construction without notching of bearing or cross bars before welding and conforming to NAAMM MBG 531 or 532.
- B. Main Bearing Bars:
  - 1. Thickness: 3/16 inch; 3/8 inch for heavy duty grating.
  - 2. Depth: As indicated.
  - 3. Spacing: Not more than 1-3/16 inches on center; 1-3/8 inches on center for heavy duty grating.
  - 4. Configuration of top surface of main bars unless otherwise indicated:
    - a. Exterior - Exposed to Weather: Serrated.
    - b. Interior - Not Exposed to Weather: Plain.
- C. Cross Bars:
  - 1. Spacing: 4 inches o.c.
  - 2. One of the following shapes and minimum sizes:
    - a. Hexagon: 5/16-inch diameter of inscribed circle; 7/16 inch for heavy duty grating.

- b. Rectangular: 1/2 inch by 3/16 inch; 5/8 inch by 1/4 inch for heavy duty grating.
  - c. Square: 1/4 inch with spiral twist; 1/2 inch for heavy duty grating.
  - d. Round: 3/8-inch diameter, 1/2 inch for heavy duty grating.
- D. Fabrication:
- 1. Fabrication shall conform to NAAMM MBG 531; MBG 532 for heavy duty grating, and MBG 533.
  - 2. Crossbars shall match crossbars of adjacent sections to form a continuous pattern of straight lines.
  - 3. Provide all openings in grating indicated and as required for installation of all piping, wiring, and equipment installed under this Contract.
  - 4. Band all openings 4 inches and larger with a metal bar same size as main bearing bar and extend 4 inches above top of grating. Band bars shall be same depth as bearing bars. Weld to each bearing bar with a 3/16-inch fillet weld 3/4 inch long. Tack weld to all crossbars.
  - 5. Trim-band all locations as follows:
    - a. Open end of grating at head of a ladder.
    - b. Manway opening.
    - c. Hinged sections.
    - d. Grating panels with four crossbars or less.
    - e. Other locations as indicated.
  - 6. Provide kickplates where indicated and at all handrail on floors or platforms 4 foot or more above adjacent floors or ground where persons can pass or machinery is located.
- E. Shop Finish:
- 1. Hot-dip galvanize after fabrication except where otherwise indicated.
  - 2. Coat with manufacturer's standard black paint at 3-mil dry-film thickness, by spraying, dipping, or flow coating only where indicated.
- F. Grating shall be manufactured by one of the following:
- 1. Tru-Weld Grating, Inc., Wexford, Pennsylvania.
  - 2. Amico-Klemp Corporation, Chicago, Illinois.

3. IKG-Borden, Clark, New Jersey.
  4. Approved equal.
- G. Provisions for Grating Connections:
1. Provide sufficient quantity of grating connecting devices to provide two fasteners at each support +10% extra fasteners.
  2. Clip-type connections using mechanical beam clamps:
    - a. Hilti X MGR Grating Fastening System.
    - b. Grating Fasteners, Inc. G-Clips.
    - c. Lindapter North America Grate-Fast.
  3. Finish of grating fasteners shall match finish of grating.

## 2.08 Stairs

- A. General Construction:
1. Stringer sizes indicated are minimum acceptable size.
  2. Cross-brace stringers to provide lateral stability where the horizontal run exceeds 12 feet.
  3. Provide struts and hangers where indicated or as otherwise required for proper support.
- B. Treads:
1. Open-riser type with grating conforming to PART 2 - Steel Floor Grating, this Section, and of the same type as specified herein, with main bars 1 inch by 3/16 inch unless indicated otherwise.
  2. Treads damaged during construction shall be replaced immediately.
  3. Nosings for grating stair treads shall be:
    - a. Standard checkered-plate nosing. Coating shall be same as specified for stair treads. Attach to treads by welding.
    - b. As indicted on Drawings.
  4. Bolt tread to each stringer with a minimum of two 3/8-inch bolts.
- C. Grating Landings:



1. Landings shall be of grating conforming to PART 2 - Steel Floor Grating, this Section.
- D. Pan-Filled Stairs:
1. Stairs shall be interlocking construction with risers, treads, and landings constructed of minimum 12-gage plate.
  2. Provide with stiffeners as required.
  3. Place temporary wood planking in pans. Planking shall extend the full length, width, and height of pan and shall be securely anchored.

## 2.09 Checkered Plate

- A. Plate shall be of thickness indicated with surface deformations of the 4-way type.
- B. Fasten in place with screws spaced at 18 inches with a minimum of one at each corner of each piece or as otherwise indicated.
- C. Screws shall be 1/4-inch countersunk stainless steel.

## 2.10 Concrete Anchors

- A. Furnish and install manually expanded and adhesive anchor types.
- B. Furnish sizes indicated and install to conform to manufacturer's printed instructions.
- C. Anchors shall be manufactured by one of the following:
  1. Hilti Inc., Tulsa, Oklahoma.
  2. ITW Ramset/Red Head, Wood Dale, Illinois.
  3. Simpson Strong-Tie Co., Pleasanton, California.
- D. Concrete anchors that are not specifically indicated to be high strength steel or stainless steel shall be carbon steel with surface plating or galvanizing in accordance with manufacturer's standard.
- E. Anchors indicated to be high strength steel anchors shall be surface plated or galvanized in accordance with manufacturer's standard.
- F. Anchors indicated to be stainless steel shall be manufactured from 300 series stainless steel per the manufacturer's standard unless specifically indicated to conform to Type 304, 316.
- G. Installed adhesive anchors shall not be disturbed or loaded until the anchor has been in place longer than the manufacturer's cure time for the adhesive.

## 2.11 Crane Runways

- A. Furnish rails, steel clips, splice bars, shims, stops, bolts, and all accessories required to complete crane runways.
- B. Refer to Division 14 for related crane runway requirements.

## 2.12 Galvanizing

- A. General:
  - 1. Galvanize all steel (including structural steel members, grating, floor plate, and fasteners) after fabrication.
  - 2. Do not galvanize ASTM A490 bolts or crane rails.
  - 3. Conform to ASTM A123 for structural shapes and plates.
  - 4. Nuts, bolts, and washers shall be hot-dip galvanized to conform to ASTM F2329 or mechanically galvanized to conform to ASTM B695.
- B. Fabrication:
  - 1. Safeguard against embrittlement in accordance with ASTM A143.
  - 2. Safeguard against warping and distortion in accordance with ASTM A384.
  - 3. Fabrication details shall be in accordance with ASTM A385 to allow for the creation of high quality zinc coatings.
  - 4. Cutting, drilling, and welding shall be performed before galvanizing.
  - 5. Weld slag shall be removed before galvanizing.
  - 6. Edges of tightly contacting surfaces shall be seal welded using minimum 1/8-inch fillet welds.
  - 7. Vent holes shall be provided for piping or tubular assemblies (including guardrail and handrail) as required by ASTM A385.
  - 8. Potential issues which could cause a problem in galvanizing shall be brought to the Engineer's attention prior to galvanizing.
- C. Galvanizing of Steel Hardware:
  - 1. Nuts shall be tapped oversize in accordance with ASTM A563.
  - 2. Nut threads shall be re-tapped after hot-dip galvanizing to provide proper fit.

3. Direct tension indicators shall be mechanically galvanized by the manufacturer in accordance with Class 50 of ASTM B695.

D. Repair:

1. Any damage to galvanizing shall be repaired in accordance with ASTM A780.
2. Before repair of damaged galvanized coating, exposed substrate metal shall be cleaned to bright metal and free of all visual rust, oil, or grease. Any nonadhering galvanizing shall be removed to the extent that the surrounding galvanizing is integral and adherent.
3. If surface defects exceed 2% of a member's area, the defects shall be repaired by redipping the member in the zinc bath.
4. Cold repair using an organic zinc rich coating shall be permitted if the following conditions exist:
  - a. Total damaged area is less than 1% of the total coated area of the member being repaired.
  - b. No single repair is greater than 2 square inches (1300 mm<sup>2</sup>).
  - c. No single repair is greater than 12 inches (300 mm) long.
5. For cold repair:
  - a. Repair areas in accordance with ASTM A780, Method A2.
  - b. Apply organic zinc-rich primer containing a minimum of 93% zinc in dry film by weight. Apply in multiple coats (allowing proper recoat time) to achieve 8-mil dry film thickness.
  - c. Color shall approximately match the color of galvanizing.
  - d. Cold galvanizing compound shall be one of the following:
    - (1) Crown North American Professional Products Co. Inc. - Cold galvanizing compound.
    - (2) Sentry Chemical Company - Galvonic.
    - (3) Subox, Division of Carboline - Galvanox Type II.
    - (4) ZRC Worldwide - Cold Galvanizing Compound.
6. Hot repairs shall be made in the shop if any of the following conditions exist:
  - a. Total damaged area is greater than 1% but less than 2% of the total coated area of the member being repaired.

- b. Any single repair is at least 2 square inches (1300 mm<sup>2</sup>) in area.
7. Any single repair is 12 inches (300 mm) long or more.
8. Hot repair shall be made using zinc alloy rod or powder manufactured for the repair of galvanized steel.
9. Flux, heavy ash, or heavy dross inclusions shall be removed by brushing, grinding, or filing as required.
10. Galvanized steel which has been rejected shall be stripped, regalvanized, and submitted again for inspection.
11. Correction of excessive warpage that exceeds ASTM A6/A6M criteria shall be performed by press straightening if possible.
12. The application of localized heating to straighten shall be approved by Engineer.
13. If galvanized tension control bolts are used, all bare steel surfaces (i.e., bolt ends) shall be repair galvanized in accordance with this Section.

## PART 3 - Execution

### 3.01 Preparation

- A. Field-check location and elevation of column anchor bolts and footings before erecting structural steel columns.
- B. Field-measure existing steel for plumbness and elevation at connecting points.
- C. Submit the method and sequence of erection for acceptance.
- D. Assure that all preassemblies not specifically indicated on Contract Drawings to be preassembled before lifting shall maintain structural integrity during lifting.

### 3.02 Steel Erection

- A. Erect all steel to conform to AISC specifications, codes, and standards or any local, state or federal codes which may exceed such requirements. Comply with applicable OSHA regulations including 29 CFR 1926, Subpart R - Steel Erection.
- B. Protect existing structure from weather when connecting steel to existing structure.
- C. Protect steel and anchor bolt sleeves from entrapped water that can cause damage from freezing or corrosion.
- D. Column Base Plates:

1. Prior to setting base plates, clean out sleeves of all foreign material and liquid. Clean bearing surface on foundation and bottom of base plate.
2. Grout under base plates with a flowable nonshrink grout, taking special care not to disturb their grade and alignment.
3. Flowable nonshrink grout shall conform to ASTM C1107 and be one of the following:
  - a. Cormix Construction Chemicals, Dallas, Texas - Supreme Grout.
  - b. L&M Construction Chemicals, Inc., Omaha, Nebraska - Crystex.
  - c. Master Builders Company, Cleveland, Ohio - Masterflow 713 Grout.
  - d. Sauereisen Cement Company, Pittsburgh, Pennsylvania - Sauereisen F100.
  - e. Five Star Products, Inc., Fairfield, Connecticut - Five Star Grout.
4. Cut off exposed edges of the grout at 45 degrees along the edges of the base plates after grout has acquired its initial set.
5. In hot or cold weather conform to manufacturer's recommendations for temperature control for grouting operations.

E. Erection Bracing:

1. Provide all necessary erection bracing and be responsible for structural adequacy, design, engineering, and construction of erection bracing.
2. Provide all necessary temporary struts, ties, cables, temporary flooring, planking, and scaffolding in connection with the erection of the structural steel or support of erection machinery.
3. Place as required to maintain proper position against loads from erection equipment, construction material, and wind.
4. Leave bracing in place until sufficient steel connections, concrete slabs, exterior walls, and roof decks are in place to ensure stability of the structure.

F. Connections:

1. Unless otherwise indicated, connections shall be bolted bearing type.
2. Tighten high-strength bolts to correct bolt tension in accordance with AISC Manual, Part 16, "Specification for Structural Joints Using High-Strength Bolts."
  - a. Slip-critical Type Connections: Tighten all bolts to the pretensioned condition.

- b. Bearing Type Connections: Tighten all bolts to the pretensioned condition, except that beam-to-beam connections in floor framing which do not connect to any bracing members may be tightened to the snug-tightened condition:
  - c. Furnish the inspecting wrench and one man to assist the Engineer when inspections are performed.
  - d. Provide Skidmore-Wilhelm Bolt-Tension calibrator or approved equal for adjusting inspection wrench in accordance with "Specification for Structural Joints Using High-Strength Bolts", Section 9.
  - e. Three bolt, nut, and washer assemblies from each lot supplied shall be tested in a tension measuring device at the jobsite at the beginning of the bolting start-up to demonstrate that the bolts and nuts, when used together, can develop tension not less than that provided in "Specification for Structural Joints Using High-Strength Bolts", Table 8.1 for the size and grade. The bolt tension shall be developed by tightening the nut.
  - f. The job-inspecting torque shall be determined in accordance with "Specification for Structural Joints Using High-Strength Bolts", Section 8.
  - g. The minimum number of bolts inspected and any required retightening shall be per "Specification for Structural Joints Using High-Strength Bolts", Section 9.
  - h. Comply with OSHA regulation 29 CFR 1926, Subpart R - Steel Erection.
3. Compressible Washer-Type, Direct-Tension Indicators:
- a. The use of compressible washer-type, direct-tension indicators is an acceptable alternative to the requirements of PART 3, Paragraph 2.F. - Connections, this Section, in determining specified minimum bolt tension.
  - b. Direct-tension indicators shall be manufactured by one of the following:
    - (1) Turnasure, L.L.C., Langhorne, Pennsylvania.
    - (2) Applied Bolting Technology Products, Inc.
    - (3) Approved equal.
  - c. Manufacture, install, and store in accordance with manufacturer's written instructions and ASTM F959.

- d. Provide Skidmore-Wilhelm Bolt Tension Calibrator or approved equal to allow Engineer random verification that the direct-tension indicators provide proper bolt tension.
  4. Where required for connection fit-up, bolt holes may be adjusted in one of the following manners (flame cutting or flame enlargement of holes is not allowed):
    - a. Reamed to AISC allowable maximum size for oversized holes.
    - b. Holes may be filled with weld metal, ground smooth, and field-drilled.
    - c. Other Engineer-approved method.
  5. Welded Connections:
    - a. Make welded connections as indicated and leave all erection bolts in place after completion of welding unless otherwise indicated.
    - b. Reinforce connections when members requiring fillet welds are not in contact.
    - c. Use backup bars or spacer bars on all butt welds where root opening exceeds 3/16-inch.
    - d. Remove all run-out tabs.
- G. Welding and Welders:
1. The requirements for erection welding and welders shall be the same as specified for basic materials and for steel fabrication.
  2. All welds shall be stamped with a mark identifying the welder. Remove welders from Work after two defective welds.
  3. Perform erection-welding inspection in accordance with AWS D1.1. (AWS D1.6 for stainless steel.) This welding inspection shall be performed by AWS Certified Welding Inspector(s) (CWI). All such Certified Welding Inspectors shall be qualified and certified in accordance with the provisions of AWS QC1. Only individuals so qualified shall perform fabrication/erection or verification inspection of the welding performed under the provisions of AWS D1.1 Code (AWS D1.6 for stainless steel) and these Contract Documents. Certifications verifying the qualifications of welding inspectors shall be submitted prior to commencement of structural welding operations or prior to welding inspection performed by an individual welding inspector. Defective welds shall be corrected.
- H. Protect pipe sleeves, other anchorage members, and concrete bases from deleterious materials at all times, and from water which may cause ice damage during freezing weather.

- I. Guardrail and Handrail:
  - 1. Form and weld all pipe railing. Grind all welds smooth and even with the surface of the pipe.
  - 2. Carefully fit all pipe railing where change of direction or elevation occurs.
  - 3. Install all rails and posts plumb, level, straight and true, and in alignment.
  - 4. Top rail shall clear all fixed objects by at least 3 inches vertically and horizontally.
  - 5. Furnish and install plates, bolts, and additional items as indicated or required for fastening to supporting members.
  
- J. Grating:
  - 1. Grating installation shall conform to NAAMM MBG 531 or MBG 532 and as specified herein.
  - 2. Space fasteners as required to overcome irregularities and maintain grating contact with supports. Minimum anchorage of each panel shall be two fasteners at each support.
  - 3. Install grating fasteners per manufacturer's printed instructions.
  - 4. All grating shall be removable unless otherwise indicated.
  
- K. Crane Runways:
  - 1. Install rails, steel clips, splice bars, shims, stops, bolts, and all accessories required to complete crane runways.
  - 2. Erect runway systems to the following tolerances:
    - a. Top of Rail Elevation:  $\pm 1/4$  inch from indicated elevation.
  - 3. Centerline Rail to Centerline Rail Dimension:  $\pm 1/8$  inch from indicated dimension.
  - 4. Space shims under rail as required to suit the above tolerances.
  - 5. Crane rail clamps to be as indicated.
  - 6. Fit and grind rail splice for smooth transition.
  
- L. Stud Shear Connectors: The requirements for field-installed stud shear connectors shall be the same as specified for shop-installed connectors.
  
- M. Concrete Anchors:



1. Install anchors to conform to manufacturer's printed instructions.
2. The hole tolerances, drill bits, and anchor installation torque shall be as per manufacturer's printed recommendations.

### 3.03 Field-Protective Coatings

- A. Surface Preparation: If grease or oils are present, SP1 - Solvent Cleaning must precede any other method specified. Prepare all surfaces by SSPC-SP11 and 1-mil profile depth.
- B. Clean all shop-coated surfaces damaged from rust and mill scale, welding, and abrasion.
- C. Field-Spotting Coat:
  1. Apply to all unpainted, damaged, or cleaned parts of the steel furnished under this Contract including unpainted portions of field-welded and bolted connections.

### 3.04 Repair of Galvanized Surfaces

- A. Repair all damaged galvanized surfaces in accordance with the "Galvanizing" paragraph in PART 2, this Section.

END OF SECTION



## PART 1 - General

### 1.01 Summary

- A. This Section includes the following:
  - 1. Coal tar-epoxy, dampproofing for corrosion protection at:
    - a. Including but not limited to mechanical drawing M503.

### 1.02 References

- A. American Society for Testing and Materials (ASTM):
  - 1. D224 - Smooth-Surfaced Asphalt Roll Roofing (Organic Felt).

### 1.03 Submittals

- A. Submit as specified in DIVISION 01.
- B. Product data for type of product specified, including data substantiating that materials comply with requirements for dampproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
  - 1. Certification by dampproofing manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

### 1.04 Quality Assurance

- A. Installer Qualifications: Engage an experienced Installer who has completed bituminous dampproofing similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Single-Source Responsibility: Obtain primary dampproofing materials and primers from one source and by a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

### 1.05 Project Conditions

- A. Substrate: Proceed with dampproofing only after substrate construction and penetrating work have been completed.
- B. Weather Limitations: Proceed with dampproofing only when existing and forecasted weather conditions will permit work to be performed according to manufacturer's recommendations and warranty requirements.
- C. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has thoroughly cured.

## 1.06 Delivery, storage, and handling

- A. Deliver materials in sealed containers or cartons bearing the manufacturer's label.
- B. Protect materials to keep clean, dry, and within manufacturer's temperature limitations.

## PART 2 - Products

### 2.01 Manufacturers

- A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
  - 1. Coal Tar-Epoxy Dampproofing:
    - a. Tnemec Tneme-Tar Hi Build Series 46H-413; 16-20 mil thickness.
    - b. Or engineer approved equal.

### 2.02 Bituminous Dampproofing

- A. General: Provide products recommended by manufacturer for designated application and suitable for service intended.
- B. Coal Tar-Epoxy Dampproofing: Roll or spray applied heavy-duty water resistant epoxy coating made with pitch for protection of concrete from severe chemical fumes and corrosive vapors. Coating shall be suitable for buried or immersion conditions.

## PART 3 - Execution

### 3.01 Preparation

- A. Clean substrate of projections and substances detrimental to Work; comply with recommendations of prime materials manufacturer. Remove oil, grease, form release agents, laitance, loose materials, and slick surfaces.
- B. Install cant strips and similar accessories as recommended by prime materials manufacturer even though not indicated.
- C. Fill voids, seal joints, and apply bond breakers, if any, as recommended by prime materials manufacturer, with particular attention at construction joints.
- D. Install separate flashings and corner protection stripping, as recommended by prime materials manufacturer, to precede application of dampproofing. Comply with manufacturer's recommendations. Pay particular attention to requirements at building expansion joints, if any.
- E. Surface prep per manufacturer recommendations: including abrasive blasting all surfaces per SSPC-SP13/NACE 6; ICRI CSP 2-4 Surface Preparation of Concrete.

- F. Prime substrate as recommended by prime materials manufacturer.
- G. Protection of Other Work: Do not allow liquid and mastic compounds to enter and clog drains and conductors. Prevent spillage and migration onto other surfaces of work by masking or otherwise protecting adjoining work.

### 3.02 Installation, General

- A. Comply with manufacturer's recommendations except where more stringent requirements are indicated or specified and where Project conditions require extra precautions to ensure satisfactory performance of work.
- B. Apply vertical dampproofing down walls from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches (150 mm) over outside face of footing. Extend 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when the Project is completed.

### 3.03 Protection and Cleaning

- A. Protect exterior, below-grade dampproofing membrane from damage until backfill is completed. Remove overspray and spilled materials from surfaces not intended to receive dampproofing.

END OF SECTION



## PART 1 - General

### 1.01 Summary

- A. This Section includes the following:
1. Factory-formed and field-assembled, standing-seam metal roof panels.
  2. Fascia panels.

### 1.02 References

- A. American Society for Testing and Materials (ASTM):
1. A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  2. A755/A755M - Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  3. C236 - Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box.
  4. C518 - Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flowmeter Apparatus.
  5. C645 - Nonstructural Steel Framing Members.
  6. C665 - Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  7. C920 - Elastomeric Joint Sealants.
  8. C991 - Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings.
  9. C1136 - Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
  10. C1289 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
  11. C1311 - Solvent Release Sealants.
  12. D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
  13. D4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
  14. E283 - Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.

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15. E329 - Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
  16. E330 - Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  17. E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  18. E548 - Guide for General Criteria Used for Evaluating Laboratory Competence.
  19. E1514 - Structural Standing Seam Steel Roof Panel Systems.
  20. E1592 - Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
  21. E1646 - Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
  22. E1680 - Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
- B. American Society of Civil Engineers (ASCE):
1. 7 - Minimum Design Loads for Buildings and Other Structures.
- C. Factory Mutual Global (FMG):
1. 4471 - Approval Standard, Class I Panel Roofs.
  2. Approval Guide.
- D. National Association of Architectural Metal Manufacturers (NAAMM):
1. Metal Finishes Manual for Architectural and Metal Products.
- E. The North American Insulation Manufacturers Association (NAIMA):
1. 202 - Flexible Fiber Glass Insulation Used in Metal Buildings.
- F. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
1. Architectural Sheet Metal Manual.
- G. The Society for Protective Coatings (SSPC):
1. Paint Specification No. 12: Cold Applied Asphalt Mastic (Extra Thick Film).

### 1.03 Definitions



- A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight roofing system.

## 1.04 Performance Requirements

- A. General: Provide metal roof panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.
- B. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of roof area when tested according to ASTM E1680 OR ASTM E283 at the following test-pressure difference:
1. Test-Pressure Difference: Positive and negative 1.57 lbf/sq. ft. (75 Pa).
  2. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. (720 Pa) and the greater of 75% of building live load or 50% of building design positive wind-pressure difference.
  3. Negative Preload Test-Pressure Difference: 50% of design wind-uplift-pressure difference.
- C. Water Penetration: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:
1. Test-Pressure Difference: 20% of positive design wind pressure, but not less than 6.24 lbf/sq. ft. (300 Pa) and not more than 12.0 lbf/sq. ft. (575 Pa).
  2. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. (720 Pa) and the greater of 75% of building live load or 50% of building design positive wind-pressure difference.
  3. Negative Preload Test-Pressure Difference: 50% of design wind-uplift-pressure difference.
- D. FMG Listing: Provide metal roof panels and component materials that comply with requirements in FMG 4471 as part of a panel roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
1. Fire/Windstorm Classification: Class 1A90.
  2. Hail Resistance: MH.
- E. Structural Performance: Provide metal roof panel assemblies capable of withstanding the effects of gravity loads and stresses within limits and under conditions indicated, based on testing according to ASTM E1592 or ASTM E330.
1. Deflection Limits: Engineer metal roof panel assemblies to withstand design loads with vertical deflections no greater than 1/240 of the span.

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**Metal Roof Panels**

- F. **Seismic Performance:** Provide metal roof panel assemblies capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
- G. **Thermal Movements:** Provide metal roof panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. **Temperature Change (Range):** 120°F (67°C), ambient; 180°F (100°C), material surfaces.

**1.05 Submittals**

- A. Submit as specified in DIVISION 01.
- B. **Product Data:** Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal roof panel and accessory.
- C. **Shop Drawings:** Show fabrication and installation layouts of metal roof panels; details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.
  - 1. **Accessories:** Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):
    - a. Flashing and trim.
    - b. Gutters.
    - c. Downspouts.
    - d. Fascia panels.
  - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. **Coordination Drawings:** Roof plans drawn to scale and coordinating penetrations and roof-mounted items. Show the following:
  - 1. Roof panels and attachments.
- E. **Samples for Initial Selection:** For type of metal roof panel indicated with factory-applied color finishes.
  - 1. Include similar Samples of trim and accessories involving color selection.

- F. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
- G. Qualification Data: For Installer professional engineer.
- H. Material Certificates: For thermal insulation and vapor retarders, signed by manufacturers.
- I. Field quality-control inspection reports.
- J. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for the following:
  - 1. Metal Roof Panels: Include reports for air infiltration, water penetration, thermal performance, and structural performance.
  - 2. Insulation and Vapor Retarders: Include reports for thermal resistance, fire-test-response characteristics, water-vapor transmission, and water absorption.
- K. Maintenance Data: For metal roof panels to include in maintenance manuals.
- L. Warranties: Special warranties specified in this Section.

## 1.06 Quality Assurance

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
  - 1. Installer's responsibilities include fabricating and installing metal roof panel assemblies and providing professional engineering services needed to assume engineering responsibility.
  - 2. Engineering Responsibility: Preparation of data for metal roof panels, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated, as documented according to ASTM E548.
- C. Source Limitations: Obtain each type of metal roof panels through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of metal roof panels and are based on the specific system indicated.
  - 1. Do not modify intended aesthetic effects, as judged solely by Engineer, except with Engineer's approval. If modifications are proposed, submit comprehensive explanatory data to Engineer for review.

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**Metal Roof Panels**

- E. Preinstallation Conference: Conduct conference at Project Site to comply with requirements in DIVISION 01.

### 1.07 Delivery, Storage, And Handling

- A. Deliver components, sheets, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.
- B. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation.
- E. Protect foam-plastic insulation as follows:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

### 1.08 Project Conditions

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal roof panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of roof framing and roof opening dimensions by field measurements before metal roof panel fabrication and indicate measurements on Shop Drawings.

### 1.09 Warranty

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal roof panel assemblies that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures, including rupturing, cracking, or puncturing.

- b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  2. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
  1. Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - Products

### 2.01 Panel Materials

- A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A755/A755M.
  1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation; structural quality.
  2. Surface: Smooth, flat finish.
  3. Exposed Finishes: Apply the following coil coating, as specified.
    - a. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      - (1) Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not

less than 70% polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2604, except as modified below:

- (a) Humidity Resistance: 1,000 hours.
  - (b) Salt Spray Resistance: 1,000 hours.
4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013-mm).
- B. Panel Sealants:
- 1. Sealant Tape: Pressure-sensitive, 100% solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2-inch (13-mm) wide and 1/8-inch (3-mm) thick.
  - 2. Joint Sealant: ASTM C920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
  - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

## 2.02 Substrate Board

- A. 5/8 inch plywood: APA Rated Exterior, Structural 1 made with waterproof glue.
- 1. Steel/wood fasteners; corrosive resistant, self-tapping, self-drilling; FM Global approved; #12 minimum and sufficient length to penetrate into steel 3/4 inch and wood 1 inch.

## 2.03 Miscellaneous Metal Framing

- A. General: Comply with ASTM C754 for conditions indicated.
- 1. Steel Sheet Components: Complying with ASTM C645 requirements for metal and with manufacturer's standard corrosion-resistant zinc coating.
- B. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power and other properties required to fasten steel members to substrates.

## 2.04 Miscellaneous Materials

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal roof panels by means of plastic caps or factory-applied coating.

1. Fasteners for Roof Panels: Self-drilling or self-tapping 410 stainless or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal roof panels.
  2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
  3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.05 Standing-Seam Metal Roof Panels

- A. General: Provide factory-formed metal roof panels designed to be field assembled by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.
- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and mechanically seaming panels together.
1. Manufacturers:
    - a. AEP-Span.
    - b. Architectural Building Components.
    - c. Architectural Roofing and Siding, Inc.
    - d. ATAS International, Inc.
    - e. Berridge Manufacturing Company.
    - f. BHP Steel Building Products USA Inc.
    - g. CENTRIA Architectural Systems.
    - h. Custom Panel Industries, LLC.
    - i. Delcoa Industries, Inc.
    - j. Fabral, Inc.

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**Metal Roof Panels**

- k. Flexospan Steel Buildings, Inc.
  - l. MBCI; Div. of NCI Building Systems.
  - m. McElroy Metal, Inc.
  - n. Merchant & Evans, Inc.
  - o. Metal-Fab Manufacturing, LLC.
  - p. Metal Sales Manufacturing Corporation.
  - q. Modern Metal Systems, Inc.
  - r. Morin Corporation; a Metecno Group Company.
  - s. Steelox Systems Inc.
- 2. Material: Zinc-coated (galvanized) steel sheet, 24 gage.
    - a. Exterior Finish: Fluoropolymer.
    - b. Color: As selected by Engineer from manufacturer's full range.
  - 3. Clips: Floating to accommodate thermal movement.
  - 4. Joint Type: As standard with manufacturer.
  - 5. Panel Coverage: 12 inches (305 mm).
  - 6. Panel Height: 1.5 inches (38 mm) minimum.
  - 7. Uplift Rating: UL 90.

**2.06 Metal Fascia Panels**

- A. General: Provide factory-formed metal fascia panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile Metal Fascia Panels: Solid fascia panels formed with vertical panel edges and flat pan between panel edges; with flush joint between panels.
  - 1. Manufacturers:
    - a. AEP-Span.
    - b. Architectural Building Components.
    - c. ATAS International, Inc.



- d. Berridge Manufacturing Company.
  - e. BHP Steel Building Products USA Inc.
  - f. CENTRIA Architectural Systems.
  - g. Custom Panel Industries, LLC.
  - h. Delcoa Industries, Inc.
  - i. Fabral, Inc.
  - j. Innovative Metals Company, Inc.
  - k. K-Metals Inc.
  - l. MBCI; Div. of NCI Building Systems.
  - m. Merchant & Evans, Inc.
  - n. Metal-Fab Manufacturing, LLC.
  - o. Metal Sales Manufacturing Corporation.
  - p. Modern Metal Systems, Inc.
  - q. Petersen Aluminum Corporation.
2. Material: Same material, finish, and color as metal roof panels.
  3. Fascia Panel: Full height coverage. No horizontal joints.
  4. Sealant: Factory applied within interlocking joint.

## 2.07 Accessories

- A. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels, unless otherwise indicated.
  1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
  2. Clips: Minimum 0.0625-inch (1.6-mm) thick, stainless-steel panel clips designed to withstand negative-load requirements.
  3. Cleats: Mechanically seamed cleats formed from minimum 0.0250-inch (0.64-mm) thick, stainless-steel or nylon-coated aluminum sheet.
  4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

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**Metal Roof Panels**

5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch (25-mm) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Formed from same material as roof panels, prepainted with coil coating, minimum 0.018-inch (0.45-mm) thick. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.
- C. Gutters: Formed from same material roof panels. Match profile gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch (2,400-mm) long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches (900 mm) o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match rake trim.
- D. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot (3-m) long sections, complete with formed elbows and offsets, and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.

## 2.08 Fabrication

- A. General: Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
  1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  2. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
  3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal roof panel manufacturer.
  - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal roof panel manufacturer for application but not less than thickness of metal being secured.

## 2.09 Finishes, General

- A. Comply with NAAMMs "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - Execution

### 3.01 Examination

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of work.
  1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 Preparation

- A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.
- B. Install fascia, and copings to comply with manufacturer's recommendations.
- C. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written recommendations.

### 3.03 Metal Roof Panel Installation, General

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**Metal Roof Panels**

- A. General: Provide metal roof panels of full length. Anchor metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Field cutting of metal roof panels by torch is not permitted.
  - 2. Install panels perpendicular to the metal deck.
  - 3. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Pre-drill panels.
  - 4. Provide metal closures at rake walls and high and low points of roof.
  - 5. Flash and seal metal roof panels with weather closures at rakes, and at perimeter of roof. Fasten with self-tapping screws.
  - 6. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 7. Locate panel splices over, but not attached to, structural supports.
  - 8. Lap metal flashing over metal roof panels at high point and under panel at low point to allow moisture to run over and off the material.
- B. Fasteners:
  - 1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.
  - 1. Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.

### 3.04 Substrate Installation

- A. Plywood joints must be true and fitting, allowing for expansion and contraction. Allow 1/8 inch at end and edge joints.
- B. Plywood fasteners shall be installed in a uniform grid pattern, with a maximum spacing of 18 inch o.c. between adjacent fasteners. Where fastening to steel studs, fasten to each framing member 6 inches on center.

### 3.05 Field-Assembled Metal Roof Panel Installation

- A. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.
1. Install clips to supports with self-tapping fasteners.
  2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
- B. Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures along lower panel edges, and at perimeter of all openings.

### 3.06 Accessory Installation

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
- C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 4 feet (1.2 m) o.c.

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**Metal Roof Panels**

using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

- D. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1,500 mm) o.c. in between.
  - 1. Provide elbows at base of downspouts to direct water away from building.

### 3.07 Erection Tolerances

- A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 1/4 inch in 20 feet (6-mm in 6-m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

### 3.08 Field Quality Control

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform inspections and prepare reports.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal roof panel installation, including accessories. Report results in writing.
- C. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.09 Cleaning And Protection

- A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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## PART 1 - General

### 1.01 Summary

- A. This Section includes sheet metal flashing and trim in the following categories:
  - 1. Roof-drainage systems.
  - 2. Exposed trim, coping and fasciae.
- B. Related Work Specified Elsewhere:
  - 1. Flashing and roofing accessories installed integral with roofing membrane as part of roofing-system work: DIVISION 07.

### 1.02 References

- A. Aluminum Association (AA):
  - 1. Designation System for Aluminum Finishes, 7th ed.
- B. American Architectural Manufacturers Association (AAMA):
  - 1. 606.2 - Integral Color Anodic Finishes for Architectural Aluminum.
- C. American Society for Testing and Materials (ASTM):
  - 1. A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. A755/A755M - Steel Sheet, Metallic-Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  - 3. B32 - Solder Metal.
  - 4. B209/209M - Aluminum and Aluminum-Alloy Sheet and Plate.
  - 5. B221/B221M - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
  - 6. D4397 - Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
  - 7. D4586 - Asphalt Roof Cement, Asbestos-Free.
- D. Federal Specifications (FS):
  - 1. UU-B-790a - Building Paper, Vegetable Fiber: (Kraft, Waterproofed, Water Repellent, and Fire Resistant).

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**Sheet Metal Flashing and Trim**

- E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
  - 1. Architectural Sheet Metal Manual.
- F. Society for Protective Coatings (SSPC):
  - 1. Paint 12 - Cold-Applied Asphaltic Mastic (Extra Thick Film).

**1.03 Performance Requirements**

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

**1.04 Submittals**

- A. Submit in accordance with DIVISION 01.
- B. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.
- C. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.
- D. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.
  - 1. 8-inch- (200-mm-) square Samples of specified sheet materials to be exposed as finished surfaces.
  - 2. 12-inch- (300-mm-) long Samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.

**1.05 Quality Assurance**

- A. Installer Qualifications: Engage an experienced Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

**1.06 Project Conditions**

- A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Provide for leakproof weather resistance, durability of Work, and protection of materials and finishes.

**PART 2 - Products****2.01 Metals**



- A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A755/A755M.
1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792-08 Grade 40 structural quality.
  2. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  3. Color: As selected by Architect from manufacturer's full range of standard colors.
  4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
  5. Basis of Design: Berridge Manufacturing.
- B. Stainless Steel (scuppers): ASTM A240A, A666, and Type 304 dead soft, fully annealed.

## 2.02 Sheet Metal Flashing and Fabrications

- A. Sheet Metal Fabrications:
1. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.
  2. Downspouts: Fabricate from the following material:
    - a. Aluminum-zinc alloy-coated steel: 22 GA thick.
  3. Conductor Heads: Fabricate from the following material:
    - a. Aluminum-zinc alloy-coated steel: 24 GA thick.
  4. Scuppers: Fabricate from the following material:
    - a. Stainless Steel Type 304 dead soft, fully annealed: 0.0276 inch (24 GA) thick.
      - (1) Finish: 2D, cold rolled.
      - (2) Surface: Smooth, flat.

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Sheet Metal Flashing and Trim

5. Sill flashing: Fabricate from the following material:
  - a. Aluminum-zinc alloy-coated steel: 24 GA thick.
- B. Miscellaneous Materials and Accessories:
  1. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
  2. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coat.
  3. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
  4. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed.
  5. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints.
  6. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.
  7. Paper Slip Sheet: 5-lb/square (0.244 kg/sq. m) red rosin, sized building paper conforming to FS UU-B-790, Type I, Style 1b.
  8. Polyethylene Underlayment: ASTM D4397, minimum 6-mil- (0.15-mm-) thick black polyethylene film, resistant to decay when tested according to ASTM E154.
  9. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.
  10. Roofing Cement: ASTM D4586, Type I, asbestos free, asphalt based.
- C. Fabrication, General:
  1. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
  2. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once

installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
4. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
5. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
6. Expansion Provisions: Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
7. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
8. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
9. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
10. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
  - a. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than two gauges thicker than the metal being secured.

## PART 3 - Execution

### 3.01 Examination

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.02 Installation

- A. Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's

"Architectural Sheet Metal Manual." Anchor units of Work securely in place providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

- B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.
- D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
- E. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant. Use joint adhesive for nonmoving joints specified not to be soldered.
- F. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- G. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- H. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
  - 1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
  - 2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.
- I. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.

- J. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.

### 3.03 Cleaning And Protection

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering.

END OF SECTION



## PART 1 - General

### 1.01 Summary

- A. This Section includes sealants and related materials for application in the joint locations specified in PART 2, this Section.
- B. Related Work Specified Elsewhere: The following sections contain requirements that relate to this Section:
  - 1. SECTION 074113 - for sealants used to install the Metal Panels.

### 1.02 References

- A. Applicable Standards:
  - 1. American Society for Testing and Materials (ASTM):
    - a. C920 - Elastomeric Joint Sealants.
    - b. C1193 - Guide for Use of Joint Sealants.

### 1.03 Submittals

- A. Submit as specified in DIVISION 01.
- B. Includes, but not limited to, the following for each type of sealant or associated material required:
  - 1. Product data and Specifications, including instructions for joint preparation and sealer application.
  - 2. Color charts.

### 1.04 Quality assurance

- A. Manufacturer of sealants shall have a minimum of five years of successful experience in the production of types of sealants required.
- B. Sealant installer shall be certified by the sealant manufacturer as having the necessary experience and equipment to install the materials properly.
- C. Obtain joint sealant materials from a single manufacturer for each different product required.

### 1.05 Delivery, storage, and handling

- A. Deliver all materials in original sealed containers or bundles with labels and inscriptions legible and intact, and informing about manufacturer, product name and

designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

- B. Store all materials in areas suitable to prevent deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

## 1.06 Project conditions

### A. Environmental Conditions:

- 1. Do not proceed with installation of joint sealers under the following conditions:
  - a. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40°F (4.4°C).
  - b. When joint substrates are wet due to rain, frost, condensation, or other causes.

- B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are more or less than allowed by joint sealer manufacturer for application indicated.

- C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

- D. Proceed with application only when forecasted weather conditions are favorable for proper cure and development of bond strength.

## PART 2 - Products

### 2.01 Acceptable manufacturers

- A. Manufacturer listed under each type of material is to establish minimum quality and specific type. Equivalent products of manufacturers listed below will be acceptable subject to suitability for intended condition.

### B. Sealants and Caulking:

- 1. Bostik Construction Products Div.
- 2. Dow Corning Corp.
- 3. General Electric Co.
- 4. Pecora Corporation.
- 5. Sika Chemical Corp.
- 6. Sonneborn Building Products.



7. Tremco Manufacturing Company.
  8. W. R. Meadows, Inc.
  9. BASF
- C. Sealant Backer Rod (Closed-Cell):
1. Bostik Construction Products Div.
  2. Sonneborn Building Products - Sonofoam.
  3. W. R. Meadows - Sealtight Backer Rod or Cera-Rod.

## 2.02 General

- A. Before purchase of each specified sealant, investigate its compatibility with the joint surfaces, joint fillers, and other materials in the joint system. Select materials for compatibility with joint surfaces and other indicated exposures, and, except as otherwise indicated, select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.
- B. Provide colors as selected by Engineer's Consultant from manufacturer's standard colors.

## 2.03 Elastomeric sealants

- A. Sealants conforming to equivalent Federal Specifications will be acceptable.
- B. One-Component Urethane Sealant - Use NT:
  1. Conform to ASTM C920, Type S, Grade NS, Class 35. Use classification as required by locations stated below.
  2. Manufacturers:
    - a. Pecora Corp. - Dynatrol I.
    - b. Tremco - Dymonic.
    - c. BASF.
  3. Use in the following locations:
    - a. Exterior and interior joints around perimeter of door frames.
    - b. Exterior and interior joints at penetration of walls, decks, and floors by piping, conduit, and other services or equipment except fire-rated penetrations.
    - c. Miscellaneous locations as indicated.

d. Miscellaneous locations as required (but not indicated).

C. Roof Flashing sealant per manufacturers recommendations.

## 2.04 Miscellaneous materials

A. Joint Cleaner: Type as recommended by the sealant manufacturer for the joint surfaces to be cleaned, which is not harmful to substrates and adjacent surfaces and which does not leave oily residues or have detrimental effect on sealant adhesion or in-service performance.

B. Joint Primer/Sealer: Type as recommended by the sealant manufacturer for the joint surfaces to be primed or sealed.

C. Bond-Breaker Tape:

1. Polyethylene tape or other plastic tape as recommended by the sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint, where such adhesion would result in sealant failure.

2. Provide self-adhesive tape where applicable.

D. Sealant Backer Rod:

1. Compressible rod stock, preformed, resilient, nonwaxing, nonextruding strips of flexible, nongassing plastic foam, nonabsorbent to water and gas, and of size, shape and density, sealant depth, and that otherwise contributes to optimum sealant performance.

2. Rod shall be of size that will compress 25% in joint width and shape to control joint depth, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

## PART 3 - Execution

### 3.01 Joint surface preparation

A. Joint Cleaning:

1. Clean joint surfaces immediately before application of sealant.

2. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust, paints (except for permanent protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealers, oil, grease, waterproofing water repellents, water, surface dirt, and frost.

3. Clean concrete, masonry, and similar porous joint surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above operations by vacuuming or blowing out joints with oil-free compressed air.
  4. Clean metal and other nonporous surfaces with chemical cleaners or other means which are not harmful to substrates and do not leave residues capable of interfering with adhesion of joint sealers.
  5. Remove laitance and form-release agents from concrete.
- B. Joint Priming: Prime joint substrates as required by joint sealant manufacturer. Confine primers to areas of joint sealer bond; do not allow spillage or migration onto adjoining surfaces.
- C. Surface Protection: Use where required to prevent contact of sealant with adjoining surfaces which would otherwise be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.02 Application

- A. Conform to sealant manufacturer's printed instructions except where more stringent requirements apply.
1. For sealant installation, comply with ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Install joint-filler units at depth or position in joint to coordinate with other Work, including installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between ends of joint fillers. Do not stretch, twist, puncture, or tear joint fillers. Remove absorbent joint fillers which have become wet prior to sealant installation and replace with dry materials.
- C. Install sealant backer rod for sealants except where indicated to be omitted.
- D. Install bond-breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to back of joints would result in sealant failure.
- E. Install sealants by proven installation techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths, which allow optimum sealant-movement capability.
- F. Install sealants to depths as indicated or, if not indicated as recommended by sealant manufacturer within the following limitations:

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**Joint Sealants**

1. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2 inch deep nor less than 1/4 inch deep.
- G. Unless indicated otherwise, provide a slightly concave surface conforming to ASTM C1193. (Provide recessed or flush configuration where indicated.)
- H. Do not allow sealants or compounds to overflow from confines of joint or spill onto adjoining surfaces. Clean the adjoining surfaces to eliminate evidence of spillage without damage to adjoining surfaces or finishes.
- I. Immediately after sealant installation and prior to time skimming or curing begins, tool nonsag sealants to form smooth uniform beads of configuration indicated to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Do not use tooling agent which would discolor sealants or adjacent surfaces or are not approved by sealant manufacturer. Remove excess sealant from surfaces adjacent to joint.

### 3.03 Cure and protection

- A. Cure sealants in compliance with manufacturer's printed instructions and recommendations to obtain high early bond strength, internal cohesive strength, and surface durability. Cure and protect sealants in a manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period. Repaired areas shall be indistinguishable from original Work.

### 3.04 Field quality control

- A. After nominal cure of exterior joint sealants which are exposed to weather, test for water leaks as follows:
  1. Flood joint exposure with water directed from a 3/4-inch garden hose and connected to water system with 25-psi minimum static water pressure.
  2. Hold hose perpendicular to wall face, 2'-0" from joint, and move stream of water along joint at approximate rate of 20 feet per minute.
  3. Test approximately 5% of total joint system in locations which are typical of every joint condition and which can be inspected easily for leakage on opposite face.
  4. Perform tests in presence of Engineer's Consultant.
- B. Repair sealant installation at leaks or, if leakage is excessive, replace sealant installation as required. Do not perform repair or replacement Work until joints are dry.

END OF SECTION

## PART 1 - General

### 1.01 Summary

- A. This Section includes heavy-duty, corrosion-resistant, fiberglass-reinforced plastic (FRP) doors and frames.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 087000 - FINISH HARDWARE.

### 1.02 References

- A. Applicable Standards:
  - 1. American Standards for Testing and Materials (ASTM):
    - a. E84 - Surface Burning Characteristics of Building Materials.
  - 2. American National Standards Institute (ANSI):
    - a. A117.1 - Specifications for ADA requirements and handicap accessibility.
    - b. A250.4-2001 - Swinging doors and frames.

### 1.03 Submittals

- A. Submit as specified in DIVISION 01.
- B. Includes, but not limited to, the following:
  - 1. Product Data: Include product literature, elevations, profiles, construction details, and specifications. Include instructions pertaining to product storage and handling.
  - 2. Shop Drawings: Include elevations of each door and frame type, details, and door schedule using Engineer's door numbers.
  - 3. Samples: Include small Sample (approximately 8" x 10") to show door and frame construction. Also provide color chips for selection of color(s) by Engineer/Architect from manufacturer's standards.
  - 4. Warranty.

### 1.04 Delivery, Storage, and Handling

- A. Ship all doors and frames as complete units, with trim and all necessary items which may be required for final installation.

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Fiberglass Doors and Frames

- B. Deliver all materials to the site in sealed, undamaged containers, fully identified.
- C. Store materials in original containers, on end, and in a manner to prevent falling or damage to face, corners, or edges.

### 1.05 Quality Assurance

- A. Doors and frames shall be by the same manufacturer.
- B. Hardware shall be coordinated with door system manufacturer to assure proper reinforcement and fit.
- C. Manufacturer shall be capable of manufacturing door system suitable for intended purpose and of quality as specified herein.

### 1.06 Warranty:

- A. Fiberglass-reinforced plastic doors and frames shall be lifetime guaranteed not to fail due to corrosion.

## PART 2 - Products

### 2.01 Acceptable Manufacturers

- A. Advance Fiberglass Inc. - Fib-R-Dor, by Chase Industries.
- B. Chem-Pruf Door Co. - Isaac Escorza, isaac@chem-pruf.com
- C. Special Lite Inc. - Sal Donze, sal@kinassoc.com
- D. Simon Door - Esmi, esmi@simondoor.com

### 2.02 Construction

- A. Door Construction:
  - 1. Doors shall be of fiberglass-reinforced plastic (FRP) using polymers tailored to the specific corrosive environment. Glass content shall be a minimum of 35% by weight. Doors shall be flush construction with no seams or cracks, 1-3/4-inch thickness. Voids between door plates shall be filled with Polypropylene Honeycomb (PPC) core material (minimum R-value of 2.0). Doors shall have a flame spread of 25 or less per ASTM E84.
  - 2. Plates, styles, and rails shall be constructed of layered FRP and molded in one continuous piece to door dimensions.
    - a. Use vinyl ester resin for plate construction.
  - 3. Doors shall have adequate reinforcing and compression members to accommodate hinges and all other required hardware.

4. Color shall be a color as selected by Engineer from manufacturer's full range of colors and glosses.
  - a. Corrosive environment.
  - b. Finish shall be smooth/gloss free of cavities and crevices.
  - c. Manufacturer's standard high performance molded in finish or two-part aliphatic polyurethane coating.
- B. Frame Construction:
  1. Frame construction shall be similar to door construction and materials, of stick and header type, mortised and tenoned for the header joint, 2" depth x 5-3/4" or 6" width.
  2. Frames shall have adequate reinforcing for hinges and other hardware. Mortises for hinges shall be molded into frame.
  3. Provide fiberglass frames for doors, transoms and fixed interior windows.
- C. Doors and frames shall be prefitted and assembled so that no cutting or other modifications shall be required in the field.
- D. Provide doors with all necessary screws, anchors, fasteners, and expansion bolts as required for installation. Metal shall be of corrosion-resistant material. Maintain warranty same as for doors.
- E. Hardware: Specified in SECTION 087000.

## PART 3 - Execution

### 3.01 Installation

- A. Frames:
  1. Erect frames as walls progress.
  2. Erect doors after completion of adjacent walls. Erect door frames plumb, square, true, securely braced, and in accordance with the manufacturer's recommendations.
  3. Anchor framing members to jambs. Space anchors not more than 24 inches apart.
  4. Make member-to-member connections with appropriate clips and stainless steel screws.
  5. After installation of frames, remove temporary braces and spreader bars if used.

- B. Doors and Hardware:
  - 1. Carefully and properly hang doors, install hardware, lubricate, and adjust each item of hardware for proper operation.
  - 2. For installation of hardware other than specified this Section, refer to SECTION 087000. Exposed fasteners shall be stainless steel.

### 3.02 Adjustments and Cleaning

- A. Remove dirt and excess sealants, lubricants, and glazing compounds from exposed surfaces.
- B. Repair minor surface abrasions and scratches to original new finish. If dents or other damage are unreparable, replace entire door or frame.
- C. Protect completed installation.

END OF SECTION



## PART 1 - General

### 1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 Summary

- A. Section includes factory-fabricated floor hatches and frames and integral fall protection grating system.

### 1.03 Referenced Standards

- A. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- B. ASTM International:
  - 1. ASTM A 666 - Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - 2. ASTM B 209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 3. ASTM B 221 - Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- C. National Association of Architectural Metal Manufacturers (NAAMM):
  - 1. Metal Finishes Manual for Architectural and Metal Products.

### 1.04 Submittals

- A. Manufacturer's Product Data: Submit for each floor hatch and frame to be installed.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, frame channel dimensions, and hatch clear zone dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

## PART 2 - Products

### 2.01 Performance Requirements

- A. Load Rating of Floor Hatches

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**Floor Hatches and Frames**

1. Non-Traffic Rated Aluminum Covers shall be reinforced to support a minimum live load of 300 psf with a maximum deflection of 1/150th of the span.
  2. Traffic Rated Aluminum Covers shall be reinforced to support AASHTO H-20 wheel load with a maximum deflection of 1/150th of the span. Manufacturer to provide structural calculations stamped by a registered professional engineer upon request.
- B. Fall Protection System
1. Grating panels shall be designed to meet OSHA 29 CFR 1910.23 requirements for fall protection.

## 2.02 Floor Hatches and Frames

- A. Aluminum Flush Floor Access Hatches:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include The Bilco Company or approved equal.
  2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings by The Bilco Company, or approved equal.
  3. Description: Face of hatch flush with frame, with concealed hinge.
  4. Locations: Top slab of concrete pump station. Refer to schedule
  5. Hatch Size: Refer to Schedule. Length and width indicate requirements for clear zone inside floor hatch opening. Length dimension indicates hinge side of frame.
  6. Hatch Cover: 1/4" Aluminum Diamond Pattern. Cover shall be single-, double-, or triple- leaf, refer to schedule.
  7. Hold-Open Arm: Cover shall be fitted with a hold-open arm which automatically locks in the open position.
  8. Assisted Opening: Cover shall be fitted with the manufacturer required number and size of compression spring operators. Spring and spring tubes shall be Type 316 stainless steel.
  9. Frame Material: Channel frame shall be extruded aluminum with bend down anchor tabs around the perimeter.
  10. Lift handle: Exterior turn/lift handle with a spring-loaded ball detent with flush, gasketed removable screw plug cover.
  11. Lock: One cover leaf per hatch shall be fitted with a snap lock with fixed handle of Type 316 stainless steel on the underside of the cover.

12. Finish: Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.
13. Drain: Provide frame channel drain with standard size coupling, maximum 1-1/2" nominal diameter.
14. Operation: Operation of the cover shall be smooth and easy with controlled operation through the entire arc of opening and closing, and operation shall not be affected by temperature.
15. Warranty: 25 years

## 2.03 Fall Protection

- A. Fall Protection Grating System: Furnish and install on floor hatches, where indicated in the Drawings, fall protection grating system. Hatch manufacturer shall install the grating system when the hatch is fabricated or field install (by others) on existing hatches already in use. If field installation is necessary, grating system shall be installed per the manufacturer's instructions.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include The Bilco Company or approved equal.
  2. Description: Rigid grating panel installed integrally with floor hatch, hinged to floor hatch frame. Cord, webbing, or other flexible fall protection system applications shall not be permitted.
  3. Location: Within floor hatch
  4. Hatch Size: Manufacturer shall provide grating sized for each floor hatch, refer to floor hatch schedule
  5. Grating Material: Aluminum
  6. Finish: Powder-coated, high visibility yellow paint
  7. Hold-Open Arm: Type 316 stainless steel hold-open device to hold grating open in full 90 degree position.
  8. Lock: Grating panel(s) shall lock automatically in the full open position, with provision to lock in the closed position.
  9. Warranty: 25 years

## 2.04 Materials

- A. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666, Type 316. Remove tool and die marks and stretch lines, or blend into finish.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063.

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**Floor Hatches and Frames**

- C. Aluminum Sheet: ASTM B209 (ASTM B209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- D. Hinges: Heavy forged Type 316 stainless steel with minimum 1/4" diameter Type 316 stainless steel pin.
- E. Inserts, Bolts, and Anchor Fasteners: Type 316 Stainless steel.

**2.05 Fabrication**

- A. General: Provide access hatch and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Hatches and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access hatches to types of supports indicated.
- D. Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

**2.06 Finishes**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

**PART 3 - Execution****3.01 Examination**

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 Installation**

- A. Comply with manufacturer's written instructions for installing hatches and frames. Locate units level, plumb, and in proper alignment with adjacent work.
  - 1. Test units for proper function and adjust until proper operation is achieved.

2. Repair finishes damaged during installation.

### 3.03 Adjusting

- A. Adjust hatches and hardware, after installation, for proper operation.
- B. Repair finished damaged during installation or adjustment.
- C. Clean exposed surfaces using methods acceptable to the manufacturer.

Table 1: Hatch Schedule

Identification	Clear Opening Length (Hinge Side)	Clear Opening Width	Load Rating	Cover Material	Leaf	Fall Protection Grating
EBPS Hatch 1	6'-8"	4'-0"	Traffic-Rated	Aluminum	Double	Yes
EBPS Hatch 2	6'-8"	4'-0"	Traffic-Rated	Aluminum	Double	Yes
EBPS Hatch 3	8'-6"	7'-0"	Non-Traffic	Aluminum	Double	Yes
EBPS Hatch 4	8'-6"	7'-0"	Non-Traffic	Aluminum	Double	Yes
EBPS Hatch 5	15'-0"	4'-0"	Non-Traffic	Aluminum	Triple	Yes
EBPS Hatch 6	3'-10"	3'-0"	Non-Traffic	Aluminum	Single	Yes

END OF SECTION



## PART 1 - General

### 1.01 Summary

- A. This Section includes hardware for the proper installation, operation, and control of doors.
- B. Related Work Specified Elsewhere:
  - 1. Section 08 16 13 - Fiberglass Doors and Frames.

### 1.02 References

- A. Applicable Standards:
  - 1. American National Standards Institute (ANSI):
    - a. A115 Series - Door and Frame Preparation.
    - b. A156 Series - Hardware.
  - 2. Builders Hardware Manufacturers Association (BHMA):
    - a. 1301 - Materials and Finishes.
  - 3. Door and Hardware Institute (DHI):
    - a. Keying - Procedures, Systems and Nomenclature.
    - b. Architectural Hardware Scheduling Sequence and Schedule Format.
    - c. Abbreviations and Symbols.
    - d. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames.
    - e. Recommended Procedure for Processing Hardware Schedules and Templates.
    - f. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames.
  - 4. Underwriters Laboratories (UL):
    - a. Building Materials Directory.
    - b. 305 - Panic Hardware.

### 1.03 Submittals

- A. Submit as specified in DIVISION 01.
- B. Includes, but not limited to, the following:
  - 1. Product data includes manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
  - 2. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
    - a. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
      - (1) Type, style, function, size, and finish of each hardware item.
      - (2) Name and manufacturer of each item.
      - (3) Fastenings and other pertinent information.
      - (4) Location of each hardware set cross referenced to indications on drawings both on floor plans and in door and frame schedule.
      - (5) Explanation of all abbreviations, symbols, and codes contained in schedule.
      - (6) Mounting locations for hardware.
      - (7) Door and frame sizes and materials.
    - b. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

### 1.04 Quality Assurance:

- A. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Engineer and Contractor for consultation at reasonable times during the course of the Work.
  - 1. Require supplier to meet with Engineer to finalize keying requirements and to obtain final instructions in writing.



## 1.05 Delivery, Storage, and Handling

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (Project Site).
- E. Provide secure lock-up for door hardware delivered to the project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the work will not be delayed by hardware losses both before and after installation.

## 1.06 Coordination

- A. Coordinate hardware with other Work.
- B. Furnish templates and other detail matter as required to each fabricator of doors and frames, and to other Work to be prepared for the installation of hardware.
- C. Where Modifications to this Specification are required due to unanticipated conditions, make recommendations of alternative procedures to the Engineer for his consideration and approval.

## 1.07 Maintenance

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Engineer's continued adjustment, maintenance, and removal and replacement of door hardware.

## PART 2 - Products

### 2.01 Acceptable Products

- A. Items of hardware are specified in Door Schedule, with reference to the listing given in this Part - Product Requirements.

### 2.02 Product Requirements

- A. Hardware shall meet the respective applicable standards specified in PART 1, this Section.
- B. Provide hardware complete with all fasteners, anchors, instructions, layout templates, and any specialized tools as required for satisfactory installation and adjustment.
- C. Provide manufacturer's standard products meeting the design intent of this Specification, free of imperfections affecting appearance or serviceability.
- D. Hardware is specified in PART 2 - HARDWARE SETS, this Section, by type and function category, each of which has been selected as that best meeting the application. Acceptable products are given for each category as follows:

### 2.03 Hardware Schedule

- A. Refer to the Door Schedule on the Drawings to ascertain hands, and sizes.

#### SET #1

#### Door 101

Qty	Description	Catalog Number	Finish	Mfr.
6 EA	HW Hinge	5BB1HW 4.5 X 4.5 NRP	630	IVE
1 EA	Panic Hardware	9827-EO	626	VON
1 EA	Panic Hardware	9827-L-17	626	VON
1 EA	Rim Cylinder	20-022	626	SCH
2 EA	Surface Closer	4111 SHCUSH	689	LCN
2 EA	Kick Plate	8400 10" X 1" LDW B4E	630	IVE

1	SET	Seals	700NA	CL	NGP
1	SET	Astragal	125NA	CL	NGP
2	EA	Door Sweep	101VA	CL	NGP
1	EA	Threshold	896V	AL	NGP

Mfr. = MANUFACTURER

SCH = Schlage

LCN = LCN

IVE = Ives

NGP = National Guard Products

VON = Von Duprin

Or Engineer approved equal

## 2.04 Materials and Fabrication

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location.
  - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Product hardware units of basic metal using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated or specified.

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Finish Hardware

- D. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed screws to match hardware finish.
- E. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use hex screw fasteners.

## PART 3 - Execution

### 3.01 Preparation

- A. Check all frames and doors for proper hardware cutouts and reinforcements.
- B. Except as specified otherwise, install articles of hardware after finishes have been completed on the substrate. Note all requirements for coordination with protective coating applications.
- C. Install hardware at such a time in the Project schedule so as to minimize the possibility of damage from the activity of other trades prior to acceptance.
- D. Check the installation directions of PART 1, paragraph 1.01.B. - Related Work Specified Elsewhere, this Section, before proceeding.

### 3.02 Installation

- A. Mount articles of hardware at locations and in the manner prescribed in the respective DHI standards specified in PART 1, this Section, unless otherwise specified.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the DIVISION 09 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. All field preparations, such as drilling, cutting, tapping, and countersinking shall be accurately executed to assure precise fitting and adjustment.

- E. Use fasteners of correct size and type with anchoring devices as required by construction conditions, suited to the nature of the attachment substrate, and the duty performance required.
- F. In the course of installation, avoid damage to hardware mechanisms, finishes, and surrounding surfaces; smearing of paints, sealants, and lubricants onto surfaces not intended to receive them; and the admission of foreign matter into chassis and cases of units and their associated preparations.
- G. Seal weather-protection components attached to the exterior sides of doors and frames in place with clear silicone caulk in such a manner as to ensure a continuously filled seam throughout the joinery.
- H. Cut and fit weatherstripping accurately so as to effect the greatest possible continuity of the contact element. Where hardware-compatible extrusions are specified "do not cut," adjust templating of soffit-mounted hardware to suit the extrusion thickness, and mount all such items on the extrusions.
- I. Protection plates shall be installed on visual centers of closed doors. Bottom edges of all such plates shall be flush with bottoms of doors or shall meet top edges of surface-applied door sweeps where they are specified.
- J. At exterior doors, obtain satisfactory operation of the installation, then apply a thin layer of clear silicone caulk under hinge leaves, both door and frame. Remove excess caulk after torquing fasteners.
- K. Adjust door closers immediately upon installation. Adjust in exact conformance with manufacturer's printed instructions. Back-check shall be advanced to reduce shock at dead stop. Latching speed shall be set to assure unassisted positive latching. Readjustment of closers may be required prior to acceptance as directed by the Engineer. Adjust hold open device so door closes with normal use. Hold open device to be engaged only when extra push to the door is applied.
- L. Degrees of swing of doors are given for closers where exact dimensioning, of the installation to achieve the indicated angles, is required.

### 3.03 Adjustment and Cleaning

- A. Check and adjust each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
  - 1. Where door hardware is installed more than one month prior to acceptance or occupancy return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

Finish Hardware

2. Checking and adjustment shall be performed by a certified Architectural Hardware Consultant to ensure proper operation and function of each unit.
- B. Lubricate units only as recommended by their manufacturers.
  - C. Remove excess sealants, lubricants, and any other foreign substances, and protect all installations from subsequent damage.
  - D. Clean units just prior to final acceptance, with only materials and procedures recommended by their manufacturers.
  - E. Maintain the sheets of instruction, layout templates, and any supplementary literature regarding hardware in a readable condition. Transmit to the Engineer all such matter together with all spare parts, specialized tools, and other accessories supplied with the hardware. Also, transmit to the Engineer a copy of the approved hardware schedule. Notify the Engineer in writing that such transmittal has occurred.
  - F. Instruct Owner's maintenance personnel in the proper adjustment and maintenance of door hardware and finishes. Instructions shall be performed by a certified Architectural Hardware Consultant or a qualified representative of the manufacturer.

END OF SECTION

## PART 1 - General

### 1.01 Summary

- A. This Section includes resinous flooring system in which the topping component, consisting of resinous compounds or resin emulsions combined with selected fine aggregates, is continuously bonded to a concrete substrate to produce a thin monolithic wearing surface.
- B. Types of resinous flooring systems in this Section include:
  - 1. Chemical-resistant epoxy flooring.

### 1.02 References

- A. American Concrete Institute (ACI):
  - 1. 503 - Use of Epoxy Compounds with Concrete.
- B. American Society for Testing and Materials (ASTM):
  - 1. C267 - Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing.
  - 2. C307 - Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
  - 3. C413 - Test Method for Absorption of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing.
  - 4. C531 - Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
  - 5. C579 - Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes.
  - 6. C580 - Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
  - 7. C811 - Practice for Surface Preparation of Concrete for Application of Chemical-Resistant Resin Monolithic Surfacing.
  - 8. D543 - Practices for Evaluating the Resistance of Plastics to Chemical Reagents.

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Construction Videos and Photographs

9. D635 - Test Method for Rate of Burning and/or Extent and time of Burning of Self-Supporting Plastics in a Horizontal Position.
10. D1308 - Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
11. D2240 - Test Method for Rubber Property - Durometer Hardness.
12. D4060 - Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

### 1.03 Submittals

- A. Submit as specified in DIVISION 01.
- B. Includes, but is not limited to, the following:
  1. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.
  2. Samples: Submit, for verification purposes, 6-inch (150-mm) square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish as selected. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.
  3. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
  4. Material Test Reports: From a qualified independent testing agency indicating and interpreting test results of the resinous flooring's reaction to chemicals and other reagents and substantiating compliance with requirements.
  5. Material Certificates: In lieu of material test reports, when permitted by Engineer/Architect, signed by manufacturers certifying that materials furnished comply with requirements.

### 1.04 Quality Assurance

- A. Installer Qualifications: Installer who has specialized in installing resinous flooring applications similar in type and size to that of this product and who is acceptable to manufacturer of primary materials.
- B. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish, or sealing coats from a single manufacturer. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.



- C. Field Samples: On floor area selected by Engineer/Architect, duplicate resinous floor finishes of prepared samples. Provide full thickness finish sample at least 48 inches (1,200 mm) square to demonstrate texture, color, thickness, chemical resistance, cleanability, and other features of the resinous flooring. Simulate finished lighting conditions for review of in-place field sample.
1. If field Samples are unacceptable, make adjustments to comply with requirements and apply additional Samples until field Samples are approved.
  2. After field Samples are approved, these surfaces will be used to evaluate resinous flooring.
  3. Obtain Engineer/Architect's approval of field Samples before applying resinous flooring.
  4. Final approval of colors will be from field Samples, not Samples submitted for verification.

### 1.05 Delivery, Storage, and Handling

- A. Deliver materials in original packages and containers with seals unbroken, bearing manufacturer's labels containing brand name, and directions for storage and mixing with other components.
- B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

### 1.06 Project Conditions

- A. Comply with resinous flooring manufacturer's directions for maintenance of substrate temperatures, ventilation, and other conditions required to execute and protect Work.
- B. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

## PART 2 - Products

### 2.01 Epoxy-Quartz Aggregate Flooring

- A. Troweled/broadcast decorative-type floor surfacing system consisting of primer; topping including epoxy resin, hardener, and ceramic-coated quartz aggregate; and clear finish coat or coats. Provide only factory-supplied and packaged materials including aggregate for all components of floor surfacing system.

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Construction Videos and Photographs

- B. Manufacturers: Subject to compliance with requirements, provide one of the following:
  - 1. Tnemec: Series 222 Deco-Tread with 286 Decoclear CR Topcoat.
  - 2. Or equal.
- C. Physical Properties:
  - 1. Provide flooring system in which physical properties of topping including aggregate, when tested in accordance with standards or procedures referenced below, are as follows:
    - a. Compressive Strength: Minimum 14,000 psi.
    - b. Flexural Strength: Minimum 4,500 psi.
    - c. Water Absorption: 0.2%.
    - d. Chemical resistance of cured floor surfacing system as indicated below. Test to qualify coatings for chemical splash and fumes (NACE TM-01-74 Procedure B):
      - (1) No effect from the following: Acetic acid (100%), chromic acid (10%), citric acid (20%), formaldehyde (37%), heavy-duty detergent, hydrochloric acid (37%), hydrogen peroxide (28%), lactic acid (85%), mineral spirits, nitric acid (40%), oleic acid, oxalic acid (10%), phosphoric acid (85%), potassium hydroxide (50%), sulfuric acid (75%), tannic acid (20%), tartaric acid (10%), urine.
- D. System Description:
  - 1. System Thickness: 1/8 inch (6.4 mm).
  - 2. Wearing surface: Anti-slip.
  - 3. Components:
    - a. Primer.
    - b. Chemical-resistant sealing or finish coat(s).

## 2.02 Patching and Fill Materials

- A. Resinous product of or approved by resinous flooring manufacturer for application indicated.

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## PART 3 - Execution

### 3.01 Substrate Preparation, General

- A. Perform preparation and cleaning procedures in compliance with resinous flooring manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry, and neutral substrate.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Comply with ASTM C811 requirements, unless manufacturer's written instructions are more stringent.
  - 2. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
  - 3. Repair damaged and deteriorated concrete to resinous flooring manufacturer's written recommendations.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

### 3.02 Application

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
  - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate and optimum intercoat adhesion.
  - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  - 3. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

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Construction Videos and Photographs

- C. Apply self-leveling slurry body coat(s) in thickness indicated.
  - 1. Broadcast aggregates and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- D. Apply troweled or screeded body(s) in thickness indicated. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.
- E. Integral Cove Base: Apply cove base mix to wall surfaces at locations indicated. Round internal and external corners. Install cove base according to manufacturer's written instructions and details including taping, mixing, priming, troweling, sanding, and topcoating of cove base.
- F. Apply sealing or finish coats(s), including grout coat, if any, of type recommended by resinous flooring manufacturer to produce finish indicated. Apply in number of coats and at spreading rates recommended in writing by resinous flooring manufacturer.

### 3.03 Curing, Cleaning, and Protection

- A. Cure resinous flooring materials, taking care to prevent their contamination during stages of application and prior to completion of curing process. Close application area for a minimum of 24 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and the method of their application. Remove temporary covering just prior to cleaning for final inspection.
- C. Clean resinous flooring just prior to final inspections. Use materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION

## PART 1 - General

### 1.01 Summary

- A. This Section includes coating of exterior and interior surfaces throughout the Project and which are listed in PART 2, with systems specified on "coating system" sheets at the end of this Section.
- B. Coating systems include surface preparation, prime coat (first coat), finish coats (second and third coats), inspection, cleaning, and touch-up of surfaces and equipment. Shop preparation, prime coat, and finish coats to be shop-applied, may be specified elsewhere or referenced to this Section so that a complete system is specified and coordinated.
  - 1. Where surface preparation and first (prime) coat are specified in other sections to be shop-applied, such as for structural steel, hollow metal doors or equipment, only the touch-up and finish coats are a part of field painting. Surface preparation is the required degree of preparation prior to application of first (prime) coat regardless if done in shop or field.
  - 2. If materials are provided without shop primer such as miscellaneous steel or sheet metal, then surface preparation, first, second, and third coats are a part of field painting.
  - 3. Concealed surfaces are generally not required to have finish-coats unless otherwise specified, but prime coat should be applied and touched up prior to concealment.
  - 4. Where Equipment and Materials are provided with shop-applied finished coating system, only touch-up is a part of field painting.
  - 5. Refer to applicable sections to determine whether surface preparation and first coat, or complete coating system, is to be shop-applied.
- C. Related Work Specified Elsewhere:
  - 1. Shop Painting and Coatings: All applicable Divisions.
  - 2. Factory Prefinished Items: All applicable Divisions.
- D. Colors:
  - 1. Color of finish coatings shall match accepted color Samples.
  - 2. When second and finish coats of a system are of same type, tint or use an alternate color on second coat to enable visual coverage inspection of the third coat. When first and second coats only are specified and are of same or

different types, tint or use an alternate color on first coat to enable visual coverage inspection of the second coat.

## 1.02 References

### A. Applicable Standards:

1. American National Standards Institute (ANSI):
  - a. A13.1 - Scheme for the Identification of Piping Systems.
  - b. Z53.1 - Safety Color Code for Marking Physical Hazards.
2. American Society for Testing and Materials (ASTM):
  - a. D2092 - Guide for Treatment of Zinc-Coated (Galvanized) Steel Surfaces for Painting.
  - b. D4258 - Surface Cleaning Concrete for Coating.
  - c. D4259 - Abrading Concrete.
  - d. D4260 - Acid Etching Concrete.
  - e. D4261 - Surface Cleaning Concrete Unit Masonry for Coating.
3. Society for Protective Coatings (SSPC) Surface Preparation Specifications:
  - a. SP1 - Solvent Cleaning: Removes oil, grease, soil, drawing and cutting compounds, and other soluble contaminants.
  - b. SP2 - Hand Tool Cleaning: Remove loose material. Not intended to remove adherent mill scale, rust, and paint.
  - c. SP3 - Power Tool Cleaning: Removes loose material. Not intended to remove all scale or rust.
  - d. SP5 - White Metal Blast Cleaning: Removes all scale, rust, foreign matter. Leaves surface gray-white uniform metallic color.
  - e. SP6 - Commercial Blast Cleaning: Two-thirds of every nine square inches free of all visible residues; remainder only light discoloration.
  - f. SP7 - Brush-Off Blast Cleaning: Removes only loose material, remaining surface tight and abraded to give anchor pattern.
  - g. SP10 - Near-White Blast Cleaning: At least 95% of every nine square inches shall be free of all visible residues.
  - h. SP11 - Power Tool Cleaning to Bare Metal.

- i. SP12 - Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultrahigh Pressure Water Jetting Prior to Recoating.
  - j. SP13 - Surface Preparation of Concrete.
4. National Sanitation Foundation (NSF):
- a. 61 - Drinking Water Treatment Chemicals - Health Effects.

### 1.03 Submittals

- A. Submit as specified.
- B. Includes, but not limited to, the following:
  - 1. Schedule of products and paint systems to be used. Schedule shall include the following information:
    - a. Surfaces for system to be applied.
    - b. Surface preparation method and degree of cleanliness.
    - c. Product manufacturer, name, and number.
    - d. Method of application.
    - e. Dry film mil thickness per coat of coating to be applied.
  - 2. Color charts for selection and acceptance.
  - 3. Technical and material safety data sheets.
  - 4. Certification(s) by coating manufacturer(s) that all coatings are suitable for service intended as stated on each coating system sheet. If manufacturer has an equivalent product as that specified, and it is suitable for the intended purpose, Contractor shall submit the recommended product for approval at no increase in cost, and state reasons for substitution.
  - 5. Contractor shall certify in writing to the Engineer that applicators have previously applied all the systems in this Specification and have the ability and equipment to prepare the surfaces and apply the coatings correctly.
    - a. Submittals for industrial maintenance coatings shall be prepared by, or have assistance in preparation of, a corrosion engineer or industrial coatings technical representative of the coating manufacturer.

### 1.04 Quality Assurance

- A. Include on label of container:

Protective Coatings

1. Manufacturer's name, product name, and number.
  2. Type of paint and generic name.
  3. Color name and number.
  4. Storage and temperature limits.
  5. Mixing and application instructions, including requirements for precautions which must be taken.
  6. Drying, recoat, or curing time.
- B. Prepainting Conference:
1. Before Project field painting starts, representatives for the Owner, Contractor, coating applicator, and coating manufacturer's technical representative shall meet with Engineer.
  2. Agenda for the meeting will include details of surface preparations and coating systems to ensure understanding and agreement by all parties for compliance.
- C. A coating report shall be completed daily by Contractor at each phase of the coating system starting with surface preparation. These shall be submitted on the form attached at end of this Section.
- D. In the event a problem occurs with coating system, surface preparation, or application, Contractor shall require coating applicator and coating manufacturer's technical representative to promptly investigate the problem and submit results to Engineer.
- E. Specified VOC shall mean unthinned maximum VOC certified by manufacturer. VOC content as a result of thinning shall not exceed that allowed by federal or local environmental regulations.

## 1.05 Delivery, Storage, and Handling

- A. Delivery of Materials:
1. Deliver in sealed containers with labels and information legible and intact. Containers shall also have correct labels with required information.
  2. Allow sufficient time for testing if required.
- B. Storage of Materials:
1. Store only acceptable materials on Project Site.
  2. Provide separate area and suitable containers for storage of coatings and related coating equipment.



3. Dispose of used or leftover containers, thinners, rags, brushes, and rollers in accordance with applicable regulations.

## 1.06 Regulatory Requirements

- A. In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the U.S. EPA and the local and regional jurisdictions. Notify Engineer of any coating specified herein that fails to conform to the requirements for the location of the Project or location of application.
- B. Lead Content: Use only coatings that are totally lead free except for zinc-rich primers which shall not have a lead content over 0.06% by weight of nonvolatile content.
- C. Chromate Content: Do not use coatings containing zinc-chromate or strontium chromate.
- D. Asbestos Content: Materials shall not contain asbestos.
- E. Mercury Content: Materials shall not contain mercury or mercury compounds.

## 1.07 Project Conditions

- A. If spray-applied, paint could contaminate adjacent building surfaces or vehicles near Site. All containment precautions and application methods shall be taken into consideration and implemented to prevent the above from occurring.
- B. Contractor must protect all mechanical equipment, controls, valves, etc., during surface preparation procedures and coating application.

# PART 2 - Products

## 2.01 Acceptable Manufacturers

- A. Proprietary names and product numbers are specified in most systems for material identification from these manufacturers:
  1. Ameron Protective Coatings Systems Group, Ameron Corp.
  2. Carboline Company, Inc.
  3. Sherwin-Williams.
  4. Tnemec Company, Inc.

## 2.02 General

## Protective Coatings

- A. Materials furnished for each coating system must be compatible to the substrate.
- B. When unprimed surfaces are to be coated, entire coating system shall be by the same coating manufacturer to assure compatibility of coatings.
- C. When shop-painted surfaces are to be coated, ascertain whether finish materials will be compatible with shop coating. Inform Engineer of any unsuitable substrate or coating conditions.

## 2.03 Coating Systems

- A. Specified on the "Protective Coating System" sheets at the end of this Section.

## 2.04 Surfaces to Be Coated

- A. System A-5:
  - 1. Item: Miscellaneous Exterior Exposed Metal Nonimmersion: Including Bridge Crane:
    - a. Reference: Drawings.
    - b. Location: As indicated.
- B. System B-4:
  - 1. Item: Galvanized-Steel Channels and Lintels:
    - a. Reference: Architectural Drawings.
    - b. Location: As indicated.
  - 2. Item: Galvanized-Steel Doors and Frames:
    - a. Reference: Architectural Drawings.
    - b. Location: As indicated.
  - 3. Item: Galvanized-Steel Bollards.
    - a. Reference: Drawings.
    - b. Location: As indicated.
  - 4. Item: Copper Refrigerant Piping
    - a. Reference: Mechanical
    - b. Location: As indicated

C. System E-1:

1. Item: All metal associated with slide gates except aluminum and stainless steel:
  - a. Reference: Division 35 and Drawings.
  - b. Location: As indicated.
2. Item: Motors, pumps, valves, piping:
  - a. Reference: DIVISION 33 and Process Drawings.
  - b. Location: As indicated.
3. Bronze components associated with the slide gates:
  - a. Reference: Drawings.
  - b. Location: As indicated.

D. System F-3:

1. Item: Concrete or Concrete Masonry Units (CMU). Interior Exposure @ block infill locations:
  - a. Reference: Drawings.
  - b. Location: As indicated.

E. System F-5:

1. Item: Emergency Pump Station Top Slab 6"x6" Containment Curb, color: yellow
  - a. Reference: Drawings
  - b. Location: As indicated

## 2.05 Surfaces Not To Be Coated

- A. Do not field paint any of the following items unless specifically noted otherwise:
1. Factory finished equipment, except for touch-up. Equipment manufacturer to provide touch-up paint. Field coat shall match existing where applicable.
  2. Metal surfaces of aluminum, stainless steel, copper, bronze and similar finished materials, except where noted.
  3. Heating and ventilation system, except as noted.
  4. Interior and exterior PVC/CPVC and HDPE piping.

Protective Coatings

5. Rigid Steel Conduit with PVC coating.

## 2.06 Color coding of piping and physical hazards:

- A. Color Coding of Piping: Exterior and interior by color coding entire pipe.

1. General:

- a. Coat piping with solid colors as specified below for entire length of pipe in exposed finished and unfinished areas. Exclude areas in pipe chases and furred areas.
- b. Coat all other piping in colors matching adjacent surfaces. If adjacent area is unfinished, paint in color determined by Engineer/Architect.
- c. Identify piping with legend and arrows as specified below. Apply after completion of finish coating.

2. Location of Legends and Arrows:

- a. Place on piping near connections to Equipment, adjacent to valves or fittings, on both sides of walls penetrated, and at intervals not to exceed 50 feet (15 meters).
- b. Place arrows adjacent to or below legends depending upon visibility. Place arrows in direction of flow. For dual-flow piping, indicate both directions.
- c. Locate legends to be visible from normal line of vision above floor level. Legend locations subject to approval of Engineer/Architect.

3. Letter Size:

- a. Block-style letters, all capitals, conforming to ANSI A13.1 and as follows:
  - (1) Outside Diameter of Pipe of Covering Size of Letters and Arrows.
  - (2) Less than 3/4" (19 mm) Approved metal tag or band.

- (3) 3/4" to 1-1/4" (19 mm to 32 mm) 1/2" (13 mm).
- (4) 1-1/2" to 2" (38 mm to 50 mm) 3/4" (19 mm).
- (5) 2-1/2" to 6" (64 mm to 150 mm) 1-1/4" (32 mm).
- (6) 8" to 10" (200 mm to 250 mm) 2-1/2" (64 mm).
- (7) Over 10" (250 mm) 3-1/2" (89 mm).

## PART 3 - Execution

### 3.01 Surface Preparation

- A. Prepare surfaces for each coating system conforming to SSPC or ASTM surface-preparation specifications listed.
  - 1. If grease or oils are present, SSPC-SP1 shall precede any other method specified for metal substrates.
  - 2. Remove surface irregularities such as weld spatter, burrs, or sharp edges prior to specified surface preparation.
- B. Depth of profile will be as specified or as recommended by the manufacturer for each system, but in no instance shall it exceed one-third of the total dry film thickness of complete system.
- C. Prepare only those areas which will receive the first coat of the system on the same day.
  - 1. On steel substrates, apply coating before rust bloom forms.
- D. Concrete and masonry surfaces shall be adequately cured prior to coating application.
  - 1. Use surface cleaning methods, followed by mechanical or chemical surface preparation as specified in SSPC SP13.
    - a. Acid etching (ASTM D4260) shall not be used for vertical surfaces.
    - b. Acid etching shall only be used where:
      - (1) Procedures are in place for removal of acid residues and the handling, containment, and disposal of hazardous materials.
      - (2) Measures for protection of worker health and safety are provided.

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**Protective Coatings**

- E. For new galvanized steel to be coated, if absence of hexavalent stain inhibitors is not documented, test as described in ASTM D2092, Appendix X2, and remove by one of the methods described therein.

### 3.02 Application

- A. Apply coatings in accordance with coating manufacturer's recommendations.
- B. Use properly designed brushes, rollers, and spray equipment for all applications.
- C. On unprimed surfaces apply first coat of the system the same day as surface preparation.
- D. Dry film thickness of each system shall meet the minimum specified. Maximum dry film thickness shall not exceed the minimum more than 20% or coating manufacturer's requirements if less. Where a dry film thickness range is specified, the range shall not be less than or exceeded.
- E. Shop and field painting shall remain 3 inches (75 mm) away from unprepared surface of any substrate such as areas to be welded or bolted.
- F. Environmental Conditions:
  - 1. Atmospheric temperature must be 50°F (10°C) or higher during application, unless otherwise approved by coating manufacturer. Do not apply coatings when inclement weather or freezing temperature may occur within coating recoat cure times.
  - 2. Wind velocities for exterior applications shall be at a minimum to prevent overspray or fallout and not greater than coating manufacturer's limits.
  - 3. Relative humidity must be less than 85%. The ambient temperature and the temperature of the surface to be painted must be at least 5°F (2.8°C) above the dew point.
  - 4. Provide adequate ventilation in all areas of application to ensure that at no time does the content of air exceed the Threshold Limit Value given on the manufacturer's Material Safety Data Sheets for the specific coatings being applied.
- G. Recoat Time: In the event a coating, such as an epoxy, has exceeded its recoat time limit, prepare the applied coating in accordance with manufacturer's recommendations.
- H. Protection:
  - 1. Cover or otherwise protect surfaces not to be painted. Remove protective materials when appropriate.

2. Mask, remove, or otherwise protect finish hardware, machined surfaces, grilles, lighting fixtures, and prefinished units as necessary.
3. Provide cover or shields to prevent surface preparation media and coatings from entering orifices in electrical or mechanical Equipment. Where ventilation systems must be kept in operation at time of surface preparation, take precautions to shield intakes and exhausts to prevent the materials from entering system or being dispersed.
4. Provide signs to indicate fresh paint areas.
5. Provide daily cleanup of both storage and working areas and removal of all paint refuse, trash, rags, and thinners. Dispose of leftover containers, thinners, rags, brushes, and rollers which cannot be reused in accordance with applicable regulations.
6. Do not remove or paint over Equipment data plates, code stamps on piping, or UL fire-rating labels.

### 3.03 Inspection

- A. Contractor shall provide and use a wet film gauges to check each application approximately every 15 minutes in order to immediately correct film thickness under or over that specified.
- B. Contractor shall provide and use a dry film gauge to check each coat mil (mm) thickness when dry, and the total system mil (mm) thickness when completed.
- C. Use holiday or pinhole detector on systems over metal substrates to detect and correct voids when indicated on system sheet.
- D. Furnish a sling psychrometer and perform periodic checks on both relative humidity and temperature limits.
- E. Check air temperature and temperature of the substrate at regular intervals to be certain surface is 5°F (2.8°C) or more above the dew point.

### 3.04 Cleaning and Repairs

- A. Remove spilled, dripped, or splattered paint from surfaces.
- B. Touch up and restore damaged finishes to original condition. This includes surface preparation and application of coatings specified.

END OF SECTION

**COATING REPORT**

Contract Name: \_\_\_\_\_ Contract No.: \_\_\_\_\_

Coating Contractor: \_\_\_\_\_ Foreman: \_\_\_\_\_

Unit or Surface Identification: \_\_\_\_\_

Unit or Surface Location: Exterior: \_\_\_\_\_, Interior: \_\_\_\_\_

Surface Preparation:

Date \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Relative Humidity \_\_\_\_\_%

Method of Surface Preparation: \_\_\_\_\_

Profile achieved \_\_\_\_\_ mils (if applicable).

Touch-Up:

Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Surface Temp \_\_\_\_\_°F

Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_°F

Coating Used \_\_\_\_\_; Dry Film Obtained mils. \_\_\_\_\_

First Coat:

Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Surface Temp \_\_\_\_\_°F

Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_°F

Coating Used \_\_\_\_\_; Dry Time Before Recoat \_\_\_\_\_ hrs.

Dry Film Obtained \_\_\_\_\_ mils.

Second Coat:



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Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_ °F; Surface Temp \_\_\_\_\_ °F

Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_ °F

Coating Used \_\_\_\_\_; Dry Time Before Recoat \_\_\_\_\_ hrs.

Dry Film Obtained \_\_\_\_\_ mils.

Third Coat:

Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_ °F; Surface Temp \_\_\_\_\_ °F

Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_ °F

Coating Used \_\_\_\_\_; Dry Film Obtained \_\_\_\_\_ mils.

<p align="center"><b>Burns &amp; McDonnell Engineering Company Engineers – Architects – Consultants Kansas City, Missouri</b></p>		<p align="center"><b>PROTECTIVE COATING SYSTEM</b></p>		
		<p align="center"><b>System: A-5</b></p>		
<p><b><u>SERVICE:</u></b></p> <p><b>Surface Preparation:</b></p> <p><b>First Coat:</b></p> <p><b>Second Coat:</b></p> <p><b>System Total:</b></p> <p><b>Volatile Organic Content:</b></p>		<p>Steel - Moderate to Severe Exposure (Nonimmersion)</p> <p>Shop: SSPC-SP6 and profile depth 1.5 to 2.0 mils (0.038 to 0.051 mm). Field: SSPC-SP2 and SP3. Clean and dry.</p> <p>High solids polyamine or polyamide epoxy with minimum 67% solids by volume. Apply at 5.0 to 8.0 mils (0.127 to 0.203 mm) dry film thickness.</p> <p>High solids aliphatic acrylic polyurethane gloss enamel with minimum 52% solids by volume. Apply at 2.0 mils (0.051 mm) dry film thickness.</p> <p>Minimum 7.0 mils (0.178 mm) dry film thickness.</p> <p>Maximum 3.5 lb/gal (425 g/L)</p>		
<p align="center"><b>COATING MANUFACTURER</b></p>	<p align="center"><b>PRODUCT DESIGNATION</b></p>			
	<p align="center"><b>FIRST COAT</b></p>	<p align="center"><b>TOUCH UP</b></p>	<p align="center"><b>SECOND COAT</b></p>	

Carboline	Carboguard 890	Same as first coat	Carbothane 134 HG
Sherwin-Williams	Macropoxy 646 B58-600/B58V600	Same as first coat	HS Polyurethane B65-300 Series
Tnemec	Epoxoline 66HS	Same as first coat	Endura-Shield II, Series 1074

<p align="center"><b>Burns &amp; McDonnell Engineering Company Engineers – Architects – Consultants Kansas City, Missouri</b></p>		<p align="center"><b>PROTECTIVE COATING SYSTEM</b></p>			
		<p align="center">System: <b>B-4</b></p>			
<p><b><u>SERVICE:</u></b> Nonferrous &amp; Galvanized Metal — Moderate to Severe Exposure Exterior or Interior (Including Galvanized Handrail)</p>					
<p><b>Surface Preparation:</b> Shop or field first coat: Remove oil or soap film with neutral detergent or emulsion cleaner.</p>					
<p><b>First Coat:</b> Pretreat and/or allow to weather as recommended by coating manufacturer.</p>					
<p><b>Second Coat:</b> High build polyamide or polyamidoamine epoxy with minimum 65% solids by volume. Apply at 4.0 - 6.0 mils (100 -150 microns) dry film thickness.</p>					
<p><b>Third Coat:</b> High solids aliphatic acrylic polyurethane gloss enamel with minimum 60% solids by volume. Apply at 2.0 – 3.0 mils (50 – 75 microns) dry film thickness.</p>					
<p><b>System Total:</b> Minimum 6.0 mils (150 microns) dry film thickness in addition to galvanizing.</p>					
<p><b>Volatile Organic Content:</b> Maximum 2.8 lb./gal (340 g/L).</p>					
<p align="center"><b>COATING MANUFACTURER</b></p>		<p align="center"><b>PRODUCT DESIGNATION</b></p>			
		<b>FIRST COAT</b>	<b>TOUCH UP</b>	<b>SECOND COAT</b>	<b>THIRD COAT</b>
Carboline		See above		Carboguard 893 SG	Carbothane 134 HG
Sherwin-Williams		See above		Macropoxy 646 B58-600 Series	HS Polyurethane B65-300 Series
Tnemec		See above		F.C. Typoxy Series	Endura-Shield II

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1074

**Burns & McDonnell Engineering Company  
Engineers – Architects – Consultants  
Kansas City, Missouri**

**PROTECTIVE COATING  
SYSTEM**

**System: E-1**

**SERVICE:** Steel & Iron – Nonpotable Liquid Immersion, Normal to Severe Exposure. Interior of Tank or Basin. Exterior of Steel, Piping, or Equipment in Tank or Basin.

**Surface Preparation:** Shop or Field First Coat: SSPC-SP5 and profile depth of 1.5 to 2.5 mils (0.038 to 0.064 mm).  
Field Touch-Up (of Shop-applied first coat): Same as for First Coat.

**First Coat:** High solids amine or polyamidoamine epoxy coating with minimum 67% solids by volume. Apply at 5.0 mils (0.127 mm) dry film thickness.

**Second Coat:** Same as first coat.

**System Total:** Minimum 10.0 mils (0.254 mm) dry film thickness. Check for voids with holiday or pinhole detector.

**Volatile Organic Content:** Maximum 2.8 lb./gal (340 g/L).

**COATING  
MANUFACTURER**


**PRODUCT DESIGNATION**

**FIRST COAT TOUCH UP SECOND COAT**

Carboline	Carboguard 890	Same as first coat	Same as first coat
Sherwin-Williams	Dura-Plate 235 B67-235/B67V235	Same as first coat	Same as first coat
Tnemec	Epoxoline 66 HS	Same as first coat	Same as first coat

<p align="center"><b>Burns &amp; McDonnell Engineering Company Engineers – Architects – Consultants Kansas City, Missouri</b></p>		<p align="center"><b>PROTECTIVE COATING SYSTEM</b></p>												
		<p align="center"><b>System: F-3</b></p>												
<table border="0"> <tr> <td><b><u>SERVICE:</u></b></td> <td>Concrete, Concrete Masonry Units (CMU) –Severe Exposure (Nonimmersion) Interior</td> </tr> <tr> <td><b>Surface Preparation:</b></td> <td>Concrete: ASTM D4258. Fill pits in concrete with patching compound as recommended by coating manufacturer. CMU: ASTM D4261, clean and dry.</td> </tr> <tr> <td><b>First Coat:</b></td> <td>Concrete: High solids epoxy with minimum 75% solids by volume. Apply at 5.0 to 8.0 mils (0.127 to 0.203 mm) dry film thickness. CMU: High solids epoxy block filler with minimum 60% solids by volume. Apply at 10.0 to 20.0 mils (0.254 to 0.508 mm) dry film thickness and as required to fill pores.</td> </tr> <tr> <td><b>Second Coat:</b></td> <td>Concrete &amp; CMU: High solids epoxy with minimum 75% solids by volume. Apply at 5.0 to 8.0 mils (0.127 to 0.203 mm) dry film thickness. Semigloss or gloss finish.</td> </tr> <tr> <td><b>System Total:</b></td> <td>Concrete: Minimum 10.0 mils (0.254 mm) dry film thickness. CMU: Minimum 15.0 mils (0.381mm) dry film thickness.</td> </tr> <tr> <td><b>Volatile Organic Content:</b></td> <td>Maximum 3.5 lb./gal (425 g/L).</td> </tr> </table>			<b><u>SERVICE:</u></b>	Concrete, Concrete Masonry Units (CMU) –Severe Exposure (Nonimmersion) Interior	<b>Surface Preparation:</b>	Concrete: ASTM D4258. Fill pits in concrete with patching compound as recommended by coating manufacturer. CMU: ASTM D4261, clean and dry.	<b>First Coat:</b>	Concrete: High solids epoxy with minimum 75% solids by volume. Apply at 5.0 to 8.0 mils (0.127 to 0.203 mm) dry film thickness. CMU: High solids epoxy block filler with minimum 60% solids by volume. Apply at 10.0 to 20.0 mils (0.254 to 0.508 mm) dry film thickness and as required to fill pores.	<b>Second Coat:</b>	Concrete & CMU: High solids epoxy with minimum 75% solids by volume. Apply at 5.0 to 8.0 mils (0.127 to 0.203 mm) dry film thickness. Semigloss or gloss finish.	<b>System Total:</b>	Concrete: Minimum 10.0 mils (0.254 mm) dry film thickness. CMU: Minimum 15.0 mils (0.381mm) dry film thickness.	<b>Volatile Organic Content:</b>	Maximum 3.5 lb./gal (425 g/L).
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<p align="center"><b>COATING MANUFACTURER</b></p>	<p align="center"><b>PRODUCT DESIGNATION</b></p>													

	<b>FIRST COAT</b>	<b>SECOND COAT</b>
<b>Concrete</b>		
Carboline	Carboguard 890	Carboguard 890
Sherwin-Williams	Macropoxy HS B58W400 Series	Macropoxy HS B58W 400 Series
Tnemec	High Build Epoxoline Series 66HS	High Build Epoxoline Series 66HS
<b>CMU</b>		
Carboline	Sanitile 600	Carbogaurd 890
Sherwin-Williams	Kem CatiCoat HS B42W400	Macropoxy HS B58W 400 Series
Tnemec	Block Filler WB 1254	High Build Epoxoline Series 66HS

		<b>PROTECTIVE COATING SYSTEM</b>		
		<b>System: F-5</b>		
<p><b><u>SERVICE:</u></b> Concrete – Moderately Severe Exposure (Nonimmersion) Exterior – Sand Texture Finish</p> <p><b>Surface Preparation:</b> Clean, dry, free of all foreign materials. Fill large pits with patching compound as recommended by coating manufacturer. Prepare surface in accordance with SSPC-SP13.</p> <p><b>First Coat:</b> Acrylic emulsion masonry texture coating with minimum 44% solids by volume. Apply at 8.0 to 10.0 mils (200 to 250 microns) dry film thickness.</p> <p><b>Second Coat:</b> Same as first coat.</p> <p><b>Third Coat:</b> As required to meet minimum thickness.</p> <p><b>System Total:</b> Minimum 16.0 mils (400 microns) dry film thickness.</p> <p><b>Volatile Organic Content:</b> Maximum 2.8 lb/gal (340 g/L).</p>				
<b>COATING MANUFACTURER</b>	<b>PRODUCT DESIGNATION</b>			
	<b>FIRST COAT</b>	<b>TOUCH UP</b>	<b>SECOND COAT</b>	<b>THIRD COAT</b>
Glidden Professional	Decra-Flex 2290		Same as first coat	
PPG	Perma-Crete Primer. 4-603		Perma-Crete 4-210	
Sherwin-Williams	Ultra-Crete A44W800 Series		Same as first coat	



Tnemec	W.B. Tneme- Crete Series 181	Same as first coat
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