

**CONTRACT DOCUMENTS
&
TECHNICAL SPECIFICATIONS
FOR**

**CANYON REGIONAL WATER AUTHORITY
WELLS RANCH II EMERGENCY GENERATOR
PROJECT**

ISSUED FOR BID



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January 17, 2025



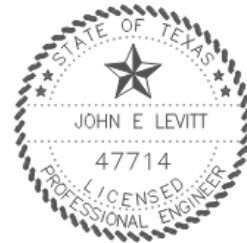
Technical Specifications
for the
Canyon Regional Water Authority
Wells Ranch II Emergency Generator Project

DIVISION 00, DIV 01



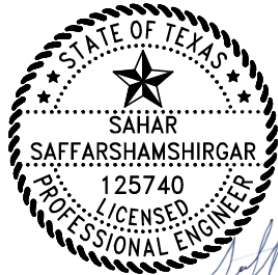
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January 17, 2025

CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

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INVITATION TO OFFERORS COMPETITIVE SEALED PROPOSALS

PART 1 - GENERAL

1.1 RECEIPT OF PROPOSALS

Sealed proposals for the construction of **Wells Ranch II Emergency Generator Project**, will be received by the Canyon Regional Water Authority (“OWNER”) at the following location:

**Canyon Regional Water Authority
850 Lakeside Pass
New Braunfels, TX 78130**

until **2:00 p.m., Friday, February 28, 2025**, and proposals will be opened publicly and proposals received will be publicly acknowledged by respondent name at the above location.

PROJECT ENGINEER: ARDURRA

1.2 GENERAL DESCRIPTION OF WORK

A. The scope of work includes but is not limited to:

1. Wagner Booster Pump Station:
 - a. Modification of existing main breaker to replace trip 1600A unit with 2500A trip unit, replace 1600A current sensors with 2500A rated current sensors
 - b. Demolition of existing ATS
 - c. Demolition of existing ductbank (including conduit & wire) to generator from ATS and wire from ATS to bus transition section.
 - d. Temporary relocation of generator and demolition of existing generator pad
 - e. Installation of new non-SE rated ATS with enclosure, ductbank from new SE rated ATS (including conduit & wire), new wire from ATS to MCC, new generator concrete pad.
 - f. Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - g. Replacement of circuit breaker feeding ancillary generator circuit panelboard and replacement of ancillary generator circuits panelboard main circuit breaker.
 - h. Installation of all required control wiring associated with generator, and ATS to the site PLC.
 - i. Inclusive of all testing and power system studies.
2. Leissner Booster Pump Station:
 - a. Demolition of existing ductbank (including conduit & wire) to generator from ATS, wire from ATS to MCC.
 - b. Temporary relocation of generator and demolition of existing generator pad
 - c. Installation of new pull box on exterior or the electrical building, new overhead conduit & wire runs from existing SE rated ATS to new pull box and new ductbank (including conduit & wire) from pull box to generator, new wire from ATS to MCC, new generator concrete pad.
 - d. Demolition of existing 208V generator engine block heater and replacement with a 240V engine block heater with same wattage
 - e. Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - f. Replacement of existing generator ancillary circuit panelboard and installation of new transformer and MCC feeder breaker to serve the proposed generator ancillary circuit panelboard.

- g. Installation of all required control wiring associated with generator, and ATS to the site PLC.
 - h. Inclusive of all testing and power system studies.
3. Dead Man Well:
- a. Demolition of existing ATS and main breaker
 - b. Installation of new ATS and main breaker
 - c. Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - d. Installation of all required control wiring associated with generator, and ATS to the site PLC.
 - e. Inclusive of all testing and power system studies.
4. Wells Ranch WTP - Service No.1
- a. Demolition of existing wire/conduit previously installed to and from main breaker/ATS/generator (non-utility wire)
 - b. Demolition of the existing main breaker section
 - c. Demolition of existing ATS
 - d. Temporary relocation of generator and demolition of existing generator pad
 - e. Modification of existing Siemens switchboard line-up to decouple the main breaker section from the distribution sections.
 - f. Installation of new main breaker section
 - g. Installation of new MLO section at the end of switchboard line up
 - h. Installation of new wire and cable tray system from new main breaker to ATS, from ATS to new MLO section.
 - i. Installation of new wire and cable tray system from new ATS to new pull box on exterior of the building.
 - j. Installation of new ductbank from pull box to the existing 1600kW generator
 - k. Installation of new dry-type transformer and panelboard for new circuits to generator panels
 - l. Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - m. Installation of all required control wiring associated with PQM, generator, and ATS to the plant PLC.
 - n. Inclusive of all testing and power system studies.
5. Wells Ranch WTP – Service No. 2
- a. Demolition of existing wire/conduit previously installed to ATS/generator
 - b. Demolition of the existing empty pull section adjacent to the switchboard
 - c. Demolition of existing ATS
 - d. Temporary relocation of generator and demolition of existing generator pad
 - e. Modification of existing Eaton switchboard line up to decouple the main breaker section from the distribution section.
 - f. Installation of new MLO section at the end of switchboard line up
 - g. Installation of new wire and cable tray system from existing main breaker to ATS, from ATS to new MLO section.
 - h. Installation of new wire and cable tray system from new ATS to pull box on exterior of the building.
 - i. Installation of new ductbank from pull box to the existing 1250kW generator
 - j. Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - k. Installation of all required control wiring associated with PQM, generator, and ATS to the plant PLC.
 - l. Inclusive of all testing and power system studies.

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

- 1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract
- 2. Division 1 - General Requirements

- 3. Division 2 – Existing Conditions
- 4. Division 13 – Instrumentation & Control
- 5. Division 16 – Electrical

1.3 PROPOSAL SUBMISSION REQUIREMENTS

Submission requirements for the competitive sealed proposals shall be found in the Section 00 21 14 - Instructions to Offerors.

1.4 BOND REQUIREMENTS

Each Proposal must be accompanied by a Bid Bond, on the furnished form, in an amount of not less than five percent of the total Proposal, as specified in Form 00 21 14, Instructions to Offerors. Performance and payment bonds, when required, shall be executed on forms furnished by the OWNER. Each bond shall be issued in an amount of 100% of the Contract Amount by a solvent corporate surety company authorized to do business in the State of Texas and shall meet any other requirements established by law or by the OWNER.

1.5 DOCUMENT EXAMINATION AND PROCUREMENT

Plans and specifications can be obtained electronically by the prospective offerors or suppliers at www.civcastusa.com. Project ID – “Canyon Regional Water Authority (CRWA) Wells Ranch II Emergency Generator Project”.

1.6 PRE-PROPOSAL CONFERENCE

A **mandatory** pre-proposal conference will be held as described in Section 00 21 14 - Instructions to Offerors at the following location, date, and time:

DATE: Thursday, February 6, 2025
TIME: 1:30 p.m.
LOCATION: Canyon Regional Water Authority Administration Building
850 Lakeside Pass, New Braunfels, TX 78130
New Braunfels, TX 78130

1.7 OWNER’S RIGHT TO ACCEPT OR REJECT PROPOSALS

OWNER reserves the right to accept or reject any or all proposals and to waive any minor informality in a proposal or in the solicitation process.

The contract is contingent upon release of funds from the Texas Water Development Board. Any contract or contracts awarded under this Invitation for Proposals is/are expected to be funded in part by a loan or grant from the Texas Water Development Board. Neither the State of Texas, nor any of its departments, agencies, or employees are or will be a party to this Invitation to Offerors or any resulting contract.

1.8 HUB PROGRAM

All procurements by the OWNER are subject to the OWNER’s Historically Underutilized Business (HUB) Program. The Program provides HUBs full opportunity to participate in all of the OWNER’s contracts. Goals for HUB participation are stated for each solicitation. Information on achieving the goals or documenting good faith efforts to achieve the goals are contained in the Proposal Documents and other Contract Documents. When a HUB participation goal applies, each Offeror is required to complete and return a HUB Participation Plan with its Proposal. If a HUB Participation Plan is not submitted with a Proposal, the Proposal will be disqualified from consideration.

1.9 UNITED STATES IRON AND STEEL REQUIREMENTS

Any contract(s) awarded under this Invitation to Offerors is/are subject to the United States Iron and Steel (U.S. I&S) requirements of Texas Water Code § 17.183 and/or Texas Government Code, Chapter 2252, Subchapter G, as amended by SB 1290, 85th Legislative Session, as applicable.

1.10 INQUIRIES

Inquiries from Offerors regarding this Invitation must be posted on Civcast. Last day for bidder question is **5:00 p.m. on Friday, February 14, 2025**. Any questions posted after this date and time will not be answered. If an Offeror contacts any officer or employee of the OWNER, or any other representative of the OWNER, during the period beginning on the date this Invitation is issued and ending on the date of contract award or rejection of all offers by the OWNER, any offer submitted by the Offeror is subject to rejection by the OWNER.

1.11 ADVERTISEMENT DATES

1st Advertisement: January 27, 2025

2nd Advertisement: February 3, 2025

END OF SECTION

SECTION 00 21 14
INSTRUCTIONS TO OFFERORS

PART 1 - GENERAL

1.1 DEFINED TERMS

- A. Terms used in these INSTRUCTIONS TO OFFERORS are defined in Section 00 72 00 - GENERAL CONDITIONS and Section 00 73 00 – SUPPLEMENTAL CONDITIONS.
 - 1. Any reference to the term “Bidder” shall also mean “Offeror” and to “Bid” shall mean “Proposal” in the Proposal Documents.
- B. Certain additional terms used in these INSTRUCTIONS TO OFFERORS have the meanings indicated below which are applicable to both the singular and plural thereof.
 - 1. Offeror: Any person, firm, partnership, company, association, or corporation submitting a Proposal for the Project.
 - 2. Nonresident Offeror: Any person, firm, partnership, company, association, or corporation submitting a Proposal for the Project whose principal place of business is not in the State of Texas.
 - 3. Successful Offeror: The Offeror that submits the Proposal for the Project that offers the Best Value to the Owner based on the Evaluation of Proposals as described in these Instructions to Offerors.
 - 4. TWDB: Texas Water Development Board.

1.2 COPIES OF PROPOSAL DOCUMENTS

- A. Neither the Owner nor the Engineer shall assume any responsibility for errors or misinterpretations resulting from the Offeror’s use of incomplete sets of Proposal Documents.
- B. The Owner in making copies of Proposal Documents available do so only for the purpose of obtaining Proposals for the Project and do not authorize or confer a license or grant for any other use.

1.3 QUALIFICATIONS OF OFFERORS

- A. Offerors shall be experienced in the kind of work to be performed in the construction of the Project, shall have the necessary equipment therefore, and shall possess sufficient capital to properly execute the work within the time allowed.
- B. Proposals received from Offerors who have previously failed to complete a project within the time required, or who have previously constructed a similar project in an unsatisfactory manner, may be rejected. A Proposal may be rejected if an Offeror cannot show that the Offeror has the necessary personnel, ability, and equipment to commence the Project at the time prescribed and thereafter to prosecute and complete the Project at the rate or within the times specified. A Proposal may be rejected if an Offeror is already obligated for the performance of other work which would delay the commencement, prosecution, or completion of the Project.
- C. Offerors shall meet the following minimum qualifications:
 - 1. Successful completion of no less than five electrical projects executed at water/wastewater facilities with municipal water/wastewater authorities in State of Texas.
 - 2. Project superintendent shall have executed/lead no less than five electrical projects executed at water/wastewater facilities with municipal water/wastewater authorities in the State of Texas.

3. Project superintendent shall hold a minimum of a journeyman electrician license in the State of Texas.
 4. Project manager shall be located in the State of Texas and shall have managed no less than five electrical projects executed at water/wastewater facilities with municipal water/wastewater authorities in the State of Texas.
 5. Contractor shall have a master electrician located on site a minimum of two hours per week during the entirety of construction.
 6. Second level of subcontracting is not acceptable.
- D. Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Offerors and any proposed Subcontractors.

1.4 EXAMINATION OF PROPOSAL AND CONTRACT DOCUMENTS, OTHER RELATED DATA, AND PROJECT SITE

- A. Before submitting a Proposal, each Offeror shall:
1. Examine and carefully study the Contract Documents and other related data identified in the Proposal Documents (including "technical data" referred to in 4.2. below). No information given by Owner or any representative of the Owner other than that contained in the Contract Documents and officially promulgated addenda thereto, shall be binding upon the Owner.
 2. Visit the Project Site to become familiar with and satisfy the Offeror as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.
 3. Consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work.
 4. Study all: (i) reports of explorations and tests of subsurface conditions at or contiguous to the Project Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Project Site (except Underground Facilities) that have been identified in the Contract Documents as containing reliable "technical data" and (ii) reports and drawings of Hazardous Environmental Conditions, if any, at the Project Site that have been identified in the Contract Documents as containing reliable "technical data."
 5. Review all easement documents associated with the Work for general requirements, as well as special conditions and requirements that may be associated with each.
 6. Be advised that the Contract Documents on file with the Owner shall constitute all of the information which the Owner will furnish. All additional information and data which the Owner will supply after promulgation of the formal Contract Documents shall be issued in the form of written addenda and shall become part of the Contract Documents just as though such addenda were actually written into the original Contract Documents. No information given by the Owner other than that contained in the Contract Documents and officially promulgated addenda thereto, shall be binding upon the Owner.
 7. Perform independent research, investigations, tests, borings, and such other means as may be necessary to gain a complete knowledge of the conditions which will be encountered during the construction of the Project. On request, the Owner may provide Offeror access to the Project Site to conduct such examinations, investigations, explorations, tests and studies as each Offeror deems necessary for submission of a Proposal. An Offeror must fill all holes and clean up and restore the Project Site to its former conditions upon completion of such explorations, investigations, tests, and studies.

8. Determine the difficulties of the Work and all attending circumstances affecting the cost of doing the Work, time required for its completion, and obtain all information required to make a proposal. Offerors shall rely exclusively and solely upon their own estimates, investigation, research, tests, explorations, and other data which are necessary for full and complete information upon which the proposal is to be based. It is understood that the submission of a proposal is prima-facie evidence that the Offeror has made the investigation, examinations and tests herein required. Claims for additional compensation due to variations between conditions encountered in construction and as indicated in the Contract Documents will not be allowed.
- B. Promptly notify the Owner of all conflicts, errors, ambiguities, or discrepancies in or between the Contract Documents and such other related documents. The Offeror shall not take advantage of any error or omission in the Contract Documents, and the Owner shall be permitted to make such corrections or interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents. Reference is made to Section 00 73 00 – Supplementary Conditions for identification of:
 1. those reports of explorations and tests of subsurface conditions at or contiguous to the Project Site which have been utilized by Owner in preparation of the Contract Documents. The logs of Soil Borings, if any, on the plans are for general information only. Neither the Owner nor the Engineer guarantee that the data shown is representative of conditions which exist.
 2. those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the Project Site that have been utilized by the Owner in preparation of the Contract Documents.

Copies of such reports and drawings will be made available by the Owner to any Offeror only if the Offeror submits a completed and signed Request and Disclaimer to the Owner's Contact. Those reports and drawings are NOT a part of the Contract Documents. If there is any "technical data" contained therein upon which an Offeror is entitled to rely, as provided in 4.2 of the General Conditions, the data has been identified and established in 4.2 of the Supplemental Conditions. Offerors are responsible for any interpretation or conclusion drawn from any "technical data" or any other data, interpretations, opinions, or information.

- C. The submission of a Proposal will constitute an incontrovertible representation by an Offeror (i) that the Offeror has complied with every requirement of this Paragraph 4; (ii) that without exception the Proposal is premised upon performing and furnishing the Work required by the Contract Documents and applying the specific means, methods, techniques, sequences or procedures of construction (if any) that may be shown or indicated or expressly required by the Contract Documents; (iii) that the Offeror has given the Owner written notice of all conflicts, errors, ambiguities or discrepancies in the Contract Documents and the written resolutions thereof by the Owner are acceptable to the Offeror, or noting when said conflicts, etc., have not been resolved through the interpretations by the Owner as described in Paragraph 6.; and (iv) that the Contract Documents are sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.
- D. The provisions of this Paragraph 4, inclusive, do not apply to Asbestos, Polychlorinated biphenyls (PCBs), Petroleum, Hazardous Waste or Radioactive Material covered by 4.4. of the General Conditions, unless specifically identified in the Contract Documents.

1.5 AVAILABILITY OF LANDS FOR WORK, ETC.

- A. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the Successful Offeror in performing the Work are identified in the Contract 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 in the Successful Offeror's name and paid for by the Successful Offeror. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by the Owner unless otherwise provided in the Contract Documents.
- B. The Offeror shall not commence construction without all executed right-of-way, easements, and/or permits, and shall submit a schedule to the Owner of how construction will proceed in the other areas of the Project for which all required permits and/or easements have been obtained.

1.6 INQUIRIES, INTERPRETATIONS AND ADDENDA

- A. All inquiries about the meaning or intent of the Proposal Documents must be submitted to the Owner's Contact identified below in writing on or before **February 14, 2025**. Inquiries received after this time may not receive a response. If an Offeror contacts any officer, employee, or representative of the Owner other than the Owner's Contact during the period beginning on the date the Invitation for Proposals is issued and ending on the date the Owner awards the contract or rejects all offers, any offer submitted by the Offeror is subject to rejection by the Owner. Interpretations or clarifications considered necessary by the Owner in response to inquiries will be issued by Addenda delivered to all parties recorded by the Owner as having received the Proposal Documents. Only responses provided by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- B. The Owner may issue Addenda to modify the Proposal Documents as deemed advisable by the Owner in its sole discretion.
- C. A mandatory Pre-proposal conference will be held at the time and place indicated in the Advertisement or INVITATION TO OFFERORS. Representatives of the Owner will be present to discuss the Project. The Owner will transmit to all prospective Offerors of record such Addenda as the Owner considers advisable in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

1.7 PROPOSAL SECURITY

- A. Each Proposal must be accompanied by a Proposal Bond made payable to Owner in an amount of five percent (5%) of the Offeror's maximum price proposed on the Proposal Form, issued by a surety meeting the requirements of 5.1 of the General Conditions.
- B. The Proposal Bonds of all Offerors will be retained until the conditions of the Notice of Award have been satisfied. If an Offeror fails to execute and deliver the complete Contract within **742 calendar days** after the Notice of Award, the Owner may declare the Offeror to be in default, rescind the Notice of Award, and forfeit the Offeror's Proposal Bond. The Owner in its discretion may proceed to consider award to other Offerors, and the Proposal Bond of all other Offerors whom the Owner believes to have a reasonable chance of receiving the award will be retained by the Owner until final contract execution. The Proposal Bond of Offerors whom the Owner believes do not have a reasonable chance of receiving an award will be released within ninety days of the Proposal opening.

1.8 CONTRACT TIMES

- A. The Contract will be a Calendar Day contract, and the provisions of the Contract Documents related to Calendar Days will apply.

- B. The Contract Time for Substantial Completion will be the number of Calendar Days specified in the Agreement, together with time extensions authorized in accordance with applicable provisions of the Contract Documents.
- C. The Contract Time for Final Completion will be the number of Calendar Days specified in the Agreement, together with time extensions authorized in accordance with applicable provisions of the Contract Documents.

1.9 LIQUIDATED DAMAGES

- A. Provisions for liquidated damages for failure to attain Substantial Completion and/or Final Completion within the applicable Contract Time are set forth in 12.1 of the General Conditions and 12.1 of the Supplemental Conditions.

1.10 SUBSTITUTE AND "OR-EQUAL" ITEMS

- A. The Contract, if awarded, will be on the basis of materials and equipment described in the Proposal Documents without consideration of possible substitute or "or-equal" items. Whenever it is indicated or specified in the Proposal Documents that a "substitute" or "or-equal" item of material or equipment may be furnished or used by the Successful Offeror if acceptable to the Owner, application for such acceptance will not be considered by the Owner until after the Effective Date of the Contract. The procedure for submission of any such application by the Successful Offeror and consideration by the Owner is set forth in 6.2.5 of the General Conditions and is supplemented in Section 01 25 00 of the General Requirements.

1.11 SUBCONTRACTORS, SUPPLIERS AND OTHERS

- A. The Successful Offeror shall not employ any Subcontractor or Supplier, whether initially or as a substitute, to which the Owner has a reasonable objection. The Successful Offeror shall not substitute any Subcontractor or Supplier for a Subcontractor or Supplier that has been accepted by the Owner unless the substitute has been accepted in writing by the Owner.

1.12 SUBMITTAL REQUIREMENTS

- A. In addition to completing all required sections of the Proposal Documents, the Offeror shall provide written documentation demonstrating the Offeror's qualifications and experience. This documentation shall be included with the sealed proposal package. Tabbed sections are recommended but are not required. Qualification and experience documentation shall be submitted on letter-size (8-1/2" x 11") paper and shall be spiral or comb bound. The qualifications and experience data provided shall include, but may not be limited to the following:
 - 1. **Quality, Reputation, and Ability to Complete Similar Projects on Schedule and Within Budget:** The Offeror shall demonstrate experience in delivering similar work as expressed in the Proposal Documents on schedule and within budget. Submit details of five (5) similar projects completed within the last ten (10) years. The submitted projects shall include any projects performed for the Owner or for any of the Owner's Partners. The Owners partners are
The Offeror should include the following items for each project submitted:
 - a. Project Name
 - b. Owner Name
 - c. Project Owner Contact Name, Phone Number, and Email Address
 - d. Contract Time and Actual Completion Time
 - e. Original Contract Cost and Final Contract Cost
 - f. Detailed Project Description.
 - g. The Offeror should present projects that demonstrate experience in the following categories:
Electrical projects including backup power generation equipment

2. **Key Personnel:** The Offeror shall include an organizational chart (maximum of 1 page) and resume (maximum of 1 page per person) of key team members that will be assigned to the Project. The Offeror should, at a minimum, provide personnel experience for the Project Manager, Superintendent, Safety Manager, Scheduler, Manager in charge of Submittals and Requests for Information, Foreman/Foremen. The Offeror shall also include Key Subcontractor Personnel including, at a minimum, Project Manager, Superintendent, and Foreman/Foremen. The Key Personnel resumes should include the following information:
 - a. Name and Job Title
 - b. Role and Responsibility
 - c. Total number of years of experience and total number of years with current firm.
 - d. Licenses and Certifications
 - e. Project Role and Responsibilities
 - f. Relevant project experience for the categories listed in 12.1.1.7, specifically within the last 5 years. Identify if projects were completed with current firm or previous firm.
 - g. List of other active projects Key Personnel will be assigned to for the duration of this project and include percentage of time allocated for each
3. **Detailed Schedule and Written Plan to Achieve the Offeror-Specified Contract Time:** The Offeror shall demonstrate means and methods to complete the Project within the Offeror-Specified Time. The Offeror shall include the following:
 - a. Baseline Schedule – The Offeror shall submit a detailed Baseline Schedule in accordance with Section 01311. The schedule should demonstrate the Offeror's ability to complete the Project within the Owner-Specified Contract Time.
 - b. Plan to achieve the Specified Contract Time – The Offeror shall submit a plan that demonstrates the Offeror's ability to complete the Project within the Offeror-Specified Contract Time. The Plan should clearly identify the Critical Path Items and the Plan to keep the project on schedule. The Plan should include, but not be limited to:
 - 1) Critical Path Plan
 - 2) Project Specific Tasks
 - 3) Equipment and material delivery
 - 4) Hours of Operation
 - a. The Hours of Operation shall be between 7:00 AM until 4:00 PM on Monday through Friday. Work on Saturday's can be requested; however, the Contractor shall be responsible for compensation of CRWA personnel required to be onsite.
 - 5) Offeror's Resources to reach Substantial Completion, including the number of shifts or crews working in parallel.
4. **Safety Record:** The Offeror shall provide responses and any supporting documentation necessary for the Owner to evaluate the safety record for the Offeror and proposed Subcontractors. The response shall include, but may not be limited to the following:
 - a. Documentation of any complaints to, or final orders entered by, the Occupational Safety and Health Review Commission (OSHRC) against the Offeror or a proposed Subcontractor for violation(s) of OSHA regulations within the last five (5) years.
 - b. Documentation of any citations received by the Offeror or a proposed Subcontractor from any federal, state, or local environmental protection enforcement agency.
 - c. Provide records showing Total Recordable Incident Rate (TRIR) for each year for the last five (5) years for the Offeror and each proposed Subcontractor.
 - d. Provide records documenting the Experience Modification Rate (EMR) for the last five (5) years for the Offeror and each proposed Subcontractor.

- e. List any fatalities in the safety history for the last ten (10) years for the Offeror and each proposed Subcontractor.
5. **Historically Underutilized Business (HUB) Program Compliance Plan:** The Successful Offeror will be required to make a good faith effort towards meeting the Owner's participation goal for HUBs, which is 11.2%. HUBs include historically underutilized businesses, minority business enterprises, disadvantaged business enterprises, or small-medium businesses, as determined under applicable rules of the Texas Comptroller of Public Accounts. The participation goal may be met either by the Successful Offeror being a HUB, or by the Successful Offeror subcontracting a portion of the Work to one or more qualified HUBs. The ability or desire of an Offeror to perform the Work with its own organization will not relieve the Offeror of the responsibility to make good faith efforts towards meeting the HUB participation goal. Offerors are not required to accept higher quotes in order to meet the participation goal. Each Offeror is required to include in its Proposal a proposed HUB Participation Plan describing the methods the Offeror will use to meet or exceed this participation goal. An Offeror's methods may include, without limitation, any or all the following:
- a. Soliciting participation by HUBs through reasonable and verifiable means at least seven business days prior to the proposal opening date to allow the HUBs to respond to the Offeror in a timely manner.
 - b. Providing interested HUBs with adequate information about the Proposal Documents and requirements, including addenda, in a timely manner to assist them in responding to the Offeror.
 - c. Negotiating in good faith with interested HUBs that have submitted bids to the Offeror.
 - d. Publishing notice in a local publication such as a newspaper, trade association publication or via electronic/social media.
 - e. Not rejecting HUBs as unqualified without sound reasons based on a thorough investigation of their capabilities.
 - f. Making economically feasible portions of the work or materials needs available to HUB subcontractors and suppliers, and selecting those portions of the work or materials needs consistent with the available HUB subcontractors and suppliers.
 - g. Effectively using the services of HUB-related community organizations and contractor groups, and local, state and federal HUB business assistance offices to provide assistance in soliciting and utilizing HUBs.
- B. The Owner reserves the right to contact references provided by the Offeror, as well as any other additional references to verify qualifications and experience.
- C. If an Offeror fails to provide a response to each of the Evaluation Criteria identified herein, points may be deducted or the Proposal may be considered non-responsive and ineligible for consideration.

1.13 PROPOSAL FORM

- A. The Proposal Form is included in Section 00 41 00 – Proposal.
- B. All blanks on the Proposal Form must be completed by printing in ink and the Proposal Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Proposal Form. A Proposal price shall be indicated for each proposed item, alternative, and unit price item listed therein. In the case of optional alternatives, the terms "No Bid," "No Change," or "Not Applicable" may be entered. All prices shall be printed legibly.

- C. Proposals by corporations 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. The corporate address and state of incorporation shall be shown below the signature. Proposals by partnerships shall be executed in the partnership name and signed by a partner, whose title must appear under the signature accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- D. Proposals by limited liability companies 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. Proposals by individuals shall show the Offeror's name, official address, and if applicable doing business as (d/b/a) documentation.
- E. Proposals by joint ventures shall be executed by each joint venturer in the manner indicated on the Proposal Form. The official address of the joint venture shall be shown.
- F. All names shall be typed or printed in ink below the signature. The Proposal shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Proposal Form.
- G. Postal and e-mail addresses and telephone number for communications regarding the Proposal shall be shown.
- H. Each Offeror must include in its Proposal a completed Section 00 43 37 – Vendor Compliance with State Law - Nonresident Bidder Reciprocity.

1.14 SUBMISSION OF PROPOSALS

- A. Proposals shall be submitted on the prescribed Proposal Form provided with the Proposal Documents, along with additional submittal documentation specified in 12.1 of this Section 00 21 14, at the time and place indicated in the Advertisement or INVITATION TO OFFERORS, and shall be enclosed in an opaque sealed envelope, marked with the Owner Project Number, Project title, the name and address of the Offeror, and accompanied by the Proposal Bond and other required documents. If the Proposal is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "PROPOSAL ENCLOSED" on the face of it.

1.15 MODIFICATION AND WITHDRAWAL OF PROPOSALS

- A. A Proposal submitted by an Offeror to the Owner cannot be withdrawn prior to the time set for Proposal opening. However, a request for withdrawal may be submitted at any time prior to the time for opening of Proposals. Any such request must be made in writing and executed in the manner that a Proposal must be executed and delivered to the place where Proposals are to be submitted. After all Proposals not requested for withdrawal are opened and Offeror names are publicly read aloud, the Proposals for which a withdrawal request has been properly submitted may, at the option of the Owner, be returned unopened.

1.16 OPENING OF PROPOSALS; PROPOSALS TO REMAIN SUBJECT TO ACCEPTANCE; CONFLICT OF INTEREST FORM

- A. Proposals will be opened and the name of each Offeror will be read aloud publicly at the place where Proposals are to be submitted. The proposed price and the Offeror-Specified Contract Time will be read aloud.
- B. All Proposals will remain subject to acceptance for the time period until the Owner awards the Contract and the Successful Offeror executes and delivers the Contract and associated documents to the Owner. The Owner may, at the Owner's sole discretion, release any Proposal and nullify the Proposal security prior to that date.

- C. Chapter 176 of the Texas Local Government Code requires vendors that have certain relationships with one or more officers of local governmental entities to submit a disclosure form regarding possible conflicts of interest. If an Offeror is subject to this requirement with respect to the Owner, the Offeror must file the form with the Owner not later than the seventh business day after submitting a Proposal, and it is recommended that the Offeror submit this completed form with the Proposal. For more information or to obtain the form (Form CIQ), visit the Texas Ethics Commission web page at www.ethics.state.tx.us/forms/CIQ.pdf.

1.17 REJECTION OF PROPOSALS

- A. The Owner reserves the right to reject any or all Proposals.
- B. The Owner reserves the right to waive informalities in a Proposal not involving price or Contract Time. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.
- C. Any of the following shall be cause to reject a Proposal:
 - 1. The Proposal is not signed by a person empowered to bind the Offeror.
 - 2. The Proposal is not accompanied by an acceptable Proposal Bond, with Power of Attorney attached.
 - 3. The Proposal is submitted by an Offeror that has submitted more than one Proposal.
 - 4. There is evidence of collusion between the Offeror submitting the Proposal and one or more other Offerors.
 - 5. The Proposal does not include a HUB Participation Plan.
 - 6. The Offeror did not attend or have an authorized agent attend a mandatory Pre-Proposal Conference, if applicable.
 - 7. The Offeror is under debarment or suspension by the Owner.
 - 8. The Offeror or a principal of the Offeror is currently debarred or suspended by a Federal, State or local governmental agency. (Applicable for Proposal amounts equal to or in excess of \$25,000.00).
 - 9. The Proposal is not accompanied by the completed form TWDB-0459, Vendor Compliance with Reciprocity of Nonresident Bidders.
- D. Any of the following may be cause to reject a Proposal:
 - 1. Incompleteness or an omission, alteration of form, or addition, or the inclusion of a qualification or condition not called for or authorized in the Proposal Documents.
 - 2. Ambiguity or lack of clarity in a Proposal, in which case the Owner reserves the right to interpret the Proposal in the most advantageous manner for the Owner, or to reject the Proposal.
 - 3. Failure to acknowledge receipt of Addenda.
 - 4. Failure to submit any item or information that is not specified as cause for mandatory rejection.
 - 5. Failure to identify a dollar amount for one or more unit prices required to be provided in the Proposal Form.
 - 6. Failure to submit post-Proposal information within the allotted time(s).
 - 7. Failure to timely execute and deliver the Contract to the Owner after award.

1.18 EVALUATION OF PROPOSALS

- A. Proposals will be evaluated by a Selection Team consisting of three (3) to five (5) persons appointed by the Owner. The Selection Team will score the received Proposals based on the evaluation criteria below to determine the Offeror that provides the Best Value. In evaluating a Proposal from a Nonresident Offeror, Proposal Prices and/or evaluation scores will be adjusted to the extent practicable to offset the advantage, if any, the Nonresident Offeror would have over a Texas-resident bidder or offeror in the Nonresident Offeror’s state.
- B. The Owner will process and evaluate the Proposals expeditiously. The Owner will not be liable to any Offeror, however, for any delays in connection with the evaluation, award or execution of the Contract.
- C. Evaluation shall be based of the highest scoring of the Proposals with a maximum score of 100 points apportioned as follows:

Evaluation Criteria	Points
Proposal Price	40
Key Personnel	20
Quality, Reputation, and Ability to Complete Similar Projects on Schedule and Within Budget	18
Detailed Schedule and Written Plan to Achieve the Offeror-Specified Contract Time	10
Offeror-Specified Contract Time	5
Safety Record	5
HUB Program	2
Maximum Score:	100

- D. Evaluation criteria will be as follows:
 - 1. **Proposal Price (40 Points):** Points for Proposal Price shall be based on prices submitted by Offerors. The lowest responsible Offeror’s Proposal Price determines the baseline.
 - 2. **Key Personnel (20 Points):** Key Personnel will be awarded points for the listed role and responsibility that the resume demonstrates with a maximum score of twenty (20) points for a single team member that demonstrates all desirable characteristics. The scores of the individual team members will then be averaged to determine the score for the Offeror’s Key Personnel.
 - 3. **Quality, Reputation, and Ability to Complete Similar Projects on Schedule and Within Budget (18 Points):**
 Point will be awarded to general contractor with specific experience in facilities construction projects of the same or similar type, size, nature and class as the project being proposed. Consideration will be given to the number of years of experience, which an offeror has. The Owner will evaluate the projects submitted per 12.1.1 to determine relevancy to the specified scope of this Project and review the Offeror’s performance on the submitted projects. The Owner may contact the references provided by the Offeror, as well as any other additional references, as may be necessary to verify the qualifications, experience, and reputation of the Offeror.
 - a. The qualifications and experience of the Offeror and Subcontractors, when applicable, will be evaluated to determine if the Offeror’s Proposal is responsive.
 - b. If an Offeror or Subcontractor fails to meet the minimum qualifications, the Offeror’s Proposal will be deemed non-responsive and will not be considered.

4. **Detailed Schedule and Written Plan to Achieve the Contractor-Specified Contract Time (10 Points):** The schedule and plan will be scored according to the criteria listed below. The schedule and plan should clearly show the Critical Path and the means and methods the Offeror will use to achieve Substantial Completion and the Offeror-Specified Contract Time. Scoring will be based on the Offeror's ability to communicate the plan and schedule.
 5. **Offeror-Specified Contract Time (5 Points):** Evaluation of Offeror-Specified Contract Time shall be based on the difference in days between the Owner-Specified Contract Time and the Offeror-Specified Contract Time.
 6. **Safety Record (5 Points):** The Owner will award points based on evaluation of the safety documentation provided by the Offeror as required in 12.1-4. Safety documentation for the Offeror and Subcontractors will be evaluated and considered in awarding points for this item.
 7. **Historically Underutilized Business (HUB) Program Compliance Plan (2 Points):** The Offeror will be evaluated based on the Offeror's proposed Historically Underutilized Business (HUB) commitment. The Offeror's response does not relieve the Offeror from turning in required HUB forms within the required time frame. Failure to provide the required forms by the required time will render the Offeror's Proposal non-responsive and the Proposal will not be considered.
- E. In the event of a tie in the total summation of Points for the Best Value, the lowest Proposal Price will break the tie and determine the Successful Offeror.
- F. The Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Contract Documents or upon the request of the Owner. The Owner also may consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.
- G. The Owner may conduct such investigations as the Owner deems necessary to assist in the evaluation of any Proposal and to establish the responsibility, qualifications, and financial ability of any Offeror, proposed Subcontractors, Suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to the Owner's satisfaction within the prescribed time.

1.19 AWARD OF CONTRACT, TWDB FUNDING AND APPROVAL

- A. If the Contract is to be awarded, it will be awarded to the Offeror whose evaluation by the Owner indicates that the Award will provide the Best Value for the Owner.
- B. Any Contract awarded under this Invitation to Offerors is expected to be funded in part by a loan or grant from the TWDB. The Owner will submit its proposed award of the Contract to the TWDB for approval. Award of a Contract is contingent upon TWDB approval and release of funds to the Owner from the TWDB. Neither the state of Texas, nor any of its departments, agencies, or employees are or will be a party to the Invitation for Proposals or any resulting Contract.
- C. The Contract is not awarded until formal approval by the appropriate authority on behalf of the Owner. If the Contract is to be awarded, the Owner will approve the award within 90 days after the day of the Proposal opening unless the Owner extends the period in writing. No other act of the Owner or others will constitute acceptance of a Proposal. Upon contract award, the Owner will issue a Notice of Award to the Successful Offeror.

1.20 DELIVERY OF SIGNED CONTRACT AND OTHER DOCUMENTATION

- A. When the Owner issues a Notice of Award to the Successful Offeror, it will be accompanied by the required number of unsigned counterparts of the Contract. Within 14 Calendar Days thereafter, the Successful Offeror shall sign and deliver all counterparts of the Contract to the Owner with the required Bonds, Certificates of Insurance, and all other required documentation. The Owner shall thereafter deliver one fully signed counterpart to the Successful Offeror. The required documentation will include a completed Certificate of Interested Parties (Texas Ethics Commission Form 1295), showing that the form has been filed with the Texas Ethics Commission. The Owner will acknowledge receipt of the form with the Texas Ethics Commission. Note: This Certificate of Interested Parties is separate and distinct from the Conflict of Interest form (Texas Ethics Commission Form CIQ) certain Offerors are required to submit to the Owner no later than seven days after submitting a Proposal.

1.21 SALES AND USE TAXES

- A. The Owner is a political subdivision of the State of Texas and is thereby exempt from payment of state and local sales taxes under Chapter 151 of the Texas Tax Code. Proposal prices shall not include sales tax on materials, supplies, or equipment that are incorporated into the Project or are otherwise completely used and consumed in the performance of the Contract. The Owner will furnish the Successful Offeror with a Sales Tax Exemption Certificate to be issued to Suppliers in lieu of payment of sales taxes.

1.22 TWDB REQUIREMENTS

- A. Any contract(s) awarded under this Invitation for Bids is/are subject to the United States Iron and Steel requirements of Texas Water Code §17.183 and/or Texas Government Code, Chapter 2252, Subchapter F, as amended by SB 1289, 85th Legislative Session. The contractor must complete the statement of understanding regarding this requirement, found in the Supplemental Contract Conditions, Item No. 9. Refer to TWDB-1105 – United States Iron and Steel (US I&S) Guidance.
- B. Each bidder shall furnish a bid guarantee equivalent to five percent of the bid price (Water Code §17.183). If a bid bond is provided, the Contractor shall utilize a surety company which is authorized to do business in Texas in accordance with Surety Bonds and Related Instruments, Chapter 3503 of the Insurance Code.
- C. A government entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located. A non-resident bidder is a Contractor whose corporate offices or principal place of business is outside of the state of Texas (Source: Texas Government Code, Chapter 2252, Subchapter A, Nonresident Bidders, §2252.002). The bidder will complete form TWDB-0459, Vendor Compliance with Reciprocity on Non-Resident Bidders, **which must be submitted with the bid.**

END OF SECTION

**SECTION 00 41 00
PROPOSAL FORM**

THIS PROPOSAL IS SUBMITTED TO:

Attention: _____

Title: _____

Address: _____

PART 1 - GENERAL

1.1 General

- A. The undersigned OFFEROR proposes and agrees, if this PROPOSAL is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Price and within the Times indicated in this FORM and in accordance with the other terms and conditions of the Contract Documents. OFFEROR accepts the terms of the form of Agreement and the Contract Documents.
- B. OFFEROR accepts all of the terms and conditions of the REQUEST FOR PROPOSAL and Instructions to OFFERORS including without limitation those dealing with the disposition of Proposal Security. This Proposal will remain subject to acceptance for sixty (60) days after the day of opening.
- C. In submitting this PROPOSAL, OFFEROR represents and warrants, as more fully set forth in the Agreement, that:
 - 1. OFFEROR has examined and carefully studied the Proposal Documents and Addenda, including the Question and Answers provided to him. OFFEROR hereby acknowledges receipt of the following Addenda: (List Addenda by Addendum Number and Date).
 - Addendum No.: _____ Dated: _____
 - Addendum No.: _____ Dated: _____
 - Addendum No.: _____ Dated: _____
 - 2. **OFFEROR has visited the site, has conducted all testing at the site OFFEROR deems necessary, has become familiar with, has taken into consideration in formulating its Proposal, and accepts the general, local and site conditions that may affect cost, progress, performance, and furnishing of the Work.**
 - 3. OFFEROR is familiar with, has taken into consideration in formulating its proposal and accepts all federal, state, and local Laws and Regulations that may affect cost, progress, performance, and furnishing of the Work.

4. OFFEROR has carefully studied all reports of explorations and tests of subsurface conditions at, or contiguous to, the site and all drawings of physical conditions in, or relating to, existing surface or subsurface structures at, or contiguous to, the site (except Underground Facilities) which have been identified as provided in Paragraph 5.03 of the General Conditions. OFFEROR accepts the determination set forth in Paragraph 5.03 of the General Conditions of the extent of the "technical data" contained in such reports and drawings upon which OFFEROR is entitled to rely as provided in Paragraph 5.03 of the General Conditions. OFFEROR understands, acknowledges, and agrees that such reports and drawings are not Contract Documents and may not be complete for OFFEROR's purposes. OFFEROR understands, acknowledges, and agrees that OWNER and ENGINEER are not responsible for and make no warranties regarding the accuracy or completeness of information and data shown or indicated in the PROPOSAL Documents with respect to surface and subsurface conditions and Underground Facilities at or contiguous to the site. OFFEROR has obtained and carefully studied and is responsible for obtaining and studying any and all such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the work, or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by OFFEROR and safety precautions and programs incident thereto as may be necessary. OFFEROR does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the determination of this PROPOSAL for performance and furnishing of the Work in accordance with the times, price, and other terms and conditions of the Contract Documents.
 - a. OFFEROR is aware of the general nature of work to be performed by OWNER and others at the site that relates to Work for which this PROPOSAL is submitted as indicated in the Contract Documents.
 - b. OFFEROR has correlated the information known to OFFEROR, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
 - c. OFFEROR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that OFFEROR has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to OFFEROR; OFFEROR has no questions regarding the Work; OFFEROR has all information necessary to make a fully informed PROPOSAL; and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this PROPOSAL is submitted.
 - d. This PROPOSAL is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; OFFEROR has not directly or indirectly induced or solicited any other OFFEROR to submit a false or sham PROPOSAL; OFFEROR has not solicited or induced any person, firm, or corporation to refrain from PROPOSAL; and OFFEROR has not sought by collusion to obtain for itself any advantage over any other OFFEROR or over OWNER.
- D. OFFEROR is duly qualified to carry on business in the State of Texas; possesses or has the ability to possess all licenses, permits, and certificates of authority necessary to commence and to complete the Work in accordance with the PROPOSAL Documents; is fully qualified and has experience in performing work of the same type as the Work covered by the PROPOSAL Documents; and will provide all necessary labor, superintendence, machinery, equipment, tools, materials, services, and other means of construction to complete all work upon which OFFEROR proposes and complete said work within the time stated and for maintaining same as required for the following prices:

1.2 PROPOSAL PRICING/SCHEDULE BASE PROPOSAL

Item No.	Quantity	Unit	Item Description	Unit Price	Amount
1	1	LS	Mobilization, Bonds and Insurance (not to exceed 5% of Total Bid Amount)		
2	200	LF	Furnish all labor, equipment, materials, tools and professional engineer's services to provide trench safety (all depths and pipe sizes) in accordance with all applicable City, State and Federal laws, ordinances, rules and guidelines, complete in place.		
3	1	LS	<p>Wagner Booster Pump Station:</p> <ul style="list-style-type: none"> • Modification of existing main breaker to replace trip 1600A unit with 2500A trip unit, replace 1600A current sensors with 2500A rated current sensors • Demolition of existing ATS • Demolition of existing ductbank (including conduit & wire) to generator from ATS and wire from ATS to bus transition section. • Temporary relocation of generator and demolition of existing generator pad • Installation of new non-SE rated ATS with enclosure, ductbank from new SE rated ATS (including conduit & wire), new wire from ATS to MCC, new generator concrete pad. • Installation of new generator 120V circuits (battery blanket heaters and receptacles) • Replacement of circuit breaker feeding ancillary generator circuit panelboard and replacement of ancillary generator circuits panelboard main circuit breaker. • Installation of all required control wiring associated with generator, and ATS to the site PLC. • Inclusive of all testing and power system studies. 		
4	1	LS	<p>Leissner Booster Pump Station:</p> <ul style="list-style-type: none"> • Demolition of existing ductbank (including conduit & wire) to generator from ATS, wire from ATS to MCC. • Temporary relocation of generator and demolition of existing generator pad • Installation of new pull box on exterior or the electrical building, new overhead conduit & wire runs from existing SE rated ATS to new pull box and new ductbank (including conduit & wire) from pull box to generator, new wire from ATS to MCC, new generator concrete pad. 		

Item No.	Quantity	Unit	Item Description	Unit Price	Amount
			<ul style="list-style-type: none"> • Demolition of existing 208V generator engine block heater and replacement with a 240V engine block heater with same wattage • Installation of new generator 120V circuits (battery blanket heaters and receptacles) • Replacement of existing generator ancillary circuit panelboard and installation of new transformer and MCC feeder breaker to serve the proposed generator ancillary circuit panelboard. • Installation of all required control wiring associated with generator, and ATS to the site PLC. • Inclusive of all testing and power system studies. 		
5	1	LS	<p>Dead Man Well:</p> <ul style="list-style-type: none"> • Demolition of existing ATS and main breaker • Installation of new ATS and main breaker • Installation of new generator 120V circuits (battery blanket heaters and receptacles) • Installation of all required control wiring associated with generator, and ATS to the site PLC • Inclusive of all testing and power system studies. 		
6	1	LS	<p>Wells Ranch WTP - Service No.1</p> <ul style="list-style-type: none"> • Demolition of existing wire/conduit previously installed to and from main breaker/ATS/generator (non-utility wire) • Demolition of the existing main breaker section • Demolition of existing ATS • Temporary relocation of generator and demolition of existing generator pad • Modification of existing Siemens switchboard line-up to decouple the main breaker section from the distribution sections. • Installation of new main breaker section • Installation of new MLO section at the end of switchboard line up • Installation of new wire and cable tray system from new main breaker to ATS, from ATS to new MLO section. 		

Item No.	Quantity	Unit	Item Description	Unit Price	Amount
			<ul style="list-style-type: none"> • Installation of new wire and cable tray system from new ATS to new pull box on exterior of the building. • Installation of new ductbank from pull box to the existing 1600kW generator • Installation of new dry-type transformer and panelboard for new circuits to generator panels • Installation of new generator 120V circuits (battery blanket heaters and receptacles) • Installation of all required control wiring associated with PQM, generator, and ATS to the plant PLC • Inclusive of all testing and power system studies. 		
7	1	LS	<p>Wells Ranch WTP – Service No. 2</p> <ul style="list-style-type: none"> • Demolition of existing wire/conduit previously installed to ATS/generator • Demolition of the existing empty pull section adjacent to the switchboard • Demolition of existing ATS • Temporary relocation of generator and demolition of existing generator pad • Modification of existing Eaton switchboard line up to decouple the main breaker section from the distribution section. • Installation of new MLO section at the end of switchboard line up • Installation of new wire and cable tray system from existing main breaker to ATS, from ATS to new MLO section. • Installation of new wire and cable tray system from new ATS to pull box on exterior of the building. • Installation of new ductbank from pull box to the existing 1250kW generator • Installation of new generator 120V circuits (battery blanket heaters and receptacles) • Installation of all required control wiring associated with PQM, generator, and ATS to the plant PLC • Inclusive of all testing and power system studies. 		

TOTAL BASE PROPOSAL AMOUNT

1.3 ADDITIVE ALTERNATIVE PROPOSAL ITEMS (NOT USED)

TOTAL CALENDAR DAYS FOR CONSTRUCTION (not to exceed 742 calendar days). Contractor proposes a contract duration of _____ Calendar days.

ATTEST:

Very truly yours

SEAL, if OFFEROR is Corporation

By: _____
Signature

Typed or Printed Name

Title

OFFEROR - Name of Company

Typed or Printed Name

Address: _____

Telephone No.: _____

Facsimile No.: _____

Surety Company: _____

Address: _____

Telephone No.: _____

Facsimile No.: _____

1.4 OFFEROR Profile

Company Name or D/B/A: _____

Telephone Numbers:

Phone: _____

Fax: _____

Corporate Contact for this Proposal:

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____ Fax: _____

E-mail: _____

Website: _____

If local contact is the same as corporate contact, check here; Local

Contact for this Proposal

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____ Fax: _____

E-mail: _____

Other company names used with dates, from/to: _____

1.5 References

OFFEROR shall submit a list of at least three (3) references for which OFFEROR has provided like products or services. References will include contact name and telephone number. Proposals submitted without three references may be disqualified from consideration.

Owner: _____

Contact name: _____ Phone number: _____

Owner: _____

Contact name: _____ Phone number: _____

Owner: _____

Contact name: _____ Phone number: _____

1.6 Deviation or Compliance Form

DEVIATIONS: In the event the undersigned OFFEROR intends to deviate from the general terms, conditions, special conditions or specifications contrary to those listed in the "Terms and Conditions" and other information attached hereto, all such deviations must be **LISTED ON THIS PAGE**, with complete and detailed conditions and information also being attached (attach additional pages as necessary).

NO DEVIATIONS: In the absence of any deviation entry on this page, OFFEROR assures the Owner of OFFEROR's compliance with the Terms, Conditions, Specifications, and information contained in this RFP.

All OFFERORS MUST COMPLETE this page.

RETURN with Proposal or Proposal will be considered NON RESPONSIVE.

Our Proposal is submitted according to: _____ Deviations listed above

OR _____ No Deviations

1.7 Release & Indemnification

TO THE MAXIMUM EXTENT PERMITTED BY LAW, OFFEROR HEREBY AGREES AND CONSENTS FOR ITSELF, INDIVIDUALLY, AND ON BEHALF OF THE BUSINESS ENTITY, TO FULLY AND UNCONDITIONALLY RELEASE, INDEMNIFY, DEFEND, AND HOLD HARMLESS THE CANYON REGIONAL WATER AUTHORITY, TEXAS, INCLUDING ITS OFFICERS, AGENTS AND EMPLOYEES, AND TO DEFEND AND HOLD IT HARMLESS FROM AND AGAINST ANY AND ALL COSTS, EXPENSES, ATTORNEY FEES, CLAIMS, SUITS, DEMANDS, LOSSES, OR LIABILITY FOR INJURIES TO REAL OR PERSONAL PROPERTY AND INJURIES TO PERSONS INCLUDING DEATH, INCLUDING OFFEROR'S EMPLOYEES, AFFILIATES, REPRESENTATIVES, PARTNERS, AGENTS, OR THOSE WORKING ON OFFEROR'S BEHALF, FROM ANY AND ALL OTHER COSTS, EXPENSES, ATTORNEY FEES, CLAIMS, SUITS, DEMANDS, LOSSES OR LIABILITIES OF ANY AND EVERY NATURE WHATSOEVER ARISING IN ANY MANNER, DIRECTLY OR INDIRECTLY, OUT OF OR IN CONNECTION WITH ANY CONTRACT AWARDED PURSUANT TO THIS RFP AN IN THE PERFORMANCE THEREOF, REGARDLESS OF CAUSE OR OF THE SOLE, JOINT, COMPARATIVE OR CONCURRENT NEGLIGENCE OR GROSS NEGLIGENCE OF CONTRACTOR, ITS OFFICERS, AGENTS OR EMPLOYEES, SAVE AND EXCEPT THE SOLE AND EXCLUSIVE NEGLIGENCE OF THE BCRUA. THIS PROVISION SHALL APPLY TO ALL IMPUTED OR ACTUAL JOINT ENTERPRISE AND JOINT VENTURE LIABILITY, IF ANY.

1.8 Non-Collusion Acknowledgment

The undersigned OFFEROR affirms that they are duly authorized to execute this Proposal, that this company, corporation, firm, partnership or individual has not prepared this Proposal in collusion with any other OFFEROR, and that the contents of this Proposal as to prices, terms and conditions thereof have not been communicated by the undersigned OFFEROR, nor by OFFEROR's employee, affiliate, representative, partner, subcontractor, or agent, to any other individual or entity engaged in this type of business prior to the official opening of this RFP.

Company Name: _____

Signature of Company Officer: _____

Company Officer Printed Name: _____

Title _____

1.9 Suspension or Debarment Certificate

Non-Federal entities are prohibited from contracting with or making subcontract awards under covered transactions to parties that are suspended or debarred or whose principals are suspended or debarred. Covered transactions include procurement for goods or services equal to or in excess of \$100,000.00. Contractors receiving individual awards for \$100,000.00 or more and all subcontract recipients must certify that the organization and its principals are not suspended or debarred.

By submitting this offer and signing this certificate, OFFEROR certifies that no suspension or disbarment is in place, which would preclude receiving a federally funded contract under the Federal OMB, A-102, Common Rule.

Vendor Name _____ Date _____

Signature of Company Officer: _____

Company Officer printed name: _____

E-mail Address _____

1.10 Conflicts of Interest

The Texas Ethics Commission adopted the attached Conflict of Interest Questionnaire (Form CIQ) pursuant to Texas Local Government Code Chapter 176, as amended. For questions about these forms, please see the Texas Ethics Commission at: <https://www.ethics.state.tx.us/forms/CIQ.pdf>

OFFEROR shall answer each question in the attached Form CIQ in relation to the following individuals and submit a completed form with its Proposal:

Local Government Officer	Title

1.11 Disclosure of Interested Parties

Prior to entering into a contract that is over one million dollars in value, the OFFEROR must submit a "Certificate of Interested Parties" Form, in accordance with Texas Government Code Section 2252.908, as amended. Within 30 days of receipt of the form, the Owner must submit a copy to the Texas Ethics Commission. The Certificate of Interested Parties form is attached.

Request for Taxpayer Identification Number and Certification

Give form to the
requester. Do not
send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)	
Business name, if different from above	
Check appropriate box: <input type="checkbox"/> Individual/Sole proprietor <input type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶ ----- <input type="checkbox"/> Exempt payee <input type="checkbox"/> Other (see instructions) ▶	
Address (number, street, and apt. or suite no.)	Requester's name and address (optional)
City, state, and ZIP code	
List account number(s) here (optional)	

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number
or
Employer identification number

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here

Signature of
U.S. person ▶

Date ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

SECTION 00 43 13
PROPOSAL BOND

Offeror Name:

Offeror Address:

Surety Name:

Surety Address:

Owner: Canyon Regional Water Authority

Project Name: Wells Ranch II Emergency Generator Project

Proposal Bond Amount: \$

The Offeror and the Surety are held and firmly bound unto the Owner in the Proposal Bond Amount stated above. The Surety certifies it is a corporation duly organized under the laws of the State of _____ and is duly authorized and admitted to write surety bonds in Texas. If the Proposal Bond Amount exceeds \$100,000.00, the Surety certifies that it either 1) holds a certificate of authority from the United States Secretary of the Treasury to qualify as a surety on obligations permitted or required under federal law, or 2) has obtained qualified reinsurance for any liability in excess of \$100,000.00 from a reinsurer that is authorized and admitted as a reinsurer in the State of Texas and is the holder of a certificate of authority from the United States Secretary of the Treasury to qualify as a surety or reinsurer on obligations permitted or required under federal law.

Whereas, the Offeror has submitted a Proposal to the Owner for construction of the Project and has offered to enter into a contract with the Owner for construction of the Project in accordance with the Contract Documents.

Now, therefore, if the Owner accepts the Proposal of the Offeror, and the Offeror enters into a contract with the Owner in accordance with the terms of the Contract Documents, and promptly delivers all bonds, insurance certificates and other documents to the Owner in accordance with the Contract Documents, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed on this _____ day of _____, 20__.

Offeror printed name	Surety printed name
Authorized signature	Authorized signature
Printed name, title	Printed name, title
Attest:	Attest:
Authorized signature	Authorized signature
Printed name, title	Printed name, title

11/2024

Name/Address of Surety's Registered Agent:

Note: The Surety must attach an original power of attorney authorizing its representative to execute bonds on behalf of the Surety.

SECTION 00 43 36
PROPOSED SUBCONTRACTORS FORM

The Bidder or Offeror shall complete the information below by identifying the Subcontractors whom they intend to utilize for the work types listed.

Second level subcontracting is not acceptable.

NAME OF SUBCONTRACTOR	LOCATION/ PLACE OF BUSINESS	PORTION (DESCRIPTION) OF WORK

END OF SECTION

SECTION 00 45 16
STATEMENT OF OFFEROR'S EXPERIENCE

1. By signing and submitting this proposal, OFFEROR acknowledges that they have inspected the specifications, are capable and willing to perform and/or provide the required services and/or products, and shall complete this project within the amount of time and dollar amount specified. The undersigned certifies that the prices contained in this Proposal have been carefully checked and submitted as correct and final. All unit prices include the cost of delivery. The undersigned is authorized to bind themselves or the entity they represent to a contract.

_____ An individual proprietorship _____ A partnership

_____ A corporation chartered under the laws of the State of _____,
acting by its officers pursuant to its by-laws or a resolution of its Board of Directors

Signature: _____

Printed Name: _____

Title: _____

Date: _____

2. Years in business under present business name: _____

3. Years of experience in construction work of the type called for in this contract as:

A General Contractor _____ A Subcontractor _____

4. What similar projects has your organization completed? List most recent FIRST.

PROJECT NO. 1:

Name of Project: _____

Location: _____

OWNER's Name and Address:

OWNER's Contact Person (Print):

Phone/Fax No.: _____ / _____

Initial Contract Price: _____

Final Contract Price: _____

Contract Start Date: _____ (Date of Notice To Proceed)

Contract Time: _____ () Calendar Days () Working Days

Contract Substantial Completion Date: _____

Actual Substantial Completion Date: _____

IF CONTRACT TIME EXTENSIONS WERE ADDED TO THE CONTRACT AS A RESULT OF BIDDER'S RESPONSIBILITIES, PROVIDE A SHORT EXPLANATION OF EACH.

Project Description and why it is comparable to this Contract:

PROJECT NO. 2:

Name of Project: _____

Location: _____

OWNER's Name and Address:

OWNER's Contact Person (Print):

Phone/Fax No.: _____ / _____

Initial Contract Price: _____

Final Contract Price: _____

Contract Start Date: _____ (Date of Notice To Proceed)

Contract Time: _____ () Calendar Days () Working Days

Contract Substantial Completion Date: _____

Actual Substantial Completion Date: _____

IF CONTRACT TIME EXTENSIONS WERE ADDED TO THE CONTRACT AS A RESULT OF BIDDER'S RESPONSIBILITIES, PROVIDE A SHORT EXPLANATION OF EACH.

Project Description and why it is comparable to this Contract:

PROJECT NO. 3:

Name of Project: _____

Location: _____

OWNER's Name and Address:

OWNER's Contact Person (Print):

Phone/Fax No.: _____ / _____

Initial Contract Price: _____

Final Contract Price: _____

Contract Start Date: _____ (*Date of Notice To Proceed*)

Contract Time: _____ () *Calendar Days* () *Working Days*

Contract Substantial Completion Date: _____

Actual Substantial Completion Date: _____

IF CONTRACT TIME EXTENSIONS WERE ADDED TO THE CONTRACT AS A RESULT OF BIDDER'S RESPONSIBILITIES, PROVIDE A SHORT EXPLANATION OF EACH.

Project Description and why it is comparable to this Contract:

Contract Amount	Name of Project & Type of Work	Date to be Completed & Percentage Complete	Owner's Name & Phone Number	Architect/Engineer's Name & Phone Number

5. Have you ever failed to complete any work awarded to you?

____ Yes _____ No. If "Yes", state where and why. _____

6. Are you at present in litigation or lawsuits involving construction work of any type?

____ Yes _____ No. If "Yes", state where and why. _____

7. Explain in detail the manner in which you have inspected the work proposed in this contract:

8. Explain in detail your plan or layout for performing the work proposed in this contract:

9. If this contract is awarded to you, your company's administrative manager for the work will be

_____, and your resident construction

superintendent will be_____.

10. What experience in this type of work does the individual designated as superintendent above possess? Please list 5 similar projects completed in the last 2 years.

11. What portions of the work do you intend to sublet, and what percentage of the entire PROPOSAL amount will be performed by subcontractors?

12. What equipment do you own that is available for the proposed work?

Quantity	Description, Size, Capacity, Etc.	Condition	Years in Service	Present Location

13. Have you received firm offers for all major items of material and/or equipment within the price used in preparing your proposal?

_____ Yes _____ No

If not, state what items/materials do not have firm costs.

The signatory of this questionnaire guarantees the truth and accuracy of all statements herein made and all answers herein expressed.

Dated this _____ day of _____, _____.

By: _____

Title: _____

STATE OF _____

COUNTY OF _____

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

Notary Public _____

My commission expires: _____

SECTION 00 45 19
AFFIDAVIT - PROHIBITED ACTIVITIES

CANYON REGIONAL WATER AUTHORITY
OFFEROR'S AFFIDAVIT REGARDING PROHIBITED ACTIVITIES
FOR
WELLS RANCH II EMERGENCY GENERATOR PROJECT

State of _____

County of _____

The undersigned affiant, after being first duly sworn, states as follows, based on his or her personal knowledge and belief:

1. **Definitions.** I understand the term "Offeror" includes the individual or business entity submitting the Proposal, and the directors, officers, partners, managers, members, principals, owners, agents, representatives, employees, other parties in interest of the Offeror, and anyone or any entity acting for or on behalf of the Offeror, including a subcontractor.
I understand the term "Owner" means the Canyon Regional Water Authority.
I understand the term "Chapter 176" means Chapter 176 of the Texas Local Government Code.
I understand the term "Officer of the Owner" includes members of the Owner's Board of Directors and the Owner's Executive Director.
I understand the term "gift" means a benefit offered by a person, including lodging, transportation, and entertainment accepted as a guest, but not including a) a benefit offered on account of kinship or a personal, professional, or business relationship independent of the official status of the recipient, b) a political contribution as defined by Title 15, Texas Election Code, or c) food accepted as a guest.
2. **Certification of Authority.** I certify that I am the duly authorized representative of the Offeror for the purpose of making this affidavit. I have personal knowledge of the matters stated in it.
3. **No Collusion Statement.** The Offeror has not in any way directly or indirectly:
 - a. colluded, conspired, or agreed with any other person, firm, corporation, offeror or potential offeror to the amount of this Proposal or the terms or conditions of this Proposal; or
 - b. paid or agreed to pay any other person, firm, corporation offeror or potential offeror any money or anything of value in return for assistance in procuring or attempting to procure a contract or in return for establishing the prices in this Proposal or the Proposal of any other Offeror.
4. **No Prohibited Contacts.** The Offeror has not contacted any member of the Owner's Board of Directors concerning the Offeror's qualifications or the award of a contract.

- 5. **Conflict of Interest Disclosure.** The Offeror certifies that all of the following are correct, in compliance with Chapter 176:
 - a. The Offeror does not have an employment or other business relationship with an Officer of the Owner, or with a family member of any such person, that results in the Officer or family member receiving taxable income;
 - b. The Offeror has not given an Officer of the Owner one or more gifts that have an aggregate value of more than \$100 in the preceding twelve-month period; and
 - c. The Offeror does not have a family relationship with an Officer of the Owner within the third degree of consanguinity or the second degree of affinity.

As required by Chapter 176, I understand the Offeror must file a completed Conflicts of Interest Questionnaire (Texas Ethics Commission Form CIQ) with the Owner’s Executive Director no later than the seventh business day after the date of an event that would make a statement in a., b. or c. above inaccurate or incomplete. The Offeror understands there are statutory penalties for failure to comply with Chapter 176.

Signature of Offeror’s Authorized Representative

Printed Name, Title

Date

Subscribed and sworn to before me this ____ day of _____, 20____.

Notary Public signature

Notary Stamp

END OF SECTION

SECTION 00 45 26

CONTRACTOR COMPLIANCE WITH WORKER'S COMPENSATION LAW

Pursuant to Texas Labor Code Section 406.096(a), as amended, Contractor certifies that it provides worker's compensation insurance coverage for all of its employees employed on Project No. _____. Contractor further certifies that, pursuant to Texas Labor Code, Section 406.096(b), as amended, it will provide to the Owner its subcontractor's certificates of compliance with worker's compensation coverage.

CONTRACTOR:

_____ By: _____
COMPANY (PLEASE PRINT)

_____ SIGNATURE: _____
ADDRESS

_____ TITLE: _____
CITY/STATE/ZIP (PLEASE PRINT)

THE STATE OF TEXAS §

THE COUNTY OF _____ §

BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED _____, KNOWN TO ME TO BE THE PERSON WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT, AND ACKNOWLEDGED TO ME THAT HE/SHE EXECUTED THE SAME AS THE ACT AND DEED OF _____ FOR THE PURPOSES AND CONSIDERATION THEREIN EXPRESSED AND IN THE CAPACITY THEREIN STATED.

GIVEN UNDER MY HAND AND SEAL OF OFFICE THIS _____ DAY OF _____, 20 _____.

NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

END OF SECTION

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**SECTION 00 51 00
NOTICE OF AWARD**

OWNER: CANYON REGIONAL WATER AUTHORITY

CONTRACTOR _____

ENGINEER: ARDURRA

Project Name: WELLS RANCH II EMERGENCY GENERATOR PROJECT

Project No.: _____

Date of Notice of Award: _____

Project Start Date: _____

The OWNER hereby notifies the CONTRACTOR that the OWNER has awarded the Contract for the Project to the CONTRACTOR. The CONTRACTOR must strictly comply with the following requirements:

1. The CONTRACTOR must execute all copies of the Contract provided with this notice.
2. The CONTRACTOR must use a copy of the Contract to obtain necessary Payment Bonds, Performance Bonds and insurance certificates. Forms for the Bonds are included in the Contract Documents, and insurance requirements are included in the General Conditions and Supplemental Conditions.
3. The CONTRACTOR must deliver all of the following documents to the OWNER's Executive Director within 14 Calendar Days after the Date of Notice of Award stated above:
 - a. All copies of the Contract duly executed by the CONTRACTOR.
 - b. Payment Bond, with attached power of attorney, one for each copy of the Contract.
 - c. Performance Bond, with attached power of attorney, one for each copy of the Contract.
 - d. Insurance certificates, one complete set for each copy of the Contract.
4. If the bonds or insurance certificates need to be corrected, the CONTRACTOR must submit the corrected documents to the OWNER within 5 Calendar Days after the OWNER notifies the CONTRACTOR of needed corrections.

The CONTRACTOR acknowledges that failure to timely submit any required document will authorize the OWNER to forfeit the CONTRACTOR's Proposal Bond, and may result in award of the Contract to another Offeror.

OWNER: Canyon Regional Water Authority

By: _____ Date: _____

Acknowledgment of receipt of Notice of Award by CONTRACTOR:

Printed Contractor name

By: _____
Signature

Date: _____

Printed name, title

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**SECTION 00 52 43
AGREEMENT**

STATE OF TEXAS

COUNTY OF HAYS

OWNER: Canyon Regional Water Authority, a political subdivision of the State of Texas, 850 Lakeside Pass, New Braunfels, TX 78130

CONTRACTOR: _____ (CONTRACTOR),
a _____ [TYPE OF BUSINESS ENTITY],
_____ [ADDRESS].

Project Name: WELLS RANCH II EMERGENCY GENERATOR PROJECT

Project No.:

Date of Agreement: _____

Contract Time: 682 Calendar Days from the Project Start Date to the date of Substantial Completion, and 742 Calendar Days from the Project Start Date to the date of Final Completion, subject to adjustment in accordance with the Contract Documents.

Contract Amount:

_____ Dollars
(Words)

(\$ _____)
(Figures)

This Agreement is made and entered into by and between the OWNER and the CONTRACTOR effective as of the Date of Agreement stated above.

1. **Agreement.** In consideration of the promises, performances, payments and agreements set forth herein, the CONTRACTOR agrees to commence and perform all Work necessary to complete the Project in accordance with the Contract Documents, which are incorporated herein by reference and made a part hereof; and the OWNER agrees to pay the CONTRACTOR the Contract Amount in accordance with the payment process described in the Contract Documents, and subject to adjustments in the Contract Amount as described in the Contract Documents.
2. **Commencement and Completion of Work.** The CONTRACTOR agrees to commence Work on the Project Start Date specified in the Notice to Proceed to be issued by the OWNER, and to Substantially Complete the Project within the Contract Time allotted for Substantial Completion, and to Finally Complete the Project within the Contract Time allotted for Final Completion, all in accordance with the Contract Documents. The CONTRACTOR acknowledges and agrees that the OWNER may assess liquidated damages or actual damages against the CONTRACTOR if the CONTRACTOR does not Substantially Complete or Finally Complete the Project within the applicable Contract Time.

3. **Payments from Available Funds.** The OWNER agrees to pay the CONTRACTOR from available funds, and the CONTRACTOR acknowledges and agrees that the OWNER's payment obligations are payable only and solely from funds available to the OWNER for the purposes of this Contract.
4. **Contract Documents.** The Contract Documents which comprise the entire Contract between the OWNER and CONTRACTOR concerning the Work consist of the following:
 - a. This Agreement.
 - b. All documents included in the attached Section 00 00 00 Table of Contents.
 - c. Drawings.
 - d. The following which may be delivered or issued after the Effective Date of the Agreement and, if issued, become an incorporated part of the Contract Documents:
 - 1) Notice to Proceed.
 - 2) Field Orders.
 - 3) Change Directives.
 - 4) Change Orders.
 - 5) Certificate of Substantial Completion.
5. **Indemnification.** The CONTRACTOR acknowledges and agrees to all of the indemnification provisions contained or referenced in the Contract Documents.
6. **Miscellaneous.**
 - a. **Defined Terms.**

Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions, as modified in the Supplemental Conditions and other provisions in the Contract Documents.
 - b. **Assignment of Contract.**

This Agreement may not be assigned by the CONTRACTOR without the advance express written consent of the OWNER.
 - c. **Successors and Assigns.**

The OWNER and the CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, in respect to all covenants, agreements and obligations contained in the Contract Documents.
 - d. **Severability.**

Any provision or part of the Contract Documents held to be unconstitutional, void or unenforceable by a court of competent jurisdiction shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon the OWNER and the CONTRACTOR.
 - e. **Governing Law and Venue.**

This Agreement, including all of the Contract Documents, is performable in the State of Texas. Venue shall be exclusively in Hays County, Texas and the laws of the State of Texas shall apply to the interpretation and enforcement of the Contract. The OWNER's execution of and performance under this Agreement will not act as a waiver of any immunity of the OWNER to suit or liability under applicable law.
 - f. **Certification regarding Boycotting of Israel.**

The CONTRACTOR by signing this Agreement certifies that the CONTRACTOR: (1) does not boycott Israel; and (2) will not boycott Israel during the term of this Agreement, in compliance with applicable state law (Government Code Chapter 2270).
 - g. **Employee Eligibility Verification.**

The CONTRACTOR acknowledges that the Contract Documents include a requirement that the CONTRACTOR verify the identity and employment eligibility of its employees and of employees of Subcontractors who perform work under this Contract.

- h. **No Third-Party Beneficiaries.**
This Agreement gives no rights or benefits to anyone other than the OWNER and the CONTRACTOR and there are no third-party beneficiaries.
- i. **Waiver of Attorney's Fees and Jury Trial.**
The Contract Documents include a waiver of any right to attorney's fees and a waiver of the right to a jury trial in disputes and litigation arising out of or connected with this Contract. In consideration of the award and execution of this Contract by the OWNER, the CONTRACTOR knowingly and voluntarily agrees to these waivers.
- j. **Interpretation of Contract.**
- k. Although drafted by the OWNER, the CONTRACTOR agrees that this Contract shall be interpreted fairly and reasonably, in the event of any disputes over its meaning or application, and neither more strongly for nor against the OWNER or the CONTRACTOR.
- l. **TWDB Requirements: United States Iron and Steel**
The Contractor acknowledges to and for the benefit of the Applicant ("Purchaser") and the Texas Water Development Board ("TWDB") that it understands the goods and services under this Agreement are being funded with monies made available by the Water Development Fund, Rural Water Assistance Fund, Economically Distressed Areas, State Participation Fund and/or Agricultural Water Conservation Fund. That these funds have statutory requirements commonly known as "United States Iron and Steel" that requires all of the iron and steel products used in the project to be produced in the United States ("United States Iron and Steel Requirement") including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the TWDB that (a) the Contractor has reviewed and understands the United States Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the United States Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the United States Iron and Steel Requirement, as may be requested by the Purchaser or the TWDB. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser to enforce this Agreement and recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the TWDB or any damages owed to the TWDB by the Purchaser). Neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the TWDB.

In the execution of the Contract, the Contractor shall be familiar with and at all times shall observe and comply with all applicable federal, state, and local laws, ordinances and regulations concerned with the use of iron and steel made in the United States which in any manner affect the conduct of the work, and shall indemnify and save harmless the Texas Water Development Board against any claim arising from violation of any such law, ordinance or regulation by the Contractor or by their Subcontractor or their employees.

SIGNATURE PAGE TO FOLLOW

IN WITNESS WHEREOF, the OWNER and the CONTRACTOR have each executed this Agreement to be effective as of the date signed by the OWNER ("Effective Date").

OWNER:

CONTRACTOR:

Canyon Regional Water Authority

(typed or printed name of organization)

By: _____
(individual's signature)

By: _____
(individual's signature)

Date: _____
(date signed)

Date: _____
(date signed)

Name: _____
(typed or printed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

Attest: _____
(individual's signature)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

Address for giving notices:

Designated Representative:

Designated Representative:

Name: _____
(typed or printed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

Address: _____

Address: _____

Phone: _____

Phone: _____

Email: _____

Email: _____

License No.: _____
(where applicable)

State: _____

END OF SECTION

SECTION 00 55 00
NOTICE TO PROCEED

OWNER: **CANYON REGIONAL WATER AUTHORITY**

CONTRACTOR _____

ENGINEER: **ARDURRA**

Project Name: **WELLS RANCH II EMERGENCY GENERATOR PROJECT**

Project No.: _____

Date of Notice of Award: _____

Project Start Date: _____

The OWNER hereby notifies the CONTRACTOR to commence the Work on the Project on the Project Start Date stated above. The OWNER and the CONTRACTOR agree that the Contract Time for the Project will begin to run on the Project Start Date. The CONTRACTOR agrees to commence the Work on the Project Start Date, to Substantially Complete the Project within the Contract Time allotted for Substantial Completion, and to Finally Complete the Project within the Contract Time allotted for Final Completion, all in accordance with the Contract Documents.

The OWNER reminds the CONTRACTOR of the CONTRACTOR's obligation under State law to file a certificate of workers' compensation insurance with the OWNER for each Subcontractor to perform work at the Project Site prior to the Subcontractor's commencement of work.

Canyon Regional Water Authority

ACCEPTANCE OF NOTICE:
Receipt of this Notice to Proceed is
acknowledged by the CONTRACTOR:

Signature

Printed name, title

Date

END OF SECTION

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SECTION 00 61 13
PERFORMANCE BOND

STATE OF TEXAS

Bond No. _____

COUNTY OF _____

Owner: Canyon Regional Water Authority

Project Name: Wells Ranch II Emergency Generator Project

IFB No.:

Contractor Name: _____

Contractor Address: _____

Know All Persons by These Presents: That the Contractor (the "Principal") and _____ (the "Surety"), a solvent company authorized under laws of the State of Texas to act as surety on bonds for principals, are held and firmly bound unto the Owner in the penal sum of _____ Dollars (\$_____) for payment whereof, well and truly to be made, the Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents: Whereas, the Principal has entered into a written contract with the Owner for construction of the Project, dated _____, 20____, which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

Now, therefore, the condition of this obligation is such, that if the Principal shall faithfully perform all of its obligations under the Contract and shall in all respects duly and faithfully observe and perform all and singular covenants, conditions and agreements in and by the Contract agreed and covenanted by Principal to be observed and performed, and according to true intent and meaning of the Contract, then this obligation shall be void; otherwise to remain in full force and effect. If the Owner notifies the Principal and the Surety that the Owner is considering declaring the Principal in default, the Surety agrees to meet with the Owner and Principal no later than fifteen days after receipt of such notice to discuss methods of performing the Work of the Contract.

This bond is executed pursuant to the provisions of Chapter 2253, Texas Government Code, as amended, and all liabilities on this bond shall be determined in accordance with provisions of that statute to the same extent as if it were copied at length herein. The period of this bond will extend to and cover the one-year warranty period as set by the Contract Documents.

According to Water Code Section 17.183 (2)(A), without limitations guarantees that work done under the Contract will be completed and performed according to approved plans and specifications and in accordance with sound construction principles and practices.

According to Water Code Section 17.183 (2)(B), the performance bond should be in penal sum of no less than 100 percent of the contract price and remain in effect for one year beyond the date of approval by the engineer of the political subdivision.

The Surety, for value received, stipulates and agrees that no change in the Contract Amount or the Contract Time, or alteration or addition to the terms of the Contract, or to the plans, specifications, drawings or other Contract Documents, or to the Work to be performed under the Contract Documents, shall in any way affect its obligation on this bond, and the Surety waives notice of any such change, extension of time, alteration or addition.

The Surety certifies that it is authorized and admitted to write surety bonds in Texas. If this bond exceeds \$100,000.00, the Surety certifies that it either 1) holds a certificate of authority from the United States Secretary of the Treasury to qualify as a surety on obligations permitted or required under federal law, or 2) has obtained qualified reinsurance for any liability in excess of \$100,000.00 from a reinsurer that is authorized and admitted as a reinsurer in the State of Texas, and is the holder of a certificate of authority from the United States Secretary of the Treasury to qualify as a surety or reinsurer on obligations permitted or required under federal law.

In witness whereof, the Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

Contractor printed name	Surety printed name
Authorized signature	Authorized signature
Printed name, title	Printed name, title
Attest:	Attest:
Authorized signature	Authorized signature
Printed name, title	Printed name, title

Note: The Surety must attach an original power of attorney authorizing its representative to execute bonds on behalf of the Surety.

Name and address of Resident Agent of Surety:

END OF SECTION

SECTION 00 61 14
PAYMENT BOND

STATE OF TEXAS

Bond No. _____

COUNTY OF _____

Owner: Canyon Regional Water Authority

Project Name: Wells Ranch II Emergency Generator Project

Project No.:

Contractor Name: _____

Contractor Address:

Know All Persons by These Presents: That the Contractor (the "Principal") and _____ (the "Surety"), a solvent company authorized under laws of the State of Texas to act as surety on bonds for principals, are held and firmly bound unto the Owner, and to all Subcontractors, workers, laborers, mechanics and suppliers, as their interests may appear, all of whom shall have right to sue upon this Bond, in the penal sum of _____ Dollars (\$ _____) for payment whereof, well and truly to be made, the Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

Whereas, the Principal has entered into a certain written contract with the Owner for construction of the Project, dated _____, 20____, which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein;

Now, therefore, the condition of this obligation is such that if the Principal shall well and truly pay all Subcontractors, workers, laborers, mechanics, and Suppliers, all monies the Principal owes them for subcontracts, work, labor, equipment, supplies and materials done and furnished for the construction of the Project in accordance with the Contract, then this obligation shall be and become null and void; otherwise to remain in full force and effect.

This bond is executed pursuant to the provisions of Chapter 2253, Texas Government Code, as amended, and all liabilities on this bond shall be determined in accordance with provisions of that statute to same extent as if they were copied at length herein.

According to Water Code Section 17.183 (2)(B), the payment bond should be in penal sum of no less than 100 percent of the contract price and remain in effect for one year beyond the date of approval by the engineer of the political subdivision.

The Surety, for value received, stipulates and agrees that no change in the Contract Amount or the Contract Time, or alteration or addition to the terms of the Contract, or to the plans, specifications, drawings or other Contract Documents, or to the Work to be performed under the Contract Documents, shall in any way affect the Surety's obligation on this bond, and the Surety waives notice of any such change, extension of time, alteration or addition.

The Surety certifies that it is authorized and admitted to write surety bonds in Texas. If this bond exceeds \$100,000.00, the Surety certifies that it either 1) holds a certificate of authority from the United States Secretary of the Treasury to qualify as a surety on obligations permitted or required under federal law, or 2) has obtained qualified reinsurance for any liability in excess of \$100,000.00 from a reinsurer that is authorized and admitted as a reinsurer in the State of Texas, and is the holder of a certificate of authority from the United States Secretary of the Treasury to qualify as a surety or reinsurer on obligations permitted or required under federal law.

This bond is filed with the Owner in Hays County, Texas, and the Principal and Surety agree that mandatory venue for any legal action filed upon this bond shall be in Hays County, Texas.

In witness whereof, the Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

Contractor printed name	Surety printed name
Authorized signature	Authorized signature
Printed name, title	Printed name, title
Attest:	Attest:
Authorized signature	Authorized signature
Printed name, title	Printed name, title

Note: The Surety must attach an original power of attorney authorizing its representative to execute bonds on behalf of the Surety.

Name and address of Resident Agent of Surety:

END OF SECTION

SECTION 00 61 25
CERTIFICATE OF INSURANCE

Name and Address of Insurance Agency:	Name and Address of Insured:
	Canyon Regional Water Authority
	850 Lakeside Pass
	New Braunfels, Tx 78130
Phone:	
Email:	

Insurers Affording Coverages:

Insurer A:

Insurer B:

Insurer C:

Insurer D:

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS OF LIABILITY	
	Commercial General Liability Policy As defined in the Policy, does the Policy provide:				Each Occurrence	\$
		General Aggregate	\$			
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Completed Operations/Products				Completed Operations /Products Aggregate	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Contractual Liability				Personal & Advertising Injury	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Explosion				Deductible or Self Insured Retention	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Collapse					
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Underground					
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Contractors/ Subcontractors Work					
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Aggregate Limits per Project Form CG 2503					
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Additional Insured Form - CG 2010					
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- 30 Day Notice of Cancellation Form - CG 0205					
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Waiver of Subrogation Form – CG 2404					

	Pollution/ Environmental Impairment Policy			Occurrence	\$
				Aggregate	\$
	Auto Liability Policy As defined in the Policy, does the Policy provide:			CSL	\$
				Bodily Injury (Per Accident)	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Any Auto			Bodily Injury (Per Person)	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- All Owned Autos			Property Damage (Per Accident)	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Non-Owned Autos				
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Hired Autos				
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Waiver of Subrogation – CA0444				
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- 30 Day Notice of Cancellation – CA0244				
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Additional Insured – CA2048				
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- MCS 90				
	Excess Liability			Occurrence	\$
	<input type="checkbox"/> Umbrella Form			Aggregate	\$
	<input type="checkbox"/> Excess Liability Follow Form				
	Workers Compensation and Employers Liability As defined in the Policy, does the Policy provide:			<input type="checkbox"/> Statutory	
				Each Accident	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Waiver of Subrogation – WC420304			Disease – Policy Limit	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- 30 Day Notice of Cancellation – WC420601			Disease – Each Employee	\$
	Is a Builders Risk or Installation Insurance Policy provided? <input type="checkbox"/> Yes <input type="checkbox"/> No				\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- Is the Owner shown as loss payee/mortgagee?				
	Professional Liability As defined in the Policy, does the Policy provide:			Each Claim	\$
	<input type="checkbox"/> Yes <input type="checkbox"/> No -- 30 Day Notice of Cancellation			Deductible or Self Insured Retention	\$
	Retroactive Date: _____				

This form is for informational purposes only and certifies that policies of insurance listed above have been issued to insured named above and are in force at this time. Notwithstanding any requirements, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, insurance afforded by policies described herein is subject to all terms, exclusions and conditions of such policies.

CERTIFICATE HOLDER:	DATE ISSUED:
Canyon Regional Water Authority	
850 Lakeside Pass	Authorized Representative Signature
New Braunfels, Tx 78130	

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SECTION 00 62 76
TEXAS SALES AND USE TAX EXEMPTION CERTIFICATE

Canyon Regional Water Authority (Owner)
630 East Hopkins Street
San Marcos, TX 78666

Contractor: _____
Street Address: _____
City, State, ZIP Code: _____
Project Name: Wells Ranch II Emergency Generator Project
Project No.: _____
Description of items/services to be purchased (or as described on the attached order or invoice): _____ _____

The Contractor may purchase all labor, materials, supplies, and equipment to be incorporated in the Owner's realty (including easements), or completely consumed at the Project Site, and all services required by or integral to the construction of the Project without paying sales or use tax, in accordance with 34 TAC §3.291.

The Contractor claims this exemption for the following reason: This Contract is to be performed for the Owner, which is a tax-exempt entity under the Texas Tax Code.

The Owner understands that it will be liable for payment of sales and use taxes which may become due for failure to comply with the provisions of the Texas Tax Code. The Owner also understands that it is a criminal offense to give an exemption certificate to the Contractor for taxable items that the Owner knows, at the time of purchase, will be used in a manner other than that expressed in this certificate and depending on the amount of tax evaded, the offense may range from a Class B misdemeanor to a felony of the second degree.

Canyon Regional Water Authority	Title	Date
_____	<u>General Manager</u>	_____
By: Kerry Averyt		

CONTRACTOR: _____

By: _____

Printed Name, Title: _____

Date: _____

NOTE: This certificate cannot be issued for the purchase, lease, or rental of a motor vehicle.

THIS CERTIFICATE DOES NOT REQUIRE A NUMBER TO BE VALID. Sales and Use Tax "Exemption Numbers" or "Tax Exempt" Numbers do not exist. This certificate should be furnished to the supplier. Do not send the completed certificate to the Comptroller of Public Accounts.

END OF SECTION

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Canyon Regional Water Authority Contract Documents
GENERAL CONDITIONS OF THE CONTRACT

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ARTICLE 1 – DEFINITIONS

Whenever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

- 1.1 Addendum** – A written instrument issued by the OWNER before the deadline for submission of Proposals which clarifies, corrects or changes the Proposal requirements or the Contract Documents. “Addenda” is the plural form of Addendum.
- 1.2 Agreement** - The prescribed form, Section 00 52 43.
- 1.3 Calendar Day** - Any day of the week; no days being excepted. Work on Saturdays, Sundays, and/or Legal Holidays shall be coordinated with the ENGINEER and the OWNER.
- 1.4 Change Directive** - A written directive to the CONTRACTOR, signed by the OWNER, ordering a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Amount or Contract Time, or both. A Change Directive may be used in the absence of total agreement on the terms of a Change Order. A Change Directive does not change the Contract Amount or Contract Time, but is evidence that the parties expect that the change directed or documented by a Change Directive will be incorporated in a subsequently issued Change Order.
- 1.5 Change Order** – A written document issued by the OWNER to the CONTRACTOR authorizing an addition, deletion, or revision to the Contract, issued on or after the Date of Agreement specified in the Agreement.
- 1.6 Claim** - A written demand seeking, as a matter of right, adjustment or interpretation of the Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract.
- 1.7 Contract** - The binding legal agreement between the OWNER and the CONTRACTOR. The Contract, as evidenced by all of the Contract Documents, represents the entire and integrated agreement between the OWNER and the CONTRACTOR for performance of the Work.
- 1.8 Contract Amount** - The amount payable by the OWNER to the CONTRACTOR for completion of the Work in accordance with the Contract Documents.
- 1.9 Contract Documents** - The Project Manual, Drawings, Specifications, Addenda, Change Orders, and all other documents and information referenced in any of these documents.
- 1.10 Contract Time** - The number of days allowed for completion of the Project as defined by the Contract. When any period is referred to in days, it shall be computed to exclude the first and include the last day of such period. For this purpose, a “day” shall be a period of twenty-four hours measured from midnight to the next midnight.
- 1.11 CONTRACTOR** - The individual, firm, corporation, or other business entity with whom OWNER has entered into the Contract for performance of the Work.
- 1.12 Critical Path** - The longest series of tasks that runs consecutively from the beginning to the end of the project, as determined by duration and workflow sequence. This longest path sets the managerial standard for how quickly a project can be completed, given appropriate resources.
- 1.13 Defective Work** - Any of the Work that, in the opinion of the ENGINEER, is unsatisfactory, faulty or Defective, does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, has been damaged prior to final payment, or does not conform to the Contract Documents.

- 1.14 Drawings** - Those portions of the Contract Documents which are graphic representations of the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been approved by OWNER. Drawings may include plans, elevations, sections, details, schedules and diagrams. Shop Drawings are not Drawings as so defined.
- 1.15 ENGINEER** - The OWNER's design professional identified in the Supplemental General Conditions. Nothing contained in the Contract Documents shall create any contractual or agency relationship between the ENGINEER and the CONTRACTOR.
- 1.16 Equal** - The terms "equal" or "approved equal" shall have the same meaning.
- 1.17 Field Order** - A written order issued by the ENGINEER which orders minor changes in the Work and which does not involve a change in the Contract Amount or the Contract Time.
- 1.18 Final Completion or Finally Complete** - The point in time when the Project has been completed in accordance with the Contract Documents, as evidenced by a Certificate of Final Completion issued by the ENGINEER and approved by the OWNER.
- 1.19 Force Account** - A basis of payment for the direct performance of Work with payment based on the actual cost of the labor, equipment and materials furnished and consideration for overhead and profit as set forth in 11.5.
- 1.20 HUB** – A historically underutilized business, a minority business enterprise, a disadvantaged business enterprise, or a small-medium business, as determined under applicable rules of the Texas Comptroller of Public Accounts.
- 1.21 Legal Holiday** – The following Legal Holidays are observed by the OWNER:

Holiday	Date Observed
New Year's Day	January 1
Good Friday	Varies, Friday before Easter
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	First Monday in September
Thanksgiving Day	Fourth Thursday in November
Friday after Thanksgiving	Friday after Thanksgiving Day
Christmas Eve Day	December 24
Christmas Day	December 25
New Year's Eve Day	December 31

If a Legal Holiday falls on Saturday, it will be observed on the preceding Friday. If a Legal Holiday falls on Sunday, it will be observed on the following Monday.

Christmas Eve is observed only if it falls on a Monday through Thursday. If Christmas Eve falls on a Friday, that day is observed as the Christmas Day holiday.

- 1.22 Milestone** - A significant event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

- 1.23 Notice to Proceed** – The Written Notice issued by the OWNER to the CONTRACTOR fixing the Project Start Date on which the Contract Time will commence to run and on which the CONTRACTOR shall start to perform the Work under the Contract Documents.
- 1.24 Offeror** - A person, firm, or entity that submits a Proposal for the Project. Any Offeror may be represented by an agent after submitting evidence demonstrating the agent’s authority. The agent cannot certify as to his/her own agency status.
- 1.25 OWNER** - The Canyon Regional Water Authority, a political subdivision organized and existing under the laws of the State of Texas.
- 1.26 Owner’s Representative** – The ENGINEER, unless otherwise designated in the Supplemental Conditions.
- 1.27 Project** - The subject of the Work and its intended result.
- 1.28 Project Manual** - That portion of the Contract Documents which may include the following: introductory information; Proposal requirements, Contract forms, General Conditions and Supplemental Conditions; General Requirements; Specifications; Drawings; MBE/WBE or DBE Procurement Program Package; Project Safety Manual; and Addenda.
- 1.29 Project Site or Site** - The entire area in which construction activities will be performed for the Project, including access areas, but not including areas for storage and staging of materials and equipment unless expressly shown and described as such on the Drawings.
- 1.30 Proposal** - A complete, properly signed response to an Invitation for Proposals that, if accepted, would bind the Offeror to perform the resultant Contract.
- 1.31 Proposal Documents** - The advertisement or Invitation for Proposals, Instructions to Offerors, the Proposal Form, and the Contract Documents.
- 1.32 Resident Project Representative** - The authorized representative of the ENGINEER who may be assigned to the Project Site or any part thereof.
- 1.33 Shop Drawings** - All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for the CONTRACTOR and submitted by the CONTRACTOR as required by the Contract Documents.
- 1.34 Specifications** - Those portions of the Contract Documents consisting of written technical descriptions as applied to the Work, which set forth to the CONTRACTOR, in detail, the requirements which must be met by all materials, equipment, construction systems, standards, workmanship, equipment and services in order to render a completed and useful Project.
- 1.35 Substantial Completion or Substantially Complete** - The stage in the progress of the Work when all or a designated portion of the Project is sufficiently complete in accordance with the Contract Documents so the OWNER can occupy or utilize all or the designated portion of the Project for its intended purposes, as evidenced by a Certificate of Substantial Completion or Certificate of Partial Substantial Completion issued by the ENGINEER and approved by the OWNER.
- 1.36 Subcontractor** - An individual, firm, corporation, or other business entity having a direct contract with the CONTRACTOR for the performance of a portion of the Work under the Contract.
- 1.37 Sub-Subcontractor** - A person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work.
- 1.38 Superintendent** - The representative of the CONTRACTOR designated to be responsible for supervising and directing the Work as set forth in the Contract Documents, and to receive and fulfill

instructions from the ENGINEER. The term “Superintendent” shall apply under the Contract Documents regardless of the actual title given to the Superintendent by the CONTRACTOR.

- 1.39 Supplemental General Conditions or Supplemental Conditions** - The part of the Contract Documents which amends or supplements the General Conditions. All General Conditions which are not so amended or supplemented remain in full force and effect.
- 1.40 Supplier** – A person or entity having a direct contract with the CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by the CONTRACTOR or the Subcontractor.
- 1.41 Surety** – A company that issues a bond to the OWNER on behalf of the CONTRACTOR under Article 5 of this Contract or under any other provision of the Contract Documents that authorizes or requires a bond.
- 1.42 Work** - The entire process of construction required to be furnished under the Contract Documents for the successful completion of the Project. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing all incidental services, including supervision, coordination, the furnishing of documents, and ensuring compliance with the Contract Documents.
- 1.43 Working Day** - Any day of the week, not including Saturdays, Sundays, or Legal Holidays in which conditions under the CONTRACTOR's control will permit work for a continuous period of not less than seven hours between 7:00 a.m. and 6:00 p.m. Upon agreement with the Owner's Representative, work on Saturdays, Sundays and/or Legal Holidays may be allowed and shall be considered a Working Day.
- 1.44 Written Notice** - A written communication between the OWNER and the CONTRACTOR, or between the OWNER and the ENGINEER, or between the CONTRACTOR and the ENGINEER, served in accordance with 2.7.

ARTICLE 2 - PRELIMINARY MATTERS

- 2.1 Delivery of Agreement, Bonds, Insurance:** Within five Working Days after written notification of award of Contract, the CONTRACTOR shall deliver to the OWNER the signed Agreement and the Bond(s), Insurance Certificate(s) and other documentation required for execution of the Contract.
- 2.2 Copies of Documents:** The OWNER shall furnish to the CONTRACTOR one Project Manual with original signatures, one copy of the executed Project Manual, one set of Drawings and one copy of the Contract Documents in .pdf format. Additional copies will be furnished, upon request, at cost.
- 2.3 Commencement of Contract Time; Notice to Proceed:** The Contract Time(s) shall begin to run on the Project Start Date specified in the Notice to Proceed. The Notice to Proceed will be given at any time within 60 Calendar Days after the Date of Agreement specified in the Agreement, unless extended by written agreement of the parties.
- 2.4 Before Starting Construction:**
- 2.4.1** No Work shall be done at the Project Site prior to the preconstruction conference without the OWNER's approval. Before undertaking each part of the Work, the CONTRACTOR shall carefully study the Contract Documents to check and verify pertinent figures shown thereon compare accurately to all applicable field measurements. The CONTRACTOR

shall promptly give Written Notice to the ENGINEER of any conflict, error, ambiguity or discrepancy which the CONTRACTOR may discover and shall obtain a written interpretation or clarification from the ENGINEER before proceeding with any Work affected thereby. The CONTRACTOR shall be liable to the OWNER for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents of which the CONTRACTOR knew or reasonably should have known.

2.4.2 It is mutually agreed between the CONTRACTOR and the OWNER that successful completion of the Work within the Contract completion date is of primary importance. Therefore, the CONTRACTOR hereby agrees to submit to the ENGINEER for review and approval, or acceptance, as appropriate, all information requested within this paragraph, including a Baseline Schedule, no later than five Working Days prior to the preconstruction conference. The ENGINEER shall schedule the preconstruction conference upon the timely submittal of the required documents, unless time is extended by written mutual agreement. The CONTRACTOR shall submit the following:

- .1** A proposed baseline schedule (the “Baseline Schedule”) developed using Microsoft Project software, unless otherwise approved by the ENGINEER, to confirm that all Work will be Substantially Completed and Finally Completed within the Contract Time. The Baseline Schedule must (i) indicate the times (number of days or the dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents, (ii) identify the Critical Path for completing the Work, (iii) identify when all Subcontractors will be utilized, and (iv) take into consideration any limitations on Working Hours, and (v) be prepared accordance with Section 01 32 16, Construction Progress Schedule, if applicable; otherwise in accordance with Section 01 33 00, Submittals. This Baseline Schedule, a copy of which shall be made available at the Project Site, must contain sufficient detail to indicate that the CONTRACTOR has properly identified required Work elements and tasks, has provided for a sufficient and proper workforce and integration of Subcontractors, has provided sufficient resources and has considered the proper sequencing of the Work required to result in a successful Project that can be Substantially Completed and Finally Completed within the Contract time;
- .2** An organizational chart showing the principals and management personnel who will be involved with the Work, including each one’s responsibilities for the Work;
- .3** A preliminary schedule of Shop Drawing and sample submittals;
- .4** A preliminary schedule of values for all of the Work, subdivided into component parts in sufficient detail to serve as the basis for progress payments during construction. Such values shall be deemed to include an appropriate amount of overhead and profit applicable to each item of Work;
- .5** A letter from the CONTRACTOR and each Subcontractor listing salaried specialists. A salaried specialist is anyone except an hourly worker whose wage rate is governed by Section 00 73 00;
- .6** A letter designating the “Competent Person(s)” on general safety and excavation safety measures along with certifications or other documentation of the safety representative’s qualifications;

- .7 If applicable, an excavation safety system plan;
 - .8 If applicable, a plan illustrating proposed locations of temporary facilities;
 - .9 A completed Non-Use of Asbestos Affidavit (Prior to Construction);
 - .10 A letter designating the Texas Registered Professional Land Surveyor for layout of the Work, if the Work requires the services of a surveyor;
 - .11 Appropriate safety training certificates for workers that will initially be on the Project Site;
 - .12 A certificate of worker's compensation insurance coverage for all persons providing services on the Project (refer to 5.2.1.3 for definition of "persons providing services on the Project"); and
 - .13 A Construction Equipment Emissions Reduction Plan.
- 2.4.3** Neither the acceptance nor the approval of any of the submittals required in 2.4.2, above, will constitute the adoption, affirmation, or direction of the CONTRACTOR's means and methods.
- 2.5 Preconstruction Conference:** Prior to commencement of Work at the Project Site, the CONTRACTOR must attend a preconstruction conference with the OWNER, the ENGINEER and others, as set forth in Division 1, Section 01 31 19 of the Specifications.
- 2.6 Initially Acceptable Schedules:** Unless otherwise provided in the Contract Documents, the CONTRACTOR shall obtain approval of the ENGINEER on the Baseline Schedule submitted in accordance with 2.4.2.1 and Division 1, Section 01 32 16 of the Specifications before the first progress payment will be made to the CONTRACTOR. The Baseline Schedule must provide for an orderly progression of the designated portion of the Work to Substantial Completion and Final Completion within any specified Milestones and the applicable Contract Time. Acceptance of the schedule by the ENGINEER will neither impose on the ENGINEER responsibility or liability for the sequencing, scheduling or progress of the Work nor interfere with or relieve the CONTRACTOR from the CONTRACTOR's full responsibility for the Work. The CONTRACTOR's schedule of Shop Drawings and sample submissions must provide an acceptable basis for reviewing and processing the required submittals. The CONTRACTOR's schedule of values must conform to the requirements set forth in 2.4.2.4.
- 2.7 Written Notice Process:** Whenever any provision of the Contract requires or provides for the giving of a Written Notice, it will be deemed to have been validly given only if delivered:
- 2.7.1** in person, by a commercial courier service or otherwise, to the recipient's place of business;
 - 2.7.2** by registered or certified mail, postage prepaid, to the recipient's place of business; or
 - 2.7.3** by e-mail to the recipient, with the words "Formal Notice" or similar wording in the e-mail's subject line.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Intent, Order of Precedence and Interpretation:

- 3.1.1** The intent of the Contract Documents is to include all information necessary for the proper execution and timely completion of the Work by the CONTRACTOR. The

CONTRACTOR shall execute the Work described in and reasonably inferable from the Contract Documents as necessary to produce the results indicated by the Contract Documents. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. In cases of disagreement or inconsistency, the following descending order of precedence shall generally govern (higher items receiving priority of interpretation):

- Signed Agreement
- Addenda to the Contract Documents, including approved changes
- Supplemental General Conditions
- General Conditions
- Other Proposal Requirements and Contract Forms
- Special Provisions to the Standard Specifications
- Special Specifications
- Standard Specifications
- Drawings (figured dimensions shall govern over scaled dimensions)
- Project Safety Manual (if applicable),

with the understanding that a common sense approach will be utilized as necessary so that the intent of the Contract Documents is observed.

- 3.1.2** Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.
 - 3.1.3** No provision in any manual, code, or technical reference included in the Contract Documents will be effective to assign responsibilities regarding the Project to the OWNER, the ENGINEER or the CONTRACTOR that are contrary to other provisions of the Contract Documents that have higher precedence.
 - 3.1.4** Although drafted by the OWNER, the CONTRACTOR agrees that this Contract shall be interpreted fairly and reasonably, in the event of any disputes over its meaning or application, and neither more strongly for nor against either the OWNER or the CONTRACTOR.
- 3.2 Reporting and Resolving Discrepancies:** If, during the performance of the Work, the CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provisions of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual or code or instructions of any Supplier, the CONTRACTOR shall give Written Notice to the ENGINEER at once, and the CONTRACTOR shall not proceed with the Work affected thereby until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in 3.3.1 or 3.3.2. The CONTRACTOR shall be liable to the OWNER for failure to report any such conflict, error, ambiguity or discrepancy of which the CONTRACTOR knew or reasonably should have known.
- 3.3 Amending and Supplementing Contract Documents:**
- 3.3.1** The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:
 - .1** Change Order.

.2 Change Directive.

3.3.2 In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

.1 Field Order.

3.4 **Reuse of Documents Prohibited:** The CONTRACTOR and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with the OWNER: (i) shall not 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 the ENGINEER or the ENGINEER's consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of the OWNER and the ENGINEER.

3.5 In the event of the breach by the OWNER or the CONTRACTOR of any of its obligations under the Contract, so as to support a claim by the other party, the provisions of this Contract shall be equitably construed to allow the resolution of such a claim and all of the other provisions of this Contract shall continue in full force and effect as to the rights, responsibilities, and remedies of the OWNER and the CONTRACTOR.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

4.1 **Availability of Lands:** The OWNER will provide access to all land and interests in land as shown on the Drawings. Restrictions or conditions associated with access to and use of such land and interests in land are indicated on the Drawings, and/or referenced in the Supplemental General Conditions. The CONTRACTOR is responsible for obtaining, in the CONTRACTOR's own name, any additional temporary construction facilities, stockpiling or storage sites not shown on the Drawings. Should the CONTRACTOR, or any of its Subcontractors, Vendors, or Suppliers in any way cause the Work to be delayed to the point that the ending date of any easement rights or other interests in land has been exceeded, the CONTRACTOR shall reimburse the OWNER for any additional costs required to extend the period of the easement rights or other interests in land in order to complete the Work.

4.2 **Subsurface and Physical Conditions:**

4.2.1 The CONTRACTOR specifically represents that it has carefully examined the Drawings and the Project Site and is thoroughly familiar with all of the conditions surrounding construction of the Project, and has had the opportunity to conduct any and all additional inquiry, tests and investigations that the CONTRACTOR considered necessary and proper to ensure the Work can be performed for the Contract Amount and within the Contract Time. The CONTRACTOR agrees that any geotechnical report made available to the CONTRACTOR was prepared for the OWNER for general design purposes only, and the report is NOT a part of the Contract Documents, and the CONTRACTOR may NOT rely on the report as a guarantee of similar conditions throughout the Project Site, or as a baseline for differing conditions to justify a change in the Contract Amount or Contract Time.

- 4.2.2** The CONTRACTOR acknowledges and agrees that under no circumstances will the CONTRACTOR be allowed an adjustment in the Contract Amount or the Contract Time due to differences between conditions actually encountered in the Work and as indicated by the Contract Documents, whether or not foreseeable by the CONTRACTOR, the ENGINEER or the OWNER.
- 4.2.3** Notwithstanding any other provision of this Contract, the CONTRACTOR is solely responsible for the location and protection of any and all public utility lines and utility customer service lines in the Work area. "Public utility lines" means all utility distribution and supply/collection system facilities, and "utility customer service lines" means the lines connecting customers to public utility lines. The CONTRACTOR shall notify "One Call" in accordance with all applicable Laws and Regulations, and exercise due care to locate, mark, uncover and otherwise protect all public utility lines and utility customer service lines in the Work area and in any of the CONTRACTOR's work or storage areas. The CONTRACTOR's responsibility for the location and protection of all public utility lines and utility customer service lines is primary and non-delegable. The CONTRACTOR acknowledges that existing utility customer service line connections are generally not shown on the Drawings and must be located by inquiry and careful investigation of the Project Site. The CONTRACTOR shall indemnify or reimburse the OWNER for all expenses and costs (including fines that may be levied against the OWNER) in connection with any unauthorized or accidental damage to any public utility lines or utility customer service lines. The OWNER reserves the right to repair any damage the CONTRACTOR causes to such facilities at the CONTRACTOR's expense. If a public utility line or utility customer service line is damaged by the CONTRACTOR or any Subcontractor, the CONTRACTOR shall give the ENGINEER verbal notice within one hour and Written Notice within twenty-four hours.
- 4.2.4** The CONTRACTOR shall take reasonable precautions to avoid disturbing any archaeological site or any site that has historical, paleontological or cultural significance. The CONTRACTOR shall not disturb any such site or any historical object or artifact without written permission of the OWNER and the Texas Historical Commission. If any such site, object or artifact is uncovered in the course of the Work, the CONTRACTOR shall stop all Work in close proximity and notify the ENGINEER and the Texas Historical Commission, and shall not disturb the site, object or artifact until written permission and permit to do so is granted. All primitive rights and antiquities uncovered on the OWNER's property shall remain property of the State of Texas, Texas Historical Commission in accordance with state law. If it is determined by the OWNER, in consultation with Texas Historical Commission, that exploration or excavation of primitive records or antiquities on the Project Site is necessary to avoid loss, the CONTRACTOR shall cooperate in salvage work attendant to preservation. If the Work stoppage or salvage work causes an increase in the CONTRACTOR's cost or the time required for the Work, the Contract Amount and/or Contract Time shall be equitably adjusted.
- 4.3 Reference Points:** Unless otherwise specified, all control lines and bench marks suitable for use in layout will be furnished by the OWNER. Layout of the Work shall be performed in accordance with Division 1 Specifications. Controls, bench marks and property boundary markers shall be carefully preserved by the CONTRACTOR by use of flags, staffs or other visible devices and in case of destruction or removal by the CONTRACTOR or its employees, such controls and bench marks shall be replaced by a Registered Professional Land Surveyor at the CONTRACTOR's expense. Any survey monuments damaged by the CONTRACTOR shall be reestablished by the CONTRACTOR at the CONTRACTOR's expense.

4.4 Hazardous Materials:

- 4.4.1** To the extent provided by applicable law, the OWNER shall be responsible for any hazardous material uncovered or revealed at the Project Site which was not shown, indicated or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the Project Site. The CONTRACTOR shall immediately notify the ENGINEER of any suspected hazardous materials encountered before or during performance of the Work and shall take all necessary precautions to avoid further disturbance of the materials.
- 4.4.2** The CONTRACTOR shall be responsible for the use, storage and remediation of any hazardous materials brought or introduced to the Project Site by the CONTRACTOR, a Subcontractor, a Supplier or anyone else for whom the CONTRACTOR is responsible. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER and the OWNER's officers, directors, employees and agents from and against all claims, losses, damages, liabilities and expenses, including attorneys' fees and expenses, arising out of or resulting from any hazardous materials introduced to the Project Site by the CONTRACTOR, a Subcontractor, a Supplier or anyone else for whom the CONTRACTOR is responsible.
- 4.4.3** No asbestos-containing materials shall be incorporated into the Work or brought on Project Site without prior approval of the OWNER. The CONTRACTOR shall not knowingly use, specify, request or approve for use any asbestos containing materials or lead-based paint without the OWNER's written approval. When a specific product is specified, the CONTRACTOR shall endeavor to verify that the product does not include asbestos containing material.
- 4.4.4** Refer to Division 1 of the Specifications for hazardous material definitions and procedures.
- .1** Unless otherwise expressly provided in the Contract Documents to be part of the Work, the CONTRACTOR is not responsible for any unexpected Hazardous Materials encountered at the Project Site. Upon encountering any Hazardous Conditions, the CONTRACTOR shall stop Work immediately in the affected area and duly notify the OWNER and, if required by Laws and Regulations, all government or quasi-government entities with jurisdiction over the Project or Project Site.
 - .2** Upon receiving notice of the presence of suspected Hazardous Materials, the OWNER shall take the necessary measures required to ensure that the Hazardous Materials are remediated or rendered harmless. Such necessary measures shall include the OWNER retaining qualified independent experts to (i) ascertain whether Hazardous Materials have actually been encountered, and, if they have been encountered, (ii) prescribe the remedial measures that the OWNER must take either to remove the Hazardous Materials or render the Hazardous Materials harmless.
 - .3** The CONTRACTOR shall be obligated to resume Work at the affected area of the Project only after the ENGINEER provides written certification that (i) the Hazardous Materials have been removed or rendered harmless and (ii) all necessary approvals have been obtained from all government and quasigovernment entities having jurisdiction over the Project or Project Site. The CONTRACTOR shall be responsible for continuing the Work in the unaffected portion of the Project and Project Site.

- .4 The CONTRACTOR will be entitled, in accordance with these General Conditions, to an adjustment in its Contract Amount and/or Contract Time(s) to the extent the CONTRACTOR's cost and/or time of performance have been adversely impacted by the presence of unexpected Hazardous Materials.

ARTICLE 5 - BONDS AND INSURANCE

5.1 Surety and Insurance Companies: All bonds and insurance required by the Contract Documents shall be obtained from solvent surety or insurance companies that are duly licensed by the State of Texas and authorized to issue bonds or insurance policies for the limits and coverages required by the Contract Documents. The bonds shall be issued by a surety which complies with the requirements of Texas Insurance Code, Chapter 3503. The Surety must obtain reinsurance for any portion of the risk that exceeds 10% of the Surety's capital and surplus. For bonds exceeding \$100,000, the Surety must also hold a certificate of authority from the U.S. Secretary of the Treasury or have obtained reinsurance for any liability in excess of \$1,000,000 from a reinsurer that is authorized as a reinsurer in Texas or holds a certificate of authority from the U.S. Secretary of the Treasury. In the event that the proposed surety for a contract award in excess of \$100,000 does not hold a certificate of authority from the U.S. Secretary of the Treasury and/or its proposed reinsurer does not hold a certificate of authority from the U.S. Secretary of the Treasury, the OWNER may require additional financial solvency information from the Offeror/CONTRACTOR and the proposed surety company and/or reinsurer as part of the Offeror's Proposal and determination of Offeror responsibility in the award of the Contract.

5.2 Workers' Compensation Insurance Coverage:

5.2.1 Definitions:

- .1 Certificate of coverage, or certificate** - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Division of Workers' Compensation of the Texas Department of Insurance, or a coverage agreement (DWC-81, DCW-82, DCW-83, or DCW-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on the Project, for the duration of the Project.
- .2 Duration of the Project** - includes the time from the beginning of the Work on the Project until the CONTRACTOR's/person's Work on the Project has been completed and accepted by the OWNER.
- .3 Persons providing services on the Project ("subcontractor"** in Texas Labor Code, Section 406.096) - includes all persons or entities performing all or part of the services the CONTRACTOR has undertaken to perform on the Project, regardless of whether that person contracted directly with the CONTRACTOR and regardless of whether that person has employees. This includes, without limitation, independent contractors, Subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

- 5.2.2** The CONTRACTOR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the CONTRACTOR providing services on the Project, for the duration of the Project.
- 5.2.3** The CONTRACTOR must provide a certificate of coverage to the OWNER prior to being awarded the Contract.
- 5.2.4** If the coverage period shown on the CONTRACTOR's current certificate of coverage ends during the duration of the Project, the CONTRACTOR must, prior to the end of the coverage period, file a new certificate of coverage with the OWNER showing that coverage has been extended.
- 5.2.5** The CONTRACTOR shall obtain from each person providing services on the Project, and provide to the OWNER:
- .1** A certificate of coverage, prior to that person beginning Work on the Project, so the OWNER will have on file certificates of coverage showing coverage for all persons providing services on the Project; and
 - .2** No later than seven Calendar Days after receipt by the CONTRACTOR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.
- 5.2.6** The CONTRACTOR shall retain all required certificates of coverage for the duration of the Project and for one year thereafter.
- 5.2.7** The CONTRACTOR shall give Written Notice to the OWNER by certified mail or personal delivery, within ten Calendar Days after the CONTRACTOR knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.
- 5.2.8** The CONTRACTOR shall post on each Project Site a notice, in the text, form and manner prescribed by the Division of Workers' Compensation of the Texas Department of Insurance, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.
- 5.2.9** The CONTRACTOR shall contractually require each person with whom it contracts to provide services on a Project, to:
- .1** Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the duration of the Project;
 - .2** Provide to the CONTRACTOR, prior to that person beginning Work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project;
 - .3** Provide the CONTRACTOR, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;
 - .4** Obtain from each other person with whom it contracts, and provide to the CONTRACTOR: a) a certificate of coverage, prior to the other person beginning Work

on the Project; and b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

- .5 Retain all required certificates of coverage on file for the duration of the Project and for one year thereafter;
- .6 Give Written Notice to the OWNER by certified mail or personal delivery, within ten Calendar Days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and
- .7 Contractually require each person with whom it contracts, to perform as required by 5.2.9.1 - 5.2.9.7, with the certificates of coverage to be provided to the person for whom they are providing services.

5.2.10 By signing this Contract or providing or causing to be provided a certificate of coverage, the CONTRACTOR is representing to the OWNER that all employees of the CONTRACTOR who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the Division of Workers' Compensation of the Texas Department of Insurance. Providing false or misleading information may subject the CONTRACTOR to administrative penalties, criminal penalties, civil penalties, or other civil actions.

5.2.11 The CONTRACTOR's failure to comply with any of these provisions is a breach of Contract by the CONTRACTOR which entitles the OWNER to declare the Contract void if the CONTRACTOR does not remedy the breach within ten Calendar Days after receipt of Written Notice of breach from the OWNER.

5.3 Other Bond and Insurance Requirements: For additional insurance requirements, refer to the Supplemental General Conditions. All bonds and insurance certificates shall be subject to approval by the OWNER.

5.4 Bonds:

5.4.1 General.

- .1 Bonds, when required, shall be executed on forms furnished by the OWNER. All bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.
- .2 If any Surety is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Texas or it ceases to meet the requirements of this 5.4, the CONTRACTOR shall within ten Calendar Days thereafter substitute another bond and surety, both of which must be acceptable to the OWNER.
- .3 When Performance Bonds and/or Payment Bonds are required, each shall be issued in an amount of 100% of the Contract Amount as security for the faithful performance and/or payment of all the CONTRACTOR's obligations under the Contract Documents. Performance Bonds and Payment Bonds shall be issued by a solvent surety company authorized to do business in the State of Texas, and shall meet any other requirements established by law or by the OWNER pursuant to applicable law.

Any surety duly authorized to do business in Texas may write Performance and Payment Bonds on a project without reinsurance to the limit of 10% of its capital and surplus. Such a surety must reinsure any obligations over the 10% limit.

5.4.2 Performance Bond.

- .1 If the Contract Amount exceeds \$100,000, the CONTRACTOR shall furnish the OWNER with a Performance Bond in the form set out in Section 00 61 13.
- .2 If the Contract Amount exceeds \$25,000 but is less than or equal to \$100,000, the CONTRACTOR shall furnish the OWNER with a Performance Bond in the form set out in Section 00 61 13, unless the original Contract Time is 60 Calendar Days/40 Working Days or less, in which case the CONTRACTOR can agree to the following terms and conditions for payment in lieu of providing a Performance Bond: No moneys will be paid to the CONTRACTOR until completion and acceptance of the Work by the OWNER; the CONTRACTOR shall be entitled to receive 95% of the Contract Amount following Final Completion, and the remaining 5% of the Contract Amount following the one-year warranty period.
- .3 If the Contract Amount is less than or equal to \$25,000, the CONTRACTOR will not be required to furnish a Performance Bond; provided that no moneys will be paid to the CONTRACTOR until completion and acceptance of the Work by the OWNER under the following terms and conditions: The CONTRACTOR shall be entitled to receive 95% of the Contract Amount following Final Completion, and the remaining 5% of the Contract Amount following the one-year warranty period.
- .4 If a Performance Bond is required to be furnished, it shall extend to and cover the one-year warranty period.

5.4.3 Payment Bond.

- .1 If the Contract Amount exceeds \$50,000, the CONTRACTOR shall furnish the OWNER with a Payment Bond in the form set out in Section 00 61 14.
- .2 If the Contract Amount is less than or equal to \$50,000, the CONTRACTOR will not be required to furnish a Payment Bond; provided that no moneys will be paid to the CONTRACTOR until completion and acceptance of the Work by the OWNER under the terms and conditions specified in 5.4.2.3.

5.4.4 Maintenance Bond: If the Contract Documents contemplate a period of maintenance beyond the one-year contractual warranty period, the OWNER agrees that any bond to be required for such maintenance work will be in the amount of the maintenance work during any extended maintenance period.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision and Superintendence:

6.1.1 The CONTRACTOR shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences

and procedures of construction. The CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.1.2 The CONTRACTOR shall assign to the Project the Superintendent identified in the Proposal Documents, and shall not change or replace the Superintendent except as described below. The CONTRACTOR shall have the Superintendent on the Project Site at all times that Work is in progress. The Superintendent shall be the CONTRACTOR's representative on the Work and shall have the authority to act on the behalf of the CONTRACTOR. All communications given to the Superintendent shall be as binding as if given to the CONTRACTOR. The Superintendent shall provide the OWNER and the ENGINEER with a cellular telephone number at which the Superintendent may be reached when the Work is in progress and an emergency and home telephone number at which the Superintendent may be reached when the Work is not in progress. The Superintendent shall be an employee of the CONTRACTOR, unless this requirement is waived in writing by the OWNER.

- .1** If, in the opinion of the OWNER, the Superintendent is not performing satisfactorily, the CONTRACTOR shall propose another person as Superintendent and present to the OWNER that person's resume containing the information called for in 12.1.2 of Section 00 21 14 Instructions to Offerors. The OWNER will either approve or disapprove the person proposed. If the OWNER disapproves the person, the CONTRACTOR shall propose another person in the same manner for approval by the OWNER.
- .2** The CONTRACTOR shall not replace the Superintendent without the written approval of the OWNER. If the CONTRACTOR deems it necessary to replace the Superintendent, the CONTRACTOR shall provide the necessary information for approval, as stated above, on the proposed new Superintendent. The OWNER will either approve or disapprove the person proposed. If the OWNER disapproves the person, the CONTRACTOR shall propose another person in the same manner for approval by the OWNER.
- .3** The CONTRACTOR may designate a qualified substitute Superintendent in the event that the regular Superintendent is temporarily away from the Work, but not to exceed a time limit acceptable to the OWNER.

6.2 Labor, Materials and Equipment:

6.2.1 The CONTRACTOR shall maintain a work force adequate to Substantially Complete and Finally Complete the Work within the applicable Contract Time. The CONTRACTOR shall verify the identity and employment eligibility of each of its employees and of each employee of a Subcontractor who performs work under this Contract, including completion of Employment Eligibility Verification forms (I-9). Upon request by the OWNER, the CONTRACTOR shall provide the OWNER with copies of all I-9 forms and supporting documentation for each employee who performs work under this Contract. The CONTRACTOR agrees to employ only orderly and competent workers, skillful in performance of the type of Work required under this Contract. The CONTRACTOR, Subcontractors, Sub-subcontractors, and their workers may not use or possess any alcoholic or other intoxicating beverages, illegal drugs or controlled substances while on the job or on the OWNER's property, nor may any such worker be intoxicated or under the influence of alcohol or drugs on the job. Subject to the applicable provisions of Texas law,

the CONTRACTOR, Subcontractors, Sub-subcontractors, and their workers may not use or possess any firearms or other weapons while on the job or on the OWNER's property. If the OWNER or the ENGINEER notifies the CONTRACTOR that any worker or representative of CONTRACTOR is incompetent, disorderly, abusive, or disobedient, has knowingly or repeatedly violated any safety regulations, has possessed any firearms or weapons in violation of applicable provisions of Texas law, or has possessed or been under the influence of alcohol or drugs on the job, the CONTRACTOR shall immediately remove such worker or representative, including an officer or owner of CONTRACTOR, from performing any of the Work, and may not employ such worker or representative again to perform any of the Work without the OWNER's prior written consent. The CONTRACTOR shall at all times maintain good discipline and order on or off the Project Site in all matters pertaining to the Project. The CONTRACTOR shall pay workers no less than the wage rates established in Section 00 73 00, and maintain weekly payroll reports as evidence thereof, in accordance with the requirements of Chapter 2258 of the Texas Government Code.

6.2.2 The CONTRACTOR shall comply with the following restrictions on times during which the Work may be performed:

- .1** Working Day Contract: All Work shall be done between 7:00 a.m. and 6:00 p.m. unless the ENGINEER authorizes night work. However, emergency work may be done without prior permission as indicated in 6.11.5. If night work is authorized and conditions under the CONTRACTOR's control will permit Work for a continuous period of not less than seven hours between 12:00 a.m. and 11:59 p.m., it shall be considered a Working Day. Authorization for night work may be revoked at any time by the OWNER if the CONTRACTOR fails to maintain adequate equipment and supervision for the prosecution and control of the night work.
- .2** Calendar Day Contract: All Work shall be done between 7:00 a.m. and 6:00 p.m. unless the ENGINEER authorizes night work. However, emergency work may be done without prior permission as indicated in 6.11.5. Authorization for night work may be revoked at any time by the ENGINEER if the CONTRACTOR fails to maintain adequate equipment and supervision for the prosecution and control of the night work.

6.2.3 Unless otherwise specified in Division 1 of the Specifications, the CONTRACTOR shall provide and pay for all 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 furnishing, performance, testing, start-up and completion of the Work.

6.2.4 All materials and equipment incorporated into the Work shall be of good quality and new (including new products made of recycled materials, pursuant to Section 361.426 of the Texas Health & Safety Code), except as otherwise provided in the Contract Documents. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (reports of required tests, manufacturer's certificates of compliance with material requirements, mill reports, etc.) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

6.2.5 Substitutes and "Approved Equal" Items:

- .1** Whenever an item of material or equipment is specified or described in the Contract Documents by using the proprietary name of an item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains words to the effect that no like, equivalent, substitute or "approved equal" item is permitted, the CONTRACTOR may submit other items of material or equipment of other Suppliers, at the CONTRACTOR's sole risk, including disruptions to the Critical Path of the Progress Schedule, for approval to the ENGINEER through the ENGINEER under the following circumstances:

 - .1.1** "Approved Equal": If in the ENGINEER's sole discretion an item of material or equipment proposed by the 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 the ENGINEER as an "approved equal" item, in which case review of the proposed item may, in the ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for evaluation of proposed substitute items. The CONTRACTOR shall provide the ENGINEER with the documentation requested by the ENGINEER to make its determination.
 - .1.2** Substitute Items: If in the ENGINEER's sole discretion an item of material or equipment proposed by the CONTRACTOR does not qualify as an "approved equal" item under 6.2.5.1.1, it will be considered a proposed substitute item. The CONTRACTOR shall submit sufficient information as provided in Division 1, Section 01 25 00 of the Specifications to allow the ENGINEER to determine whether the item of material or equipment proposed is essentially equivalent to the specified item or material.
- .2** Substitute Construction Methods and Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the Contract Documents, the CONTRACTOR may, at the CONTRACTOR's sole risk, including disruptions to the Critical Path of the Progress Schedule, with prior approval of the ENGINEER, furnish or utilize a substitute means, method, technique, sequence, or procedure of construction. The CONTRACTOR shall submit sufficient information to the ENGINEER to allow the ENGINEER, in the ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by the ENGINEER will be same as that provided for substitute items in Division 1 of the Specifications.
- 3.** ENGINEER's Evaluation: The ENGINEER shall be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to 6.2.5.1.1 and 6.2.5.1.2. The ENGINEER shall be the sole judge of acceptability. No "approved equal" or substitute shall be ordered, installed, or utilized until the ENGINEER's review is complete, which will be evidenced by either a Change Order or completion of the Shop Drawing review procedure. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR's expense a special performance guarantee or other surety bond with respect to any "approved equal" or substitute or for any other delay or disruption to the Critical Path of the Project Schedule attributable to any such

substitution. The OWNER shall not be responsible for any delay due to review time for any "approved equal" or substitute.

- .4 CONTRACTOR's Expense: All data and documentation to be provided by the CONTRACTOR in support of any proposed "approved equal" or substitute item, method or procedure shall be at the CONTRACTOR's expense.
- .5 The approval of the ENGINEER will not relieve the CONTRACTOR from primary responsibility and liability for the suitability and performance of any proposed substitute item, method or procedure and will not relieve the CONTRACTOR from its primary responsibility and liability for curing Defective Work and performing warranty work, which the CONTRACTOR shall cure and perform, regardless of any claim the CONTRACTOR may make against the ENGINEER or manufacturer.

6.2.6 The CONTRACTOR agrees to assign to the OWNER any rights it may have to bring antitrust suits against its Suppliers for overcharges on materials or equipment incorporated in the Project growing out of illegal price fixing agreements. The CONTRACTOR further agrees to cooperate fully with the OWNER should the OWNER prosecute a suit against any Supplier for illegal price fixing.

6.3 Progress Schedule: Unless otherwise provided in Division 1 of the Specifications, the CONTRACTOR shall adhere to the Baseline Schedule established in accordance with 2.6 as it may be adjusted from time to time as provided below:

6.3.1 The CONTRACTOR shall submit to the ENGINEER for review and approval on a monthly basis any proposed adjustments in the Progress Schedule that will not change the Contract Time or Milestones. Any such proposed adjustments must be substantiated with documentation of any changes to the underlying logic of the Progress Schedule. The CONTRACTOR's Progress Schedule must show how the CONTRACTOR will consistently advance the progress of the Work in accordance with the Critical Path of the Work and the Contract Time or Milestones. Such adjustments will conform generally to the Progress Schedule then in effect and additionally will comply with any provisions of Division 1 of the Specifications applicable thereto.

6.3.2 Proposed adjustments in the Progress Schedule that will change the Contract Time or Milestones shall be submitted in accordance with the requirements of Article 12. Any such proposed adjustments must be substantiated with documentation of any changes to the underlying logic of the Progress Schedule. Such adjustments may only be made by a Change Order in accordance with Article 12.

6.4 Concerning Subcontractors, Suppliers and Others:

6.4.1 Assignment: The CONTRACTOR shall retain direct control of and give direct attention to the fulfillment of this Contract. The CONTRACTOR shall not, by Power of Attorney or otherwise, assign this Contract without the prior written consent of the OWNER. In addition, the CONTRACTOR shall not subcontract the performance of the entire Work or the supervision and direction of the Work without the OWNER's prior written consent.

6.4.2 Award of Subcontracts for Portions of the Work: The CONTRACTOR shall not employ any Subcontractor or Supplier, whether initially or as a substitute, to which the OWNER has a reasonable objection. The OWNER shall communicate such an objection by Written Notice. If the OWNER, without good cause, requires a change of any Subcontractor or Supplier previously accepted by the OWNER, the Contract Amount shall be increased or

decreased by the difference in the cost occasioned by the change, and an appropriate Change Order shall be issued. The CONTRACTOR shall not substitute any Subcontractor, person or organization for a Subcontractor, person or organization that has been accepted by the OWNER unless the substitute has been accepted in writing by the OWNER. No acceptance by the OWNER of any Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of the OWNER to reject Defective Work.

- 6.4.3** The CONTRACTOR shall enter into written agreements with all Subcontractors and Suppliers which specifically bind the Subcontractors or Suppliers to the applicable terms and conditions of the Contract Documents for the benefit of the OWNER and the ENGINEER. The OWNER reserves the right to specify that certain requirements shall be adhered to by all Subcontractors and Sub-subcontractors as indicated in other portions of the Contract Documents and these requirements shall be made a part of the agreement between the CONTRACTOR and Subcontractor or Supplier. Subject to and in accordance with the above requirements, the CONTRACTOR shall provide and shall be deemed for all purposes to have provided in its contracts with major Subcontractors or Suppliers on the Project (those contracts of more than \$10,000) the following specific provision: Alternative Dispute Resolution (16.2 and 16.3), which shall be mandatory in the event of a subcontractor or supplier claim and a prerequisite for the submission of any derivative claim. The CONTRACTOR's standard subcontract form is subject to the OWNER's review and approval. The OWNER may request and the CONTRACTOR shall provide within five Working Days a copy of any subcontract requested by the OWNER.
- 6.4.4** The CONTRACTOR shall be fully responsible to the OWNER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with the CONTRACTOR just as the CONTRACTOR is responsible for the CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between the OWNER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of the OWNER or the ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.
- 6.4.5** The CONTRACTOR shall be solely responsible for efficiently scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with the CONTRACTOR in order to avoid any delays or inefficiencies in the prosecution of the Work. The CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the ENGINEER only through the CONTRACTOR.
- 6.4.6** The divisions and sections of the Specifications and the identifications of any Drawings shall not control the CONTRACTOR in dividing or delineating the Work to be performed by any specific trade.
- 6.4.7** The CONTRACTOR shall pay each Subcontractor and Supplier their appropriate share of payments made to the CONTRACTOR not later than ten Calendar Days of the CONTRACTOR's receipt of payment from the OWNER. Upon request from the OWNER, the CONTRACTOR has two Working Days to provide documentation verifying Payment

to Subcontractor(s). The CONTRACTOR is required to notify the Subcontractor(s) in writing of rejection of Application for Payment within two Working Days following notification by the OWNER. Failure of the CONTRACTOR to make payments to Subcontractors or for labor, materials or equipment in accordance to this Contract, may be cause to reject future Proposals or bids by the CONTRACTOR and may be cause to reject payment in accordance with 14.4.1.3.

6.4.8 To the extent allowed by Texas law, the OWNER shall be deemed to be a third party beneficiary to each subcontract and may, if the OWNER elects, following any termination of the CONTRACTOR, require that the Subcontractor(s) perform all or a portion of unperformed duties and obligations under its subcontract(s) for the benefit of the OWNER rather than the CONTRACTOR; however, if the OWNER requires any such performance by a Subcontractor for the OWNER's direct benefit, then the OWNER shall be bound and obligated to pay such Subcontractor the reasonable value for all Work performed by the Subcontractor to the date of the termination of the CONTRACTOR, less previous payments, and for all Work performed thereafter. In the event that the OWNER elects to invoke its right under this section, the OWNER will provide Written Notice of such election to the CONTRACTOR and the affected Subcontractor(s).

6.5 Patent Fees and Royalties:

6.5.1 The CONTRACTOR shall be responsible at all times for compliance with applicable patents or copyrights encompassing, in whole or in part, any design, device, material, or process utilized, directly or indirectly, in the performance of the Work or the formulation or presentation of its Proposal.

6.5.2 The CONTRACTOR shall pay all royalties and license fees and shall provide, prior to commencement of Work hereunder and at all times during the performance of same, for lawful use of any design, device, material or process covered by letters, patent or copyright by suitable legal agreement with the patentee, copyright holder, or their duly authorized representative whether or not a particular design, device, material, or process is specified by the OWNER.

6.5.3 The CONTRACTOR shall defend all suits or claims for infringement of any patent or copyright and shall save the OWNER and the ENGINEER harmless from any loss or liability, direct or indirect, arising with respect to the CONTRACTOR's process in the formulation of its Proposal or the performance of the Work or otherwise arising in connection therewith. The OWNER reserves the right to provide its own defense to any suit or claim of infringement of any patent or copyright, in which event the CONTRACTOR shall indemnify and save harmless the OWNER from all costs and expenses of such defense as well as satisfaction of all judgments entered against the OWNER.

6.5.4 The OWNER shall have the right to stop the Work and/or terminate this Contract at any time in the event the CONTRACTOR fails to disclose to the OWNER that the CONTRACTOR's work methodology includes the use of any infringing design, device, material or process.

6.6 Permits, Fees: The CONTRACTOR shall obtain and pay for all construction, driveway, electrical, mechanical, plumbing, inspection, right-of way, gas and all other permits, contributions, licenses and fees required in connection with the Work except those provided for in the Supplemental Conditions or Contract Documents.

6.7 Laws and Regulations:

- 6.7.1** The CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performing the Work, including arranging for and obtaining any required inspections, tests, approvals or certifications from any public body having jurisdiction over the Work or any part thereof. Except where otherwise expressly required by applicable Laws and Regulations, neither the OWNER nor the ENGINEER shall be responsible for monitoring the CONTRACTOR's compliance with any Laws and Regulations.
- 6.7.2** Maintaining or improving the quality of water, air and earth in connection with the Work shall be regarded as of prime importance. The CONTRACTOR shall plan and execute its operations in compliance with all applicable Federal, State and local Laws and Regulations concerning control and abatement of water pollution and prevention and control of air pollution.
- 6.7.3** If the CONTRACTOR performs any Work knowing or having reason to know that it is contrary to any Laws and Regulations, the CONTRACTOR shall bear all claims, costs, losses and damages arising therefrom; however, it shall not be the CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this does not relieve the CONTRACTOR of the CONTRACTOR's obligations under this Article or under Article 3.

6.8 Taxes:

- 6.8.1** The CONTRACTOR shall pay only those sales, consumer, use and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations of the State of Texas in the performance of this public works contract.
- 6.8.2** The OWNER is a political subdivision of the State of Texas and is thereby exempt from payment of state and local sales taxes under Chapter 151 of the Texas Tax Code.

6.9 Use of Premises:

- 6.9.1** The CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project Site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, right-of-way, permits and easements, and shall not unreasonably encumber any of these areas with construction equipment or other materials or equipment. The CONTRACTOR shall assume full responsibility for any damage to any such land or areas or any adjacent land or areas, or to the owners or occupants thereof, in connection with the performance of the Work. Should any claim be made by any such owner or occupant in connection with the performance of the Work, the CONTRACTOR shall promptly resolve the claim with such other party by negotiation, Alternative Dispute Resolution, or at law. The CONTRACTOR shall indemnify, defend and hold harmless OWNER, the ENGINEER, the ENGINEER's consultants and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages (including court costs and reasonable attorney's fees) arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against the OWNER, the ENGINEER or any other party indemnified hereunder to the extent caused by or based upon performance of the Work or failure to perform the Work.

- 6.9.2** During the progress of the Work and on a daily basis, the CONTRACTOR shall keep the Project Site free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, the CONTRACTOR shall remove all waste materials, rubbish and debris from and about the Project Site as well as all tools, appliances, construction equipment and machinery and surplus materials. The CONTRACTOR shall leave the Project Site clean and ready for occupancy by the OWNER at Substantial Completion of the Work. The CONTRACTOR shall, at a minimum, restore to original condition all property not designated for alteration by the Contract Documents. If the CONTRACTOR fails to clean up at the completion of the Work, the OWNER may do so and the cost thereof shall be charged against the CONTRACTOR.
- 6.9.3** The CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that may damage them.
- 6.10 Record Documents:** The CONTRACTOR shall maintain in a safe place at the Project Site, or other location acceptable to the OWNER, one record copy of all Drawings, Specifications, Addenda, Change Orders, Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to 9.5) in good order and annotated to show all changes made during construction. These record documents together with all final samples and all final Shop Drawings shall be available to the OWNER and the ENGINEER for reference during performance of the Work. Upon Substantial Completion of the Work, these record documents, samples and Shop Drawings shall be promptly delivered to the ENGINEER.
- 6.11 Safety and Protection:**
- 6.11.1** The CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Upon request, and prior to installation of measures, the CONTRACTOR shall submit a site security plan for approval by the OWNER. By reviewing the plan or making recommendations or comments, the OWNER will not assume liability nor shall the CONTRACTOR be relieved of liability for damage, injury or loss. The CONTRACTOR shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:
- .1** all persons on the Project 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 Project Site; and
 - .3** other property at the Project Site or adjacent thereto, including, but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.
- 6.11.2** The CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and of underground facilities, and 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. All damage, injury or loss to any property described in subsection 6.11.1.2 or 6.11.1.3 caused, directly or indirectly, in whole or in part, by the CONTRACTOR, Subcontractor, Supplier or any person or organization directly or indirectly employed by

any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the CONTRACTOR (except damage or loss to the extent attributable to the fault of the Drawings or Specifications or to the acts or omissions of the OWNER, or the ENGINEER, or the ENGINEER's consultants). The CONTRACTOR's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and the ENGINEER has issued a Written Notice to the OWNER and the CONTRACTOR in accordance with Article 14 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion). Without limitation, the CONTRACTOR shall comply with the following specific provisions:

- .1 It shall be the duty and responsibility of the CONTRACTOR and all of its Subcontractors to be familiar with and comply with 29 USC Section 651, et seq., the Occupational Safety and Health Act of 1970, as amended (“OSHA”) and to enforce and comply with all provisions of OSHA.
- .2 The CONTRACTOR and all of its subcontractors shall comply with all applicable requirements of Subpart P of Part 1926 of 29 C.F.R, OSHA Safety and Health Standards, Texas Health and Safety Code Section 756.023, as amended, and shall submit a unit price for the particular excavation safety systems to be utilized by the CONTRACTOR for all excavations which exceed a depth of five feet.
- .3 Before commencing any excavation which will exceed a depth of five feet, the CONTRACTOR shall provide the OWNER with detailed plans and specifications regarding the safety systems to be utilized that include a certification from a Texas licensed professional engineer indicating full compliance with the OSHA provisions cited above.

6.11.3 The CONTRACTOR shall designate by Written Notice a qualified and experienced safety representative (the “Safety Representative”) to be present at the Project Site whose duties and responsibilities shall include safety training, identifying and mitigating hazardous conditions and unsafe work practices, and developing, maintaining and supervising the implementation of safe work practices and safety programs as deemed necessary and appropriate for the Project. The Safety Representative may be the Superintendent or a specially designated person. The Safety Representative shall exercise due diligence in the execution of all Project-related safety duties. The Safety Representative shall report directly to a company executive of the CONTRACTOR, and not to the Superintendent. Upon request of the OWNER, the CONTRACTOR shall provide certifications or other acceptable documentation of the Safety Representative's qualifications. The following requirements shall apply:

- .1 The Safety Representative shall present certification of completion of the OSHA 30-hour Construction Industry Training Outreach Program described at: http://www.osha.gov/dte/outreach/construction_generalindustry/construction.html
- .2 The Safety Representative shall verify that all construction workers (defined as persons covered by a prevailing wage determination) on the Project Site, whether employed by the CONTRACTOR or subcontractors, have completed the OSHA 10-hour Construction Industry Training Outreach Program described at: http://www.osha.gov/dte/outreach/construction_generalindustry/construction.html. The Safety Representative must receive a certificate of training completion before allowing a worker on the Project Site and shall have all such certificates available for inspection by the OWNER.

- .3** The Safety Representative shall ensure that workers, including designated competent persons, have completed all applicable OSHA specific or other training needed to perform their job assignments. Training topics applicable to the scope of the current Project may include, but are not limited to, scaffolds, fall protection, cranes, excavations, electrical safety, tools, concrete and masonry construction, steel erection, operation of motor vehicles and mechanized equipment.
 - .4** The Safety Representative shall post notice on the Project Site stating that all workers shall have completed OSHA Construction Industry Training. The OWNER may require, and the Safety Representative should consider providing a means of readily identifying workers who have completed the required training to monitor compliance with these requirements.
 - .5** The Safety Representative shall ensure that all required OSHA and Workers Compensation notices to workers are posted in English and Spanish at one or more conspicuous locations on the Project Site.
- 6.11.4** Hazard Communication Program: The 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 Project Site in accordance with Laws and Regulations.
- 6.11.5** Emergencies:
- .1** In emergencies affecting the safety or protection of persons or the Work at the Project Site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the OWNER or the ENGINEER, is obligated to act reasonably to prevent potential damage, injury or loss, and to mitigate any damage or loss to the Work. The CONTRACTOR shall give the ENGINEER verbal notification as soon as reasonably practical and a prompt Written Notice if the CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the ENGINEER determines that a change in the Contract Documents is required because of the action taken by the CONTRACTOR in response to such an emergency, a Change Directive or Change Order will be issued to document the consequences of such action.
 - .2** The Superintendent or another authorized agent of the CONTRACTOR shall respond immediately to call-out at any time of any day or night when an emergency condition warrants the presence on the Project Site of a CONTRACTOR representative to protect the Work or adjacent property from damage, restriction or limitation, or to take any necessary action or measures to protect the Work and to provide for the safety of all persons, including members of the public. Should the CONTRACTOR fail to immediately respond and take action to alleviate an emergency condition, the OWNER may direct other forces to take action as necessary to alleviate the emergency condition, and the OWNER shall deduct the cost of such action from the funds due the CONTRACTOR under this Contract.
 - .3** In the event there is an accident involving injury to any person or damage to any property on or near the Work, the CONTRACTOR shall provide to the ENGINEER verbal notification within one hour and written notification within 24 hours of the event, and shall record the location of the event and the circumstances

surrounding the event through photographs, interviewing witnesses, obtaining medical reports, police accident reports and other documentation that describes the event. The CONTRACTOR shall provide a copy of all such documentation to the ENGINEER, for the OWNER's and the ENGINEER's records, within 48 hours of the event. The CONTRACTOR shall cooperate with the OWNER on any investigation of any such event by the OWNER.

- 6.11.6** If the CONTRACTOR fails to carry out the Work in accordance with the Contract Documents so that a safety violation has occurred, the OWNER may order the CONTRACTOR to stop the Work or any portion thereof, until the cause for the order has been corrected. However, the right of the OWNER to stop the Work under this 6.11 shall not give rise to a duty on the part of the OWNER to supervise the CONTRACTOR's Work or to control the CONTRACTOR's means and methods or to exercise this right for the benefit of the CONTRACTOR or any other person or entity. All time lost due to a stop work order under this 6.11 shall be the CONTRACTOR's sole responsibility and shall be charged against the Contract Time, and the CONTRACTOR shall be responsible for any and all expenses incurred.
- 6.11.7** Confined Space Program: The CONTRACTOR acknowledges and agrees that the OWNER is temporarily transferring management and control of the Project Site to the CONTRACTOR for the purpose of constructing the Project. The CONTRACTOR's responsibilities to manage the Work includes the responsibility to manage the property for purposes of compliance with all Laws and Regulations for confined spaces in construction, including 29 CFR 1926 subpart AA. To the best of the OWNER's knowledge and belief, the OWNER has provided the following information in the Drawings and Specifications and other Contract Documents: (i) the location of each known permit space, (ii) the hazards or potential hazards in each space or the reason it is a permit space; and (iii) any precautions that the OWNER or any previous contractor has implemented for the protection of employees in the permit space. This transfer shall result in the CONTRACTOR being both the host employer and the controlling contractor for this portion of the Work.
- 6.12** **Continuing the Work:** The CONTRACTOR shall carry on the Work and adhere to the Progress Schedule during all disputes and disagreements with the OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the OWNER and the CONTRACTOR may otherwise agree in writing.
- 6.13** **CONTRACTOR's General Warranty and Guarantee:**
- 6.13.1** The CONTRACTOR warrants and guarantees to the OWNER that all Work shall conform to the Drawings and Specifications, shall be performed in a good and workmanlike manner in accordance with the Contract Documents, and shall not be Defective Work. This warranty shall survive the termination or expiration of the Contract. The CONTRACTOR's warranty and guarantee hereunder excludes defects or damage to the extent caused by:
- .1** abuse, modification or improper maintenance or operation by persons other than the CONTRACTOR, Subcontractors or Suppliers; or
 - .2** normal wear and tear within the limits of normal usage.
- 6.13.2** The CONTRACTOR's obligation to perform and complete the Work in conformity with the Drawings and Specifications and in a good and workmanlike manner 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 the CONTRACTOR's obligation to perform the Work in accordance with the CONTRACTOR's obligations:

- .1 inspections by the ENGINEER, OWNER, or Resident Project Representative;
- .2 a recommendation of any progress or final payment by the ENGINEER;
- .3 the issuance of a certificate of Substantial Completion or any payment by the OWNER to the CONTRACTOR under the Contract Documents;
- .4 any use or occupancy of the Project or a part thereof by the OWNER;
- .5 any acceptance of Work by the OWNER or ENGINEER or any failure to do so;
- .6 any review of a Shop Drawing or sample submittal;
- .7 any inspection, test or approval by others; or
- .8 any correction of Defective Work by the OWNER.

6.14 Indemnification:

6.14.1 The CONTRACTOR shall defend, indemnify and hold harmless the OWNER, the ENGINEER, and the ENGINEER's consultants and their respective officers, directors, partners, employees, and agents (the "Indemnified Parties") 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, mediation, arbitration or other dispute resolution costs) arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage:

- .1 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, and
- .2 Is caused in whole or in part by any negligent act or omission of the CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish 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 the Indemnified Parties hereunder or whether liability is imposed upon such Indemnified Parties by Laws and Regulations regardless of the negligence of any such person or entity.
- .3 In the event that indemnification of any of the Indemnified Parties is prohibited by law, the CONTRACTOR shall nonetheless be solely responsible for any liability arising out of or resulting from the performance of the Work, subject to the limitations set forth above, and shall indemnify and hold harmless the remaining Indemnified Parties, who may be legally indemnified, from such liability of the CONTRACTOR and the associated costs described above.

6.14.2 The indemnification obligation under 6.14.1 shall not be limited in any way by any limitation on the amount or type of damages, or compensation or benefits payable by or for the CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.14.3 The obligations of the CONTRACTOR under 6.14.1 shall not extend to the liability of the OWNER, the ENGINEER, the ENGINEER's consultants, and their officers, directors,

partners, employees or agents caused primarily by negligent preparation of maps, drawings, surveys, designs or specifications upon which is placed the applicable state-authorized design professional seal of an officer, director, partner, employee or agent of the OWNER, the ENGINEER or a consultant to the ENGINEER.

- 6.14.4** In the event the CONTRACTOR fails to follow the OWNER's directives concerning use of the Project Site, scheduling or course of construction, or engages in other conduct which proximately causes damage to property based on inverse condemnation or otherwise, then and in that event, the CONTRACTOR shall indemnify the OWNER against all costs resulting from claims related to the damage.
- 6.14.5** In the event the CONTRACTOR unreasonably delays progress of the work being done by others so as to cause loss for which the OWNER becomes liable, then the CONTRACTOR shall indemnify the OWNER from and reimburse the OWNER for such loss.
- 6.15** **Survival of Obligations:** 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, shall survive final payment, completion and acceptance of the Work and termination or completion of the Contract.
- 6.16** **Losses from Natural Causes:** Unless otherwise specified, all loss or damage to the CONTRACTOR arising out of the nature of the Work to be done or from action of the elements, floods or from unforeseeable circumstances in prosecution of the Work or from unusual obstructions or difficulties which may be encountered in prosecution of the Work, shall be sustained and borne by the CONTRACTOR at its own cost and expense.
- 6.17** **Notice of Claim:** Should the CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the OWNER or of any of the OWNER's officers or employees, the CONTRACTOR shall submit a written Claim to the OWNER within 30 Calendar Days of the event giving rise to the injury or damage. The provisions of this 6.17 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.
- 6.18** **LIQUIDATED DAMAGES:** THE CONTRACTOR AND ITS SURETY ON THE PERFORMANCE BOND SHALL BE LIABLE TO THE OWNER FOR LIQUIDATED DAMAGES IF THE CONTRACTOR FAILS TO ACHIEVE SUBSTANTIAL COMPLETION AND/OR FINAL COMPLETION OF THE PROJECT WITHIN THE APPLICABLE CONTRACT TIME.

ARTICLE 7 - OTHER WORK

- 7.1** **OWNER's Right; Coordination:** The OWNER may perform other work related to the Project at the Project Site by the OWNER's own forces, or through other contractors, or through utility owners. The CONTRACTOR and the OWNER shall use their best efforts to cooperate and coordinate the Work with persons performing other work related to the Project in order to avoid conflicts and delays in the Work. If the CONTRACTOR believes that delay or additional cost has been caused by any such other work, the CONTRACTOR may make a Claim as provided in Article 11 or Article 12.
- 7.2** **CONTRACTOR Obligations:** The CONTRACTOR shall afford other contractors performing work for the OWNER and each utility owner (and the OWNER, if the OWNER is performing work with the OWNER's own forces) proper and safe access to the Project Site and a reasonable

opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with such other work. Unless otherwise provided in the Contract Documents, the CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together and integrate properly with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and the persons or contractors whose work will be affected. The CONTRACTOR shall promptly remedy damage wrongfully caused by the CONTRACTOR to such other work or to property of the OWNER, another contractor, or a utility.

- 7.3 CONTRACTOR Inspection and Reports:** If the proper execution or result of any part of the CONTRACTOR's Work depends upon work performed by others under this Article 7, the CONTRACTOR shall inspect such other work and promptly give Written Notice to the ENGINEER of any delays, defects or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of the CONTRACTOR's Work. The CONTRACTOR's failure to report shall constitute an acceptance of such other work as fit and proper for integration with the CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in such other work.
- 7.4 Schedule Adjustments:** The OWNER shall provide for coordination of the work of others with the Work of the CONTRACTOR, and the CONTRACTOR shall cooperate with the others in their performance of work. The CONTRACTOR shall participate with other separate contractors and the ENGINEER in reviewing their construction Progress Schedules when directed to do so. On the basis of such review, the CONTRACTOR shall make any revisions to the construction Progress Schedule deemed necessary after a joint review and mutual agreement. The agreed upon construction Progress Schedules shall then constitute the Progress Schedules to be used by the CONTRACTOR, separate contractors and the OWNER until subsequently revised.
- 7.5 Responsibility for Costs:** Costs caused by delays or by improperly timed activities or Defective Work shall be borne by the party responsible therefor.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

- 8.1 Designation of ENGINEER as Owner's Representative:** The OWNER designates the ENGINEER to act as the Owner's Representative during construction. Except as otherwise provided in these General Conditions, the OWNER shall issue all communications to the CONTRACTOR through the ENGINEER.
- 8.2 OWNER Not to Supervise CONTRACTOR:** The OWNER shall not supervise, direct, control or have authority over or be responsible for the CONTRACTOR's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto.
- 8.3 Limitations on OWNER's Responsibility:** The OWNER is not responsible for the acts or omissions of the CONTRACTOR, or of any Subcontractor, any Supplier, or any other person or organization performing or furnishing any of the Work. The CONTRACTOR acknowledges and agrees that the OWNER's direction to perform Work in accordance with the approved Progress Schedule is not a demand for acceleration or a dictation of the CONTRACTOR's means or methods. The OWNER is not responsible for any failure of the CONTRACTOR to comply with Laws and Regulations applicable to furnishing or performing the Work. The OWNER is not responsible for any failure by the CONTRACTOR to perform or furnish the Work in accordance

with the Contract Documents. Failure or omission of the OWNER to discover, or object to or condemn any Defective Work shall not release the CONTRACTOR from the obligation to properly and fully perform the Work and comply with the Contract Documents.

- 8.4 OWNER Furnishing of Information:** Information or services under the OWNER's control shall be furnished by the OWNER with reasonable promptness to avoid delay in orderly progress of the Work. The OWNER shall have a reasonable amount of time to investigate site conditions, review submittals, analyze requests for changes, and make other decisions in the orderly administration of the Contract. The CONTRACTOR shall give Written Notice to the OWNER if the time for the OWNER's investigation, review, analysis of any submittals, or otherwise required for the OWNER's decision impacts in any way the Critical Path of the approved Progress Schedule.
- 8.5 Other OWNER Responsibilities:** The foregoing are in addition to other duties and responsibilities of the OWNER enumerated herein and especially those in respect to Article 4 (Availability of Lands; Subsurface and Physical Conditions; Reference Points), Article 7 (Other Work) and Article 14 (Payments to the CONTRACTOR and Completion).
- 8.6 Notice of Claim:** Should the OWNER suffer injury or damage to person or property because of any error, omission or act of the CONTRACTOR or of any of the CONTRACTOR's employees or agents or others for whose acts the CONTRACTOR is liable, the OWNER shall submit a written Claim to the CONTRACTOR within 30 Calendar Days of receipt of actual or constructive notice of the event giving rise to such injury or damage. The provisions of this 8.6 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.1 ENGINEER's Authority and Responsibilities:

- 9.1.1** The duties and responsibilities and the limitations of authority of the ENGINEER are as set forth in this Article and otherwise in the Contract Documents, and these may not be modified without written consent of the OWNER and the ENGINEER. The ENGINEER's duties and responsibilities as assigned by the OWNER, or any undertaking, exercise or performance thereof by the ENGINEER, are intended to be for the sole and exclusive benefit of the OWNER and not for the benefit of the CONTRACTOR or any Subcontractor, Supplier, or any other person or organization, or for any Surety or an employee or agent of any of them.
- 9.1.2** The ENGINEER shall not have control or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, for the acts or omissions of the CONTRACTOR, Subcontractors or any other persons performing any of the Work, or for the failure of any of them to carry out the Work in accordance with the Contract Documents, unless the acts or omissions are due to the negligence of the ENGINEER or are acts or omissions under the ENGINEER's control. The ENGINEER shall exercise its authority on behalf of the OWNER so that all Work performed by the CONTRACTOR results in the Project being completed in accordance with the Contract Documents. If the ENGINEER becomes aware of the CONTRACTOR's utilization of means, methods, techniques, sequences and/or procedures of construction which, in the ENGINEER's opinion, will not result in completion of the Project in accordance with the Contract Documents or which are unsafe, the ENGINEER shall immediately inform the OWNER

and shall take all necessary action which the ENGINEER is authorized to take under the Contract Documents to correct the matter.

- 9.1.3** The ENGINEER shall review the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by Article 14, but only 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.
- 9.1.4** The limitations upon authority and responsibility set forth in this 9.1 shall also apply to the ENGINEER's consultants, Resident Project Representative and assistants.
- 9.2** **ENGINEER as Owner's Representative:** The ENGINEER shall serve as the OWNER's representative as stated in 8.1. The ENGINEER shall administer its construction phase services as set forth in the Contract Documents. The ENGINEER shall not pursue a course of conduct that might jeopardize any of the OWNER's rights under the Contract Documents.
- 9.3** **Inspections:** The ENGINEER shall make professional on-site inspections of the Work often enough to ensure familiarity with the progress and quality of the Work, to determine if the Work is proceeding in acceptable conformance with the Contract Documents. On the basis of these inspections, the ENGINEER shall keep the OWNER informed of the progress and quality of the Work. The ENGINEER shall also perform visits to the Project Site at the specific request of the OWNER by the next Working Day after a request is made.
- 9.4** **Resident Project Representative:** If the OWNER and the ENGINEER agree, the ENGINEER shall furnish a Resident Project Representative to assist the ENGINEER in providing more continuous observation and inspections of the Work. The responsibilities and authority and limitations of any such Resident Project Representative and assistants shall be as provided in 9.1 and in the Supplemental General Conditions. The OWNER may designate another representative or agent to represent the OWNER at the Project Site who is not the ENGINEER, the ENGINEER's consultant, agent or employee.
- 9.5** **Clarifications and Interpretations:** The ENGINEER may determine that written clarifications or interpretations of the requirements of the Contract Documents (in the form of drawings or otherwise) are necessary. Such written clarifications or interpretations shall be consistent with the intent of and reasonably inferable from the Contract Documents, shall be issued with reasonable promptness by the ENGINEER and shall be binding on the OWNER and the CONTRACTOR. If the OWNER or the CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Amount or the Contract Time, the OWNER or the CONTRACTOR may make a Claim therefor as provided in Article 11 or Article 12.
- 9.6** **Rejecting Defective Work:** The ENGINEER shall have authority to reject Defective Work or Work that does not conform to the Construction Contract Documents. Whenever it is necessary or advisable in the ENGINEER's opinion for the proper implementation of the intent of the Contract Documents, and with the approval of the OWNER, the ENGINEER shall have authority to require special inspection or testing of the Work, whether or not the Work is then fabricated, installed or completed. The ENGINEER shall inspect and review the Work and results of all special inspections and testing in accordance with the Contract Documents.
- 9.7** **Shop Drawings:** Refer to Division 1, Section 01 33 00 of the Specifications for the ENGINEER's authority concerning Shop Drawings.

ARTICLE 10 - CHANGES IN THE WORK

10.1 Changes in General:

- 10.1.1** Without invalidating the Contract and without notice to any Surety, the OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work. Such changes in the Work shall be authorized by Change Order, Change Directive or Field Order. In the event that the OWNER and the CONTRACTOR are unable to negotiate the terms of a Change Order for the performance of additional Work, the OWNER may, at its election, perform such additional Work with its own forces or with another contractor and such work will be considered "other work" in accordance with Article 7.
- 10.1.2** The CONTRACTOR shall proceed promptly to carry out any changes in the Work under applicable provisions of the Contract Documents, unless otherwise provided in the Change Order, Change Directive or Field Order. If, based on a change in the Work, the CONTRACTOR wishes to propose a change in the Contract Amount and/or Contract Time, the CONTRACTOR shall give Written Notice to the OWNER before beginning work to carry out the change. The ENGINEER shall review the notice, and may request additional supporting information or data from the CONTRACTOR, which the CONTRACTOR shall provide within seven Calendar Days, unless the ENGINEER grants an extension. The OWNER shall determine whether to pursue the change in Work within seven Calendar Days of receipt of the CONTRACTOR's information and data.
- 10.1.3** The CONTRACTOR shall not be entitled to an increase in the Contract Amount or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented under 3.3.1 and 3.3.2, except in the case of an emergency as provided in 6.11.5, or in the case of uncovering Work as provided in 13.4.
- 10.1.4** Except in the case of an emergency as provided in 6.11.5, a Change Order or Change Directive is required before the CONTRACTOR commences any activities associated with a change in the Work which, in the CONTRACTOR's opinion, will result in a change in the Contract Amount and/or Contract Time.
- 10.1.5** If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Amount or Contract Time) is required by the provisions of any Bond to be given to a Surety, the CONTRACTOR shall be responsible for giving the notice, and the amount of each applicable Bond shall be adjusted accordingly.

10.2 Change Orders:

- 10.2.1** The OWNER and the CONTRACTOR shall execute appropriate written Change Orders covering:
- .1** a change in the Work;
 - .2** the amount of the adjustment in the Contract Amount, if any; and
 - .3** the extent of the adjustment in the Contract Time, if any.
- 10.2.2** An executed Change Order shall represent the complete, equitable, and final amount of adjustment in the Contract Amount and/or Contract Time owed to the CONTRACTOR or

the OWNER as a result of the occurrence or event causing the change in the Work encompassed by the Change Order.

10.3 Change Directives:

- 10.3.1** Without invalidating the Contract, the OWNER may, in the absence of complete and prompt agreement on the terms of a Change Order, issue a Change Directive to order additions, deletions or other changes in the Work within the general scope of the Contract, the Contract Amount and Contract Time being adjusted as necessary. Where practicable, any items of Work that may be agreed upon prior to the performance of Work under this 10.3 shall be included in a separate Change Order. For example, the cost of the installation of additional asphalt may be agreed upon based on the unit prices in the Proposal.
- 10.3.2** If a Change Directive provides for an adjustment to the Contract Amount, the adjustment shall be based on the method provided in 11.5.
- 10.3.3** A Change Directive shall be effective immediately and shall be recorded later by preparation and execution of an appropriate Change Order.
- 10.3.4** Upon receipt of a Change Directive, the CONTRACTOR shall promptly proceed with the change in the Work involved, provided, prior to the commencement of any Work under this 10.3.4, the CONTRACTOR must submit its proposed Work plan, anticipated schedule, and a list of its work force and equipment proposed to be used in the Work for the OWNER's approval. Upon such approval, the CONTRACTOR must promptly commence and make continuous progress in the Work. The OWNER reserves the right to withhold payment for low production or lack of progress.

10.4 Field Orders:

- 10.4.1** The ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Amount or the Contract Time and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These shall be accomplished by written Field Order and shall be binding on the OWNER and on the CONTRACTOR who shall perform the Work involved promptly.
- 10.4.2** If the CONTRACTOR believes that a Field Order would require an adjustment in the Contract Amount and/or Contract Time, the CONTRACTOR shall make a prompt written request to the ENGINEER for a Change Order. Any request by the CONTRACTOR for an adjustment in Contract Amount and/or Contract Time must be made by Written Notice prior to beginning the work covered by the Field Order.

- 10.5 No Damages for Delay:** The CONTRACTOR shall receive no extra compensation for delays or hindrances to the Work, except when direct and unavoidable extra cost to the CONTRACTOR is caused by failure of the OWNER to provide material or necessary instructions which the OWNER is required to furnish, if any, or access to the Work, and only to the extent that such failure continues after the CONTRACTOR delivers Written Notice of the failure and the extra cost consequences of the failure to the OWNER. When such extra compensation is claimed, the CONTRACTOR shall present a written statement thereof to the OWNER, and the OWNER shall approve the statement if the OWNER finds it to be correct. If delay is caused by specific orders given by the OWNER to stop work or by performance of extra Work or by failure of the OWNER to provide material or necessary instructions for carrying on the Work, then such delay will entitle the CONTRACTOR to an equivalent extension of time, the CONTRACTOR's application for which shall, however, be

subject to approval of the OWNER. No such extension of time shall release the CONTRACTOR or a Surety on its performance bond from all the CONTRACTOR's obligations hereunder which shall remain in full force until discharge of the Contract. In no event shall the CONTRACTOR be entitled to any compensation or recovery of any special damages in connection with any delays, including without limitation: consequential damages, lost opportunity costs, impact damages, or other similar damages. The OWNER's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling, or correction of the Work), regardless of the extent or frequency of the OWNER's exercise of such rights or remedies, shall not be construed as active interference in the CONTRACTOR's performance of the Work. Except as otherwise provided herein, an extension of the Contract Time, to the extent permitted under Article 12, shall be the sole remedy of the CONTRACTOR for any acknowledged delays.

ARTICLE 11 - CHANGE OF CONTRACT AMOUNT

- 11.1 Contract Amount as Total Amount Payable:** The Contract Amount is stated in the Contract and, including authorized adjustments, is the total amount payable by the OWNER to the CONTRACTOR for performance of the Work under the Contract Documents.
- 11.2 Limits on Change in Contract Amount:** The original Contract Amount may not be increased by more than 25% by the aggregate of all Change Orders, except to the extent one or more Change Orders result i) from unanticipated conditions encountered during construction or renovation, ii) from changes in regulatory criteria, or iii) to facilitate project coordination with another political entity. The original Contract Amount may not be decreased more than 25% without the consent of the CONTRACTOR to such decrease, except in the event of a termination for convenience under 15.2 or the failure of the OWNER to appropriate sufficient funding for the Project, in which events it is agreed that the consent of the CONTRACTOR will not be required.
- 11.3 Changes by Change Order:** The Contract Amount shall only be changed by a Change Order. Any claim for an adjustment in the Contract Amount shall be made by Written Notice delivered by the party making the Claim to the other party promptly (but in no event later than 30 Calendar Days after the start of the occurrence or event giving rise to the Claim) and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered within 30 Calendar Days after the Written Notice of Claim is delivered by the claimant, and shall represent that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of the occurrence or event. If the OWNER and the CONTRACTOR cannot otherwise agree, all Claims for adjustment in the Contract Amount shall be determined as set out in Article 16.
- 11.4 Determination of Value of Work:**
- 11.4.1** The value of any Work covered by a Change Order for an adjustment in the Contract Amount shall be determined by one or more of the following methods:
- .1** By application of unit prices contained in the Contract Documents to the quantities of the items involved.
 - .2** By a mutually agreed lump sum properly itemized and supported by sufficient substantiating data, including documentation by subcontractors performing the work, to permit evaluation.
 - .3** By cost of Work plus the CONTRACTOR's fee for all overhead costs and profit (determined as provided in 11.5).

No cost will be included in a change order for time spent preparing the change order, nor will costs be included for an estimate of time to negotiate the change order costs for machinery, tools, or equipment as described in 11.5.3.

11.4.2 Before using the method described in 11.4.1.3, the OWNER and the CONTRACTOR agree to negotiate a Change Order using the methods identified in 11.4.1.1 and 11.4.1.2, as appropriate, to determine the adjustment in the Contract Amount.

11.5 Cost of Work: If neither of the methods defined in 11.4.1.1 and 11.4.1.2 can be agreed upon before a change in the Work is commenced which will result in an adjustment in the Contract Amount, then the change in the Work will be performed by Change Directive, using the Force Account method, and payment will be made as follows:

11.5.1 For all personnel, the CONTRACTOR will receive actual field cost wage rates for each hour that the personnel are actually engaged in such Work, as substantiated by its certified payroll, to which will be added an amount equal to 25% of the sum thereof as compensation for the CONTRACTOR's and any affected Subcontractor's total overhead and profit. No separate charge will be made by the CONTRACTOR or any Subcontractor for organization or overhead expenses. In no case will the rate of wage be less than the minimum shown in the Contract for a particular category. The CONTRACTOR will also receive an amount equal to 55% of the wages paid personnel, excluding the 25% compensation provided above, for the CONTRACTOR's and any affected Subcontractor's cost of premiums on public liability insurance, workers' compensation insurance, social security and unemployment insurance. The actual cost of the CONTRACTOR's bond(s) on the extra Work shall be paid based on invoices from the Surety. No charge for superintendence shall be made unless considered necessary and approved by the OWNER.

11.5.2 The CONTRACTOR shall receive the actual cost, including freight charges, of the materials used and installed on such Work, to which costs shall be added a sum equal to 25% thereof as compensation for the CONTRACTOR's and any affected Subcontractor's total overhead and profit. In case material invoices indicate a discount may be taken, the actual cost shall be the invoice price minus the discount.

11.5.3 For machinery, trucks, power tools, or other similar equipment (the "Equipment") agreed to be necessary by the OWNER and the CONTRACTOR, the OWNER will allow the CONTRACTOR the Regional and Model Year adjusted Monthly Ownership Cost divided by 176 plus the Hourly Estimated Operating Costs as given in the latest edition of the "Rental Rate Blue Book" as published by EquipmentWatch (1-800-6693282) for each hour that the Equipment is in use on such Work. The established equipment rates will be paid for each hour that the Equipment is utilized in the Work. In the event that the Equipment is used intermittently during the Work, full payment for an eight-hour day will be made if the Equipment is not idle more than four hours of the day. If the Equipment is idle more than four hours in a day, then payment will be made only for the actual hours worked. No additional compensation will be allowed on the Equipment for the CONTRACTOR's or any affected Subcontractor's overhead and profit. The OWNER may accept an actual rental invoice in lieu of the method of calculation set forth in this 11.5.3 for Equipment rented exclusively for Force Account Work or for Equipment not included in the Rental Rate Blue Book.

11.5.4 The compensation, as herein provided for, shall be received by the CONTRACTOR and any affected Subcontractor as payment in full for work done by Change Directive and will

include use of small tools, and total overhead expense and profit. The CONTRACTOR and the ENGINEER shall compare records of work done by Change Directive at the end of each day. Copies of these records will be made upon forms provided for this purpose by the OWNER and signed by both the ENGINEER and the CONTRACTOR, with one copy being retained by the OWNER and one by the CONTRACTOR. Refusal by the CONTRACTOR to sign these records within two Working Days of presentation does not invalidate the accuracy of the record.

11.6 Unit Price Work:

- 11.6.1** Where the Contract Documents provide that all or part of the Work is to be unit price Work, initially the Contract Amount shall be deemed to include for all unit price work an amount equal to the sum of the established unit price for each separately identified item of unit price work times the estimated quantity of each item as indicated in the Proposal. The estimated quantities of items of unit price work are not guaranteed and are solely for the purpose of comparison of Proposals and determining an initial Contract Amount. Determinations of the actual quantities and classifications of unit price work performed by the CONTRACTOR shall be made by the ENGINEER. The ENGINEER shall review with the CONTRACTOR the preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise).
- 11.6.2** When "plan quantity" is indicated for a Proposal item, the CONTRACTOR shall be paid the amount specified in the Contract Documents without any measurements.
- 11.6.3** Each unit price shall be deemed to include an amount considered by the CONTRACTOR to be adequate to cover the CONTRACTOR's overhead and profit for each separately identified item.
- 11.6.4** A Major Item is any individual Proposal item in the Proposal that has a total cost equal to or greater than 5% of the original Contract Amount or \$50,000, whichever is greater, computed on the basis of Proposal quantities and Contract unit prices.
- 11.6.5** The OWNER or the CONTRACTOR may make a Claim for an adjustment in the Contract Amount in accordance with this Article if:
- .1** the actual quantity of any Major Item should become as much as 20% more than or 20% less than that in the Proposal; or
 - .2** the CONTRACTOR presents documentation contesting accuracy of "plan quantity" and the ENGINEER verifies quantity and determines original value is in error by 5% or more; provided, however, in the event a Major Item is reduced by 20% or more of the amount in the Proposal, no additional Article 11 profit or overhead will be added, if, due to other additions in the Work, the net value of the Contract Amount is not reduced.

ARTICLE 12 - CONTRACT TIME

- 12.1 Compliance with Contract Time:** Time is of the essence of this Contract. The CONTRACTOR agrees to Substantially Complete and Finally Complete the Project within the applicable Contract Time. For each Calendar Day that Substantial Completion and/or Final Completion of the Project is delayed beyond the applicable Contract Time, as adjusted under Article 10 and this Article 12, the CONTRACTOR agrees that the OWNER may deduct from the CONTRACTOR's total

compensation the applicable amount set forth in the Supplemental Conditions as liquidated damages for loss of use of the completed Project, public inconvenience, and added expense for engineering services, contract administration, salaries and other related costs up to the date of Substantial Completion and/or Final Completion, or in the alternative, actual damages up to the date of Substantial Completion and/or Final Completion. The ENGINEER will be the sole judge as to whether the Project has been Substantially Completed and Finally Completed within the applicable Contract Time. The OWNER will determine whether to assess liquidated damages or actual damages against the CONTRACTOR.

12.2 Change of Contract Time - Working Day Contracts and Calendar Day Contracts:

12.2.1 The Contract Time (or Milestones) may only be changed by Change Order duly executed by both the CONTRACTOR and the OWNER. Any claim for an adjustment of the Contract Time (or Milestones) shall be made by Written Notice delivered by the party making the Claim to the other party promptly (but in no event later than 30 Calendar Days after the start of the occurrence or event giving rise to the delay) and stating the general nature of the delay. Notice of the extent of the delay with supporting data shall be delivered within 30 Calendar Days after Written Notice of Claim is delivered by the claimant, and shall represent that the adjustment claimed is the entire adjustment to which the claimant is entitled as a result of said occurrence or event. If the OWNER and the CONTRACTOR cannot otherwise agree, all Claims for adjustment in the Contract Time (or Milestones) shall be determined as set out in Article 16. No Claim for an adjustment in the Contract Time (or Milestones) will be valid if not submitted in accordance with the requirements of this 12.2.1.

12.2.2 When the CONTRACTOR is at fault and the OWNER stops the Work, so that corrections in the Work can be made by the CONTRACTOR, no extension in time will be allowed.

12.2.3 When the CONTRACTOR is prevented from Substantially Completing or Finally Completing any part of the Work within the applicable Contract Time (or Milestones) due to delay beyond the control of both the OWNER and the CONTRACTOR, the CONTRACTOR may by Written Notice request an extension of the Contract Time (or Milestones) in an amount equal to the time lost due to such delay. The OWNER will determine whether to approve the request. If the request is approved, the extension shall be the CONTRACTOR's sole and exclusive remedy for such delay. If performance by the CONTRACTOR or the OWNER is interrupted by any occurrence not occasioned by its own conduct, whether such occurrence be an act of god or the result of war, riot, civil commotion, sovereign conduct, or the conduct of a third party, then such performance shall be excused for a period of time necessary to remedy its effects, and a conference shall be held within three Working Days to establish a new Progress Schedule for the Project.

12.2.4 The OWNER will consider requests for Contract Time extensions and may grant the CONTRACTOR an extension because of:

- .1** Changes ordered in the Work which justify additional time;
- .2** Failure of materials or products being at the Project Site due to delays in transportation or failures of Suppliers, which are not the result of the CONTRACTOR's, Subcontractor's or Supplier's negligence. The request for an extension of time shall be supported by a citation of acts demonstrating that the delays are beyond the CONTRACTOR's control, including, but not limited to, the CONTRACTOR's efforts to overcome such delays documented as follows:

- Copy of purchase order for delayed item(s) indicating date ordered by the CONTRACTOR/ Subcontractor and date purchase order received by Supplier.
 - If item(s) require Shop Drawings or other submittal information in accordance with the Contract Documents, provide record of date submittal(s) forwarded to the ENGINEER, date submittal(s) returned to the CONTRACTOR, and date submittal(s) forwarded to Supplier.
 - Copy of document(s) from Supplier, on Supplier's letterhead, indicating date(s) item(s) would be ready for shipment and/or actual shipment date(s).
 - Copies of all correspondence between the CONTRACTOR / Subcontractor and Supplier indicating the CONTRACTOR / Subcontractor's efforts to expedite item(s).
 - If item(s) are being purchased by a Subcontractor, provide correspondence, meeting notes, etc., that reflect the CONTRACTOR's efforts with the Subcontractor to expedite delivery of the item(s);
- .3** Acts of the OWNER, the ENGINEER, utility owners or other contractors employed by the OWNER delay progress of Work through no fault of the CONTRACTOR. The CONTRACTOR shall only be entitled to an extension of time for delays that affect the Critical Path of the Work and that are not caused by the CONTRACTOR;
- .4** Strikes, lockouts, fires, losses from natural causes, or other unavoidable cause or causes beyond the CONTRACTOR's control; or
- .5** Unusually rainy or otherwise abnormal weather conditions for the Austin, Texas area.

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

13.1 Notice of Defects: Prompt notice of all Defective Work of which the OWNER or the ENGINEER has actual knowledge will be given to the CONTRACTOR. All Defective Work may be rejected, corrected or accepted as provided in this Article. The CONTRACTOR shall give the OWNER and the ENGINEER prompt notice of any Defective Work of which the CONTRACTOR has actual knowledge.

13.2 Access to Work: The OWNER, the ENGINEER, the ENGINEER's consultants, other representatives and personnel of the OWNER, independent testing laboratories and governmental agencies having jurisdiction shall have access to the Work at reasonable times for observing, inspecting and testing. The CONTRACTOR shall provide them proper and safe conditions for such access, and advise them of the CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

13.3 Tests and Inspections:

13.3.1 The CONTRACTOR shall give timely Written 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.

13.3.2 The OWNER shall employ and pay for services of an independent testing laboratory to perform all inspections, tests or approvals required by the Contract Documents except:

- .1 for inspections, tests or approvals covered by 13.3.3 and 13.3.4 below;
- .2 that costs incurred for tests or inspections conducted pursuant to 13.4.3 shall be paid as provided in 13.4.3;
- .3 for reinspecting or retesting Defective Work, including any associated costs incurred by the testing laboratory for cancelled tests or standby time; and
- .4 as otherwise specifically provided in the Contract Documents.

13.3.3 If any Laws and Regulations require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, the 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.

13.3.4 The CONTRACTOR shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for the OWNER's and ENGINEER's review of submittals covering materials, equipment, and mix designs to be incorporated in the Work.

13.3.5 All testing laboratories shall meet the requirements of ASTM E-329.

13.4 Uncovering Work:

13.4.1 If any Work (or the work of others) that is to be inspected, tested or approved is covered by the CONTRACTOR without written concurrence of the ENGINEER, or if any Work is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered and recovered at the CONTRACTOR's expense.

13.4.2 Uncovering Work as provided in paragraph 13.4.1 shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER timely Written Notice of the CONTRACTOR's intention to cover the same and the ENGINEER has not acted within five Working Days to such notice.

13.4.3 If the ENGINEER considers it necessary or advisable that covered Work be observed, inspected or tested, the CONTRACTOR shall uncover, expose or otherwise make available for observation, inspection or testing that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is Defective Work, the CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from 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 the OWNER shall be entitled to an appropriate decrease in the Contract Amount, and may make a Claim therefor as provided in Article 11. If, however, such Work is not found to be Defective Work, the CONTRACTOR shall be allowed an increase in the Contract Amount or an extension of the Contract Time (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and the CONTRACTOR may make a Claim therefor as provided in Articles 11 and 12.

13.5 OWNER May Stop the Work:

13.5.1 If any of the Work is Defective Work, or the CONTRACTOR fails to supply sufficient skilled workers, suitable materials, and/or equipment; or fails to furnish or perform the Work in such a way that the Work in progress or the completed Work will conform to the

Contract Documents, the OWNER may order the CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been corrected; 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 or any Surety or other party.

13.5.2 If the CONTRACTOR fails to correct Defective Work or submit a satisfactory plan to take corrective action, with procedure and time schedule, the OWNER may order the CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been corrected, or may take any other action permitted by this Contract. A notice to stop the Work, based on Defective Work, shall not stop Calendar or Working Days charged to the Project.

13.6 Correction or Removal of Defective Work: If required by the OWNER, the CONTRACTOR shall promptly, as directed, either 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 Site and replace it with Work that is not Defective Work. The CONTRACTOR shall correct or remove and replace Defective Work, or submit a plan of action detailing how the Defective Work will be corrected, within the time frame identified in the notice of Defective Work. The CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.7 Warranty Period:

13.7.1 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by any Laws and Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents (e.g., 14.11.2), any Work, including Work performed after the Substantial Completion date, is found to be Defective Work, the CONTRACTOR shall promptly, without cost to the OWNER and in accordance with any written instructions provided by the OWNER:

- .1 correct the Defective Work, including removal of Defective Work from the Project Site and replacing it with Work that is not Defective Work; and
- .2 satisfactorily correct or remove and replace any damage to other Work or the work of others in connection with the corrective work.

The CONTRACTOR shall complete all corrective work within seven Calendar Days after receipt of Written Notice from the OWNER. If the CONTRACTOR cannot complete the corrections within seven Calendar Days, the CONTRACTOR shall provide a written explanation to the Owner's Representative describing the corrections needed and the time required to complete the corrections.

If the CONTRACTOR does not promptly initiate the corrections after receipt of a notice, or if the CONTRACTOR fails to either complete the corrections or provide a written explanation to the Owner's Representative describing the corrections needed and the time required to complete the corrections within seven Calendar Days, or in an emergency where delay would cause serious risk of loss or damage, the OWNER may have the Defective Work corrected or removed and replaced, and all claims, costs, losses and damages connected with the correction, removal and replacement (including but not limited to all costs of repair or replacement of work of others) shall be paid by the CONTRACTOR. The warranty period shall be deemed to be renewed and recommenced based on the date of completion of the corrective work.

- 13.7.2** In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the warranty period for that item may start to run from an earlier date if so provided in the Contract Documents.
- 13.7.3** If correction of Defective Work will affect the function or use of the Project, the CONTRACTOR shall not proceed with correction of Defective Work without prior coordination and approval of OWNER.
- 13.7.4** The obligations of the CONTRACTOR to perform warranty work shall survive the acceptance of the Work and any termination of the Contract.
- 13.8** **Acceptance of Defective Work:** If, instead of requiring correction or removal and replacement of Defective Work, the OWNER decides to accept it, the OWNER may do so. The CONTRACTOR shall pay all claims, costs, losses and damages attributable to the OWNER's evaluation of and determination to accept such Defective Work. If any such acceptance occurs prior to recommendation of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents and compensating the OWNER for the diminished value of the Defective Work. If the acceptance occurs after such recommendation, an appropriate amount shall be paid by the CONTRACTOR to the OWNER after a calculation by the OWNER of the diminished value of the Defective Work.
- 13.9** **OWNER May Correct Defective Work:** If the CONTRACTOR fails to correct Defective Work within a reasonable time after Written Notice of the OWNER, or fails to remove and replace rejected Work, or fails to perform the Work in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the OWNER may, after seven Calendar Days' Written Notice to the CONTRACTOR, correct and remedy any such deficiency. If, in the opinion of the ENGINEER, significant progress has not been made during this seven calendar day period to correct the Defective Work, the OWNER may exercise any actions necessary to remedy the Defective Work. In exercising the rights and remedies under this paragraph, the OWNER shall proceed expeditiously. In connection with such corrective and remedial action, the OWNER may exclude the CONTRACTOR from all or part of the Project Site, take possession of all or part of the Work, and suspend the CONTRACTOR's services related thereto, and incorporate in the Work all materials and equipment stored at the Project Site or for which the OWNER has paid the CONTRACTOR but which are stored elsewhere. The CONTRACTOR shall allow the OWNER, its agents and employees, the OWNER's other contractors, the ENGINEER and the ENGINEER's consultants access to the Project Site to enable the OWNER to exercise the rights and remedies under this 13.9. All claims, costs, losses and damages incurred or sustained by the OWNER in exercising such rights and remedies shall be charged against the CONTRACTOR and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the Work. Such claims, costs, losses and damages shall 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 the CONTRACTOR's Defective Work. The CONTRACTOR shall not be allowed an extension of the Contract Time (or Milestones), or claims of damage because of any delay in the performance of the Work attributable to the exercise by the OWNER of the OWNER's rights and remedies hereunder.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 Applications for Progress Payments:

- 14.1.1** No more often than once a month, the CONTRACTOR shall submit to the ENGINEER for review an application for payment, in a form acceptable to the OWNER, filled out and signed by the 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.
- 14.1.2** Such applications shall not include requests for payment on account of changes in the Work which have been properly authorized by Change Directives but not yet included in Change Orders.
- 14.1.3** Such applications shall not include requests for payment of amounts the CONTRACTOR does not intend to pay to a Subcontractor or Supplier because of a dispute or other reason.
- 14.1.4** If payment is requested on the basis of materials or equipment not incorporated in the Work but delivered and suitably stored at the Project Site, or at another location agreed to in writing, the application for payment shall be accompanied by such bills of sale, data and other procedures satisfactory to the OWNER substantiating the OWNER's title to such materials or equipment and otherwise protecting the OWNER's interest in the materials or equipment. Payment on account of such materials or equipment shall not include any amount for the CONTRACTOR's overhead or profit or relieve the CONTRACTOR of its obligation to protect and install such materials or equipment in accordance with the requirements of the Contract and to restore damaged Work or Defective Work. If materials or equipment are stored at another location, at the direction of the OWNER they shall be stored in a bonded and insured facility, accessible to the ENGINEER and the OWNER, and shall be clearly marked as property of the OWNER. Title to materials delivered to the Project Site or a staging area shall pass to the OWNER upon payment by the OWNER without the necessity for further documentation. Risk of loss shall not pass to the OWNER until the Work is accepted by the OWNER.
- 14.1.5** Where the original Contract Amount is less than \$400,000, the OWNER will pay the CONTRACTOR the total amount of each approved application for payment, less ten percent, which will be retained until final payment, and less all previous payments and less all other sums that the OWNER may retain under the terms of this Contract. Where the original Contract Amount is \$400,000 or more, the OWNER will pay the CONTRACTOR the total amount of each approved application for payment, less five percent, which will be retained until final payment, and less all previous payments and less all other sums that the OWNER may retain under the terms of this Contract. In either case, if the Work is near completion and delay occurs due to no fault or neglect of the CONTRACTOR, the OWNER may pay a portion of the retained amount to the CONTRACTOR. The CONTRACTOR, at the OWNER's option, may be relieved of the obligation to complete the Work and, thereupon, the CONTRACTOR shall receive payment of the balance due under the Contract subject to the conditions stated under 15.2. A Subcontractor may submit a written request to the CONTRACTOR and the Owner's Representative requesting release of retainage for work by the Subcontractor that has been completed and approved. The Owner's Representative will evaluate the request and if it is approved, the Owner's Representative will request the CONTRACTOR to include the request for release of an appropriate amount of retainage in the next application.
- 14.1.6** Applications for payment shall include the following documentation:

- .1 Updated Progress Schedule;
- .2 Monthly subcontractor report;
- .3 Any other documentation required under the Supplemental General Conditions.

14.2 CONTRACTOR's Warranty of Title: The 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 the OWNER free and clear of all Liens no later than the time of payment to the CONTRACTOR.

14.3 Review of Applications for Payment:

14.3.1 The ENGINEER will, within seven Calendar Days after receipt of each application for payment, either indicate a recommendation for payment and forward the Application for processing by the OWNER, or return the Application to the CONTRACTOR indicating the ENGINEER's reasons for refusing to recommend payment. In the latter case, the CONTRACTOR shall make the necessary corrections and resubmit the Application.

14.3.2 The ENGINEER's recommendation of any payment requested in an application for payment shall constitute a representation by the ENGINEER, based upon the ENGINEER's on-site inspections of the executed Work and on the ENGINEER's review of the application for payment and the accompanying data and schedules, that to the best of the ENGINEER's knowledge, information and belief:

- .1 the Work has progressed to the point indicated; and
- .2 the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for unit price Work, and to any other qualifications stated in the recommendation).

14.3.3 By recommending any such payment, the ENGINEER will not thereby be deemed to have represented that:

- .1 exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work;
- .2 examination has been made to ascertain how or for what purpose the CONTRACTOR has used money previously paid on account of the Contract Amount;
- .3 the CONTRACTOR's construction means, methods, techniques, sequences or procedures have been reviewed; or
- .4 that there may not be other matters or issues between the parties that might entitle the CONTRACTOR to be paid additionally by the OWNER or entitle the OWNER to withhold payment to the CONTRACTOR.

14.4 Decisions to Withhold Payment:

14.4.1 The OWNER may withhold or nullify the whole or part of any payment to such extent as may be necessary on account of:

- .1 Defective Work not remedied;

- .2 third party Claims filed or reasonable evidence indicating probable filing of such Claims;
 - .3 failure of the CONTRACTOR to make payments properly to Subcontractors for labor, materials or equipment;
 - .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Amount;
 - .5 damage to the OWNER or to another contractor;
 - .6 reasonable evidence that the Project will not be Substantially Completed or Finally Completed within the applicable Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay in completion;
 - .7 failure of the CONTRACTOR to submit a schedule of values in accordance with the Contract Documents;
 - .8 failure of the CONTRACTOR to submit a submittal schedule in accordance with the Contract Documents;
 - .9 failure of the CONTRACTOR to submit and update a construction Progress Schedule in accordance with the Contract Documents;
 - .10 failure of the CONTRACTOR to maintain a record of changes on drawings and documents;
 - .11 failure of the CONTRACTOR to maintain weekly payroll reports and, as applicable, provide copies of reports in a timely manner upon request of the OWNER;
 - .12 failure of the CONTRACTOR to submit monthly subcontractor reports;
 - .13 the CONTRACTOR's neglect or unsatisfactory prosecution of the Work, including failure to clean up in accordance with 6.9.2;
 - .14 failure of the CONTRACTOR to comply with the OWNER's Minority-Owned and Women-Owned Business policies; or
 - .15 failure of the CONTRACTOR to comply with any provision of the Contract Documents.
- 14.4.2** When the CONTRACTOR corrects an applicable reason for withholding payment, the CONTRACTOR shall submit an application for payment that includes the withheld amount. Payment will be made within 30 Calendar Days of the OWNER's receipt of an approved application for payment.
- 14.4.3** If the OWNER withholds an amount for any reason listed in 14.4.1, the CONTRACTOR shall notify all affected Subcontractors within two Working Days of notice that payment is being withheld. An affected Subcontractor may then resubmit a written request for partial payment to the CONTRACTOR and the ENGINEER. If directed by the ENGINEER, the CONTRACTOR shall within three Working Days submit to the ENGINEER an application for payment for the same period that includes only the work performed by the requesting Subcontractor(s) during this period. The ENGINEER will review this application for payment in accordance with 14.3.1. Upon receipt of payment, the

CONTRACTOR shall pay the Subcontractor within ten Calendar Days in accordance with 6.4.7.

14.5 Delayed Payments: Should the OWNER fail to make payment to the CONTRACTOR of the amount in any mutually acceptable application for payment within 30 Calendar Days after the day on which the OWNER receives the application, then the OWNER shall pay to the CONTRACTOR, in addition to amount due on the application, interest thereon at the rate specified in Government Code Section 2251.025(b) from the date due until fully paid, which shall fully liquidate any damage to the CONTRACTOR related to the delay in payment.

14.6 Arrears: No money shall be paid by the OWNER upon any claim, debt, demand or account whatsoever to any person, firm or corporation which is in arrears to the OWNER for any reason; and the OWNER shall be entitled to automatically offset against any such debt, claim, demand or account the amount so in arrears; and no assignment or transfer of such debt, claim, demand or account shall affect the right of the OWNER to so offset the amount in arrears, and associated penalties and interest, if applicable, against the same.

14.7 Substantial Completion:

14.7.1 When the CONTRACTOR considers that the Project, or a portion thereof which the OWNER agrees to accept separately, is Substantially Complete, the CONTRACTOR shall notify the ENGINEER and request a determination as to whether the Project or designated portion thereof is Substantially Complete. If a certificate of occupancy for the Project or portion thereof is required under any Laws and Regulations, the Project or portion thereof will not be considered Substantially Complete unless and until the certificate of occupancy is issued. If the ENGINEER does not consider the Work Substantially Complete, the ENGINEER will notify the CONTRACTOR giving reasons therefor. After performing any required Work, the CONTRACTOR shall then submit another request for the ENGINEER to determine Substantial Completion. If the ENGINEER considers the Work Substantially Complete, the ENGINEER will prepare and deliver a certificate of Substantial Completion which shall (i) establish the date of Substantial Completion, (ii) include a punch list of items to be completed or corrected before final payment, (iii) establish the time within which the CONTRACTOR shall finish the punch list, and (iv) establish responsibilities of the OWNER and the CONTRACTOR for security, maintenance, heat, utilities, risk of loss to the Work, warranty and insurance. Failure to include an item on the punch list does not alter the responsibility of the CONTRACTOR to complete all Work in accordance with the Contract Documents. The certificate of Substantial Completion shall be signed by the OWNER and the CONTRACTOR to evidence acceptance of the responsibilities assigned to them in the certificate.

.1 For water or wastewater line construction, Substantial Completion means that the Work, including all testing and disinfection, has been completed and accepted and the line placed into service. A certificate of Substantial Completion will not be issued. Work that remains after Substantial Completion could include the final surface course, adjustment of structures to final grade and revegetation. The Owner's Representative will issue a Written Notice specifying what portion of the Work is Substantially Complete for the purpose of payment and what Work remains to be done on the portion being accepted as Substantially Complete. This 14.7.1.1 changes the definition of Substantial Completion in 1.35 above.

.2 For roadway construction and/or reconstruction, Substantial Completion means that the Work, including the final surface course, all permanent traffic control devices (pavement markings, signs, etc.), substantial clean-up, and punchlist items have been completed, accepted, and placed into service, and any traffic signal or street lighting conduit that has been installed, lowered or relocated has been inspected for usability and approved by the Owner's Representative, and has been completed, accepted, and placed into service. A certificate of Substantial Completion will not be issued. Work that remains after Substantial Completion could include final clean up. The Owner's Representative will issue a Written Notice specifying what portion of the Work is Substantially Complete for the purpose of payment and what Work remains to be done on the portion being accepted as Substantially Complete. This 14.7.1.2 changes the definition of Substantial Completion in 1.35 above.

14.7.2 The OWNER shall have the right to exclude the CONTRACTOR from the Project Site after the date of Substantial Completion, but the OWNER will allow the CONTRACTOR reasonable access to complete or correct items on the punch list and complete warranty work.

14.8 Partial Utilization: Use by the OWNER, at the OWNER's option, of any Substantially Complete part of the Project which: (i) has specifically been identified in the Contract Documents, or (ii) the OWNER and the CONTRACTOR agree constitutes a separately functioning and usable part of the Project that can be used by the OWNER for its intended purpose without significant interference with the CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work in accordance with the following:

14.8.1 The OWNER at any time may request the CONTRACTOR to permit the OWNER to use any such part of the Project which the OWNER wishes to use upon Substantial Completion. If the CONTRACTOR agrees that such part of the Project is Substantially Complete, the CONTRACTOR shall certify to the ENGINEER that such part of the Project is Substantially Complete and request the ENGINEER to issue a notice specifying what portion of the Work is Substantially Complete for the purpose of payment and what Work remains to be done on the portion being accepted. The CONTRACTOR at any time may notify the ENGINEER that the CONTRACTOR considers any such part of the Project ready for its intended use and Substantially Complete and request the ENGINEER to issue a Written Notice specifying what portion of the Work is Substantially Complete for the purpose of payment and what Work remains to be done on the portion being accepted. The provisions of 14.7.1 and 14.7.2 will apply with respect to the notice specifying what portion of the Work is Substantially Complete for the purpose of payment and what Work remains to be done on the portion being accepted.

14.8.2 If the partial utilization is subject to authorization or approval by any public authorities having jurisdiction over the Project, the CONTRACTOR shall secure such authorization or approval before a certificate of Substantial Completion is issued for the applicable part of the Project.

14.9 Final Completion: Upon Written Notice from the CONTRACTOR that the entire Work or an agreed portion thereof is Finally Complete, the ENGINEER will make a final inspection with the CONTRACTOR and provide Written Notice of all particulars in which this inspection reveals that

the Work is incomplete or Defective Work. The CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such Defective Work.

14.10 Application for Final Payment: The CONTRACTOR may make application for final payment following the procedure for progress payments after the CONTRACTOR has completed all corrections in response to the final inspection to the satisfaction of the ENGINEER, and delivered the following documents:

14.10.1 Affidavit by the CONTRACTOR certifying the payment of all debts and claims without exception on the form provided in the Contract Documents;

14.10.2 Three complete operating and maintenance manuals, each containing maintenance and operating instructions, schedules, guarantees, and other documentation required by the Contract Documents;

14.10.3 Record documents (as provided in 6.10);

14.10.4 Consent of Surety, if any, to final payment; if there is no Surety, complete and legally effective releases or waivers (satisfactory to the OWNER) of all claims arising out of or filed in connection with the Work;

14.10.5 Certificate evidencing that insurance required by the Supplemental General Conditions will remain in force after final payment and through the warranty period;

14.10.6 Non-Use of Asbestos Affidavit (After Construction);

14.10.7 Subcontractor report and all other documentation necessary for evaluation of the CONTRACTOR's fulfillment of the Historically Underutilized Business goals in the Contract Documents;

14.10.8 Documentation of notice to claimants, to the extent applicable and subject to 14.11.4; and

14.10.9 Any other documentation called for in the Contract Documents.

14.11 Final Payment and Acceptance:

14.11.1 If, on the basis of inspection of the Work during construction, final inspection, and review of the application for final payment and accompanying documentation as required by the Contract Documents, the ENGINEER is satisfied that the Project has been Finally Completed, the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, liquidated damages, if any, assessed against the CONTRACTOR have been properly accounted for in the application, and there are no outstanding claims, the ENGINEER will approve and recommend the application for final payment and thereby notify the OWNER, who will pay to the CONTRACTOR the balance due the CONTRACTOR under the terms of the Contract.

14.11.2 If the sole remaining unfinished item to complete the Project is the reestablishment of vegetation, the CONTRACTOR may deliver a revegetation commitment letter with a letter of credit or other fiscal guarantee acceptable to the OWNER to ensure completion of this item, and the CONTRACTOR shall accomplish the revegetation within 120 Calendar Days of the date of Final Completion of the other Work. When the revegetation has been established, the OWNER will initiate an inspection for final acceptance of the revegetation. If the revegetation is not completed within the 120 Calendar Days, the OWNER, at its option, may complete the revegetation using funds drawn under the fiscal guarantee.

- 14.11.3** If the Contract measures the Contract Time to Final Completion, rather than Substantial Completion, the ENGINEER will issue a certificate of final acceptance to the CONTRACTOR which establishes the Final Completion date and initiates the one-year warranty period. If the sole remaining unfinished item to complete the Work is the reestablishment of vegetation and the CONTRACTOR has complied with 14.11.2 to ensure completion of this item, the ENGINEER will issue a certification of conditional acceptance to the CONTRACTOR which establishes the Final Completion date and initiates the one-year warranty period.
- 14.11.4** Final payment is considered to have taken place when the CONTRACTOR or any of its representatives negotiates the OWNER's final payment check, whether labeled final or not, for cash or deposits the check in any financial institution.
- 14.11.5** The OWNER shall withhold funds from final payment sufficient to cover the amount of an unresolved Subcontractor or Supplier claim if the claim is covered by Chapter 53, subchapter J of the Texas Property Code, and the Subcontractor or Supplier has given timely and adequate notice of the claim to the OWNER and the CONTRACTOR in accordance with Chapter 53, subchapter J of the Texas Property Code. The CONTRACTOR may secure release of the withheld funds if the CONTRACTOR delivers a bond to the OWNER in a form that complies with Chapter 53, subchapter J of the Texas Property Code to secure payment to the Subcontractor or Supplier. If the OWNER approves the bond, the OWNER shall send an exact copy of the bond to the Subcontractor or Supplier by certified or registered mail, return receipt requested. Thereafter, the validity and payment of the claim and associated costs will be determined among the Subcontractor or Supplier, the CONTRACTOR, and the surety on the bond in accordance with subchapter J of the Texas Property Code.
- 14.12 Waiver of Claims:** The making and acceptance of final payment will constitute:
- 14.12.1** a waiver of claims by the OWNER against the CONTRACTOR, except for claims (i) made by Written Notice that are unsettled as of the date final payment is issued, (ii) from Defective Work appearing after final inspection, (iii) from failure to comply with the Contract Documents or the terms of any warranty specified therein, or (iv) from the CONTRACTOR's continuing obligations under the Contract Documents; and
- 14.12.2** a waiver of all claims by the CONTRACTOR against the OWNER other than those previously made by Written Notice and still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

- 15.1 OWNER May Suspend Work Without Cause:** At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 Calendar Days by Written Notice to the CONTRACTOR which will fix the date on which the Work will be resumed. The CONTRACTOR shall resume the Work on the date so fixed. The CONTRACTOR shall be allowed an adjustment in the Contract Amount or an extension of the Contract Time, or both, directly attributable to any such suspension if the CONTRACTOR makes a Claim therefor that is approved as provided in Articles 11 and 12.
- 15.2 OWNER May Terminate Contract Without Cause:** Upon seven Calendar Days' Written Notice to the CONTRACTOR, OWNER may, without cause and without prejudice to any right or remedy

of OWNER, elect to terminate the Contract. In such case, the CONTRACTOR shall be paid (without duplication of any items):

- 15.2.1** for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination;
- 15.2.2** for reasonable demobilization costs;
- 15.2.3** for anticipated profits on completed and accepted Work not previously paid and not included in separate pay items calculated to date of termination but not for anticipated profit on the entire Contract not previously paid, unabsorbed overhead, or lost opportunity; and
- 15.2.4** for all claims incurred in settlement of terminated contracts with Subcontractors, Suppliers and others, including for anticipated profits on completed and accepted Work not previously paid and not included in separate pay items calculated to date of termination but not for anticipated profit on the entire Contract not previously paid, unabsorbed overhead, or lost opportunity. The CONTRACTOR shall negotiate in good faith with Subcontractors, Suppliers and others and take all reasonable actions to mitigate the amounts of all such claims.

15.3 OWNER May Terminate CONTRACTOR's Services with Cause:

- 15.3.1** The OWNER may, after giving the CONTRACTOR and the Surety, if any, seven Calendar Days' Written Notice, terminate the services of the CONTRACTOR upon the occurrence of any one or more of the following events:
 - .1** The CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents;
 - .2** The CONTRACTOR disregards any Laws and Regulations;
 - .3** The CONTRACTOR disregards the authority of the ENGINEER or the OWNER;
 - .4** The CONTRACTOR makes fraudulent statements;
 - .5** The CONTRACTOR fails to maintain a work force adequate to Substantially Complete or Finally Complete the Project within the applicable Contract Time;
 - .6** The CONTRACTOR fails to make adequate progress and endangers timely and successful Substantial Completion or Final Completion of the Project; or
 - .7** The CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents.

The OWNER, at its option, may proceed to negotiate with the Surety for completion of the Work. Alternatively, the OWNER may under these circumstances exclude the CONTRACTOR from the Project Site and take possession of the Work (without liability to the CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Project Site or for which the OWNER has paid the CONTRACTOR but which are stored elsewhere, and finish the Work as the OWNER may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Amount exceeds all claims, costs, losses and damages sustained by the OWNER arising out of or resulting from completing the Work, such excess will be paid to the CONTRACTOR. If such claims, costs, losses and damage exceed such unpaid balance, the CONTRACTOR or

Surety shall pay the difference to the OWNER within 30 days of the OWNER's delivery to the CONTRACTOR of a statement for the amount of the difference and showing the manner in which the difference was determined. In the event that a termination of the CONTRACTOR's services for cause is found to be wrongful, the termination shall be converted to a termination of the Contract without cause as set forth in 15.2, and the CONTRACTOR's remedy for the termination shall be limited to the recovery of the payments permitted for termination without cause as set forth in 15.2.

- 15.3.2** Where the CONTRACTOR's services have been so terminated by the OWNER, the termination will not affect any rights or remedies of the OWNER against the CONTRACTOR and Surety then existing or which may thereafter accrue. Any retention or payment of moneys due the CONTRACTOR by the OWNER will not release the CONTRACTOR from liability.
- 15.4 CONTRACTOR May Terminate or Stop Work:** If through no act or fault of the CONTRACTOR, the Work is suspended for a period of more than 90 Calendar Days by the OWNER or under an order of court or other public authority, or (except during disputes) the ENGINEER fails to forward for processing any mutually acceptable application for payment within 30 Calendar Days after it is submitted, or (except during disputes) the OWNER fails to pay the CONTRACTOR any sum determined by the ENGINEER to be due within 60 Calendar Days after approval, then the CONTRACTOR may either (i) give seven Calendar Days' Written Notice to the OWNER of the CONTRACTOR's intent to terminate the Contract; and if the OWNER does not remedy such suspension or failure within that time, the Contract will terminate and the CONTRACTOR shall recover from the OWNER payment on the same terms as provided in paragraph 15.2; or (ii) without prejudice to any other right or remedy, upon seven Calendar Days' Written Notice to the OWNER, stop the Work until payment of all such amounts due the CONTRACTOR, including interest thereon. The provisions of this paragraph 15.4 are not intended to preclude the CONTRACTOR from making a Claim under Articles 11 and 12 for an increase in Contract Amount or Contract Time or otherwise for expenses or damage directly attributable to the CONTRACTOR's stopping Work as permitted by this paragraph.
- 15.5 Discretionary Notice to Cure:** In its complete discretion, the OWNER may, but is not required to, provide a Notice to Cure to the CONTRACTOR and its Surety to cure an event of default described above and/or an anticipatory breach of contract and, if required by the OWNER, to attend a meeting with the OWNER regarding the Notice to Cure, the event of default, and/or the anticipatory breach of contract. The Notice to Cure will set forth the time limit in which the cure is to be completed or commenced and diligently prosecuted. Upon receipt of any Notice to Cure, the CONTRACTOR shall prepare a report describing its program and measures to effect the cure of the event of default and/or anticipatory breach of contract within the time required by the Notice to Cure. The CONTRACTOR's report must be delivered to the OWNER at least three Working Days prior to the date of any requested meeting with the OWNER and Surety.
- 15.6 Bankruptcy:** If the CONTRACTOR declares bankruptcy or is adjudged bankrupt or makes an assignment for the benefit of creditors or if a receiver is appointed for the benefit of creditors or if a receiver is appointed by reason of the CONTRACTOR's insolvency, the CONTRACTOR may be unable to perform this Contract in accordance with the Contract requirements. In such an event, the OWNER may demand the CONTRACTOR or its successor in interest provide the OWNER with adequate assurance of the CONTRACTOR'S future performance in accordance with the terms and conditions of the Contract. If the CONTRACTOR fails to provide adequate assurance of future performance to the OWNER's reasonable satisfaction within ten Calendar Days of such a request,

the OWNER may terminate the CONTRACTOR's services for cause or terminate the Contract without cause, as set forth above. If the CONTRACTOR fails to provide timely adequate assurance of its performance and actual performance, the OWNER may prosecute the Work with its own forces or with other contractors on a time and material or other appropriate basis and all costs of the Work will be charged to the CONTRACTOR.

- 15.7 Duty to Mitigate:** In the event of any termination or suspension under this Contract, the CONTRACTOR agrees to and shall take all reasonable actions to mitigate its damages and any and all claims which may be asserted against the OWNER.
- 15.8 Responsibility during Demobilization:** While demobilizing, the CONTRACTOR will take all necessary and reasonable actions to preserve and protect the Work, the Project Site and other property of the OWNER or others at or near the Project Site.

ARTICLE 16 - DISPUTE RESOLUTION

16.1 Filing of Claims:

16.1.1 Claims arising from the circumstances identified in 3.2, 4.1, 4.2.2, 4.2.4, 6.4.2, 6.11.5.2, 6.17, 7.5, 8.6, 9.5, 10.4.2, 13.4.3, 13.8, 13.9, 15.1, 15.2, 15.3, or 15.4, or other occurrences or events, shall be made by Written Notice delivered by the party making the Claim to the other party within 30 Calendar Days after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. The claimant shall deliver Written Notice of the amount of the Claim and/or any extension of the Contract Time with supporting data within 30 Calendar Days after the claimant delivers the Written Notice of the Claim. The Written Notice of the amount of the Claim and/or time extension shall include a statement that the Claim covers all known amounts and/or extensions of time to which the claimant is entitled.

16.1.2 Within 30 Calendar Days of receipt of Written Notice of the amount of the Claim and/or time extension, the OWNER, the ENGINEER and the CONTRACTOR shall meet to discuss the Claim, after which an offer of settlement or notification of no settlement offer will be given to the claimant. If the claimant is not satisfied with the proposal presented, the claimant shall have 30 Calendar Days in which to: (i) submit additional supporting data requested by the other party; (ii) modify the initial Claim; or (iii) request Alternative Dispute Resolution.

16.2 Alternative Dispute Resolution:

16.2.1 If a dispute exists concerning a Claim, the parties agree to use the following procedure prior to pursuing any other available remedies. The OWNER reserves the right to include the ENGINEER as a party.

16.2.2 Negotiating with Previously Uninvolved Personnel: Either party may make a written request for a meeting to be held between representatives of each party within 14 Calendar Days of the request or at a later date agreed to by the parties. Each party shall endeavor to include, at a minimum, one previously uninvolved senior level decision maker (an owner, officer, or employee of the party) empowered to negotiate on behalf of the party. If a previously uninvolved senior level decision maker is unavailable due to the size of the CONTRACTOR's organization or any other reason, the CONTRACTOR shall nonetheless provide an appropriate senior level decision maker for the meeting. The purpose of this

and any subsequent meetings will be good faith negotiations of the matters constituting the dispute. Negotiations shall be concluded within 30 Calendar Days of the first meeting, unless mutually agreed otherwise. This step may be waived by a written agreement signed by both parties, in which event the parties may proceed directly to mediation as described below.

16.2.3 Mediation:

- .1** If the negotiations under 16.2.2 are not successfully concluded within 30 Calendar Days of the first meeting, or 16.2.2 is waived by the parties, the parties shall select within 30 Calendar Days a mediator trained in mediation skills, to assist with resolution of the dispute. The OWNER and the CONTRACTOR agree to act in good faith in the selection of the mediator and to give consideration to qualified individuals nominated to act as mediator. A person trained in the subject matter of the dispute and/or contract interpretation are not disqualified from serving as the mediator. If the parties fail to agree on a mediator within 30 Calendar Days, the parties agree to ask the Central Texas Dispute Resolution Center to designate a qualified mediator, which shall be binding on the parties.
- .2** Mediation is a forum in which the mediator facilitates communication between parties to promote reconciliation, settlement, or understanding among them. The parties hereby agree that mediation, at a minimum, shall provide for (i) conducting an on-site investigation, if appropriate, by the mediator for fact gathering purposes, (ii) a meeting of all parties for the exchange of points of view and (iii) separate meetings between the mediator and each party to the dispute for the formulation of resolution alternatives. The parties agree to participate in mediation in good faith for up to 30 Calendar Days from the date of the first mediation session, unless mutually agreed otherwise. Should the parties fail to reach a resolution of the dispute through mediation, then each party is released to pursue other remedies available to them.

16.3 Resolution of Disputes between CONTRACTOR and Subcontractor or Supplier: If a dispute exists concerning a claim between a CONTRACTOR and a Subcontractor or Supplier, the CONTRACTOR agrees to participate with such Subcontractor and/or Supplier in a process substantially paralleling the steps set out in 16.1 and 16.2 above, including the delivery of Written Notices, submission of supporting data, negotiation with previously uninvolved personnel, and, if the negotiation process is unsuccessful, mediation between the parties to the claim. If the CONTRACTOR and Subcontractor or Supplier agreement provides an alternative dispute resolution process with substantially equivalent rights to those set forth herein, the agreement may be followed, unless the CONTRACTOR and affected Subcontractor or Supplier agree to follow the process outlined herein. The OWNER is not a party to an alternative dispute resolution process between the CONTRACTOR and Subcontractor or Supplier and will not pay any costs incurred in the process. Each party will be responsible for its own expenses incurred in the process, which will include an equal share of the mediation expenses, unless otherwise determined by the mediator. NOTICE: THE PROCESS SET FORTH HEREIN IS NOT A SUBSTITUTE FOR THE STATUTORY PAYMENT BOND CLAIM PROCESS.

16.4 Claim Calculation:

16.4.1 Delay Claims: The intent of paying for delay damages is to reimburse the CONTRACTOR for actual expense arising out of a compensable delay. No profit or Force Account

markups, other than labor burden, shall be allowed for delay claims by the CONTRACTOR. No consequential damages shall be allowed to the CONTRACTOR in connection with any claimed delays. If the CONTRACTOR requests compensation for delay damages and the delay is determined to be compensable, then standby equipment costs and project overhead compensation will be based on the duration of the compensable delay and the following:

- .1 Standby equipment costs shall not be allowed during periods when the equipment would have otherwise been idle. Standby equipment time shall not exceed more than eight hours per 24-hour day, 40 hours per week, and 176 hours per month. Standby equipment costs shall be paid at 50% of the applicable Rental Rate Blue Book rates and calculated by dividing the monthly rate by 176, multiplying the result by the number of standby hours, and multiplying that number by the regional adjustment factor and the rate adjustment factor contained in the Blue Book. Operating costs shall not be allowed.
- .2 Project overhead shall be determined from actual costs that the CONTRACTOR will be required to document. Project overhead is defined as the administrative and supervisory expenses incurred at the Project Site and shall not include home office overhead.

16.4.2 General: Except as limited with respect to delay claims, as set forth above, the criteria set forth in 11.4.1 may be used as a basis to calculate an adjustment in the Contract Amount in the resolution of a claim, provided that there shall be no compensation for home office overhead.

16.5 **Historically Underutilized Business (HUB) Program:** The CONTRACTOR shall make a good faith effort towards meeting the OWNER's participation goal for HUBs. This goal may be met either by the CONTRACTOR being a HUB, or by the CONTRACTOR subcontracting a portion of the Work to one or more qualified HUBs. The Supplemental General Conditions include the OWNER's participation goal for HUBs and a description of the methods the CONTRACTOR shall use to achieve this participation goal.

ARTICLE 17 – MISCELLANEOUS

17.1 **Venue:** IN THE EVENT OF ANY SUIT AT LAW OR IN EQUITY INVOLVING THE CONTRACT, VENUE SHALL BE EXCLUSIVELY IN HAYS COUNTY, TEXAS AND THE LAWS OF THE STATE OF TEXAS SHALL APPLY TO THE INTERPRETATION AND ENFORCEMENT OF THE CONTRACT.

17.2 **Extent of Contract:** This Contract represents the entire and integrated agreement between the OWNER and the CONTRACTOR with respect to the subject matter hereof and supersedes all prior negotiations, representations or agreements, either written or oral.

17.3 **Cumulative Remedies:** The rights and remedies available to the parties 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 and Regulations, by special warranty or guarantees or by other provisions of the Contract Documents. The provisions of this 17.3 shall 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. Specifically, the OWNER is not required to only assess liquidated damages, and the OWNER may elect to pursue its actual damages resulting from the

failure of the CONTRACTOR to complete the Project in accordance with the requirements of the Contract Documents.

- 17.4 Severability:** If any word, phrase, clause, sentence or provision of the Contract, or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, invalid or unenforceable, that finding shall only effect such word, phrase, clause, sentence or provision, and such finding shall not affect the remaining portions of this Contract; this being the intent of the parties in entering into the Contract; and all provisions of the Contract are declared to be severable for this purpose.
- 17.5 Independent Contractor:** The Contract shall not be construed as creating an employer/employee relationship, a partnership, or a joint venture. The CONTRACTOR is an independent contractor and the CONTRACTOR's services shall be those of an independent contractor. The CONTRACTOR agrees and understands that the Contract does not grant any rights or privileges established for employees of the OWNER.
- 17.6 Prohibition of Improper Benefits:** The OWNER may, by Written Notice to the CONTRACTOR, terminate the Contract without liability if it is determined by the OWNER that the CONTRACTOR or any agent or representative of the CONTRACTOR offered or gave a benefit to any officer or employee of the OWNER with a view toward securing the Contract or securing favorable treatment with respect to the awarding or amending or the making of any determinations with respect to the performing of the Contract. For this purpose, the term "benefit" has the meaning given to it in Section 36.01 of the Texas Penal Code. In the event the Contract is terminated by the OWNER under this 17.6, the OWNER shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by the CONTRACTOR in providing the benefit.
- 17.7 Prohibition Against Personal Interest in Contracts:** No officer, employee, or independent consultant of the OWNER who is involved in the planning, design or development of the Project, or the evaluation, or decision-making process for award of the Contract shall have a financial interest, direct or indirect, in this Contract. Any violation of this provision, with the knowledge, expressed or implied, of the CONTRACTOR shall render the Contract voidable by the OWNER.
- 17.8 OWNER's Right to Audit:**
- 17.8.1** The CONTRACTOR shall allow the OWNER's agent or authorized representative to inspect, audit, and/or reproduce, or all three, all records generated by or on behalf of the CONTRACTOR and each Subcontractor and Supplier, upon the OWNER's written request. Further, the CONTRACTOR shall allow the OWNER's agent or authorized representative to interview any of the CONTRACTOR's employees, all Subcontractors and all Suppliers, and all their respective employees.
- 17.8.2** In this 17.8.2, the term "records" includes all records generated by or on behalf of the CONTRACTOR and each Subcontractor and Supplier of the CONTRACTOR, whether paper, electronic, or other media, which are in any way related to performance of or compliance with this Contract, including, without limitation:
- .1** accounting records;
 - .2** written policies and procedures;
 - .3** subcontract files (including bids or proposals of successful and unsuccessful subcontractors, and recaps of all such bids or proposals, etc.);

- .4 original estimates and estimating work sheets;
- .5 correspondence;
- .6 Change Order files (including documentation covering negotiated settlements);
- .7 back charge logs and supporting documentation;
- .8 general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends;
- .9 lump sum agreements between the CONTRACTOR and any Subcontractor or Supplier;
- .10 records necessary to evaluate: Contract compliance, Change Order pricing, and any Claim submitted by the CONTRACTOR or any of its payees; and
- .11 any other CONTRACTOR record that may substantiate any charge related to this Contract.

17.8.3 The CONTRACTOR shall retain all of its records, and require all its Subcontractors and Suppliers to retain their respective records, during the term of this Contract and for three years after final payment, or until all audit and litigation matters that the OWNER has brought to the attention of the CONTRACTOR are resolved, or as otherwise required by law, whichever period is longer. The OWNER's right to inspect, audit, or reproduce records, or interview employees of the CONTRACTOR or its Subcontractors or Suppliers exists during the term of this Contract, and for three years after final payment, or until all audit and litigation matters that the OWNER has brought to the CONTRACTOR's attention are resolved, or as otherwise required by law, whichever period is longer, and at no cost to the OWNER, either from the CONTRACTOR or any of its Subcontractors or Suppliers that may furnish Records or make employees available for interviewing.

17.8.4 The CONTRACTOR shall provide sufficient and accessible facilities during its normal business hours for the OWNER to inspect, audit, or reproduce records, and to interview any person.

17.8.5 The CONTRACTOR shall insert these requirements in each written contract between the CONTRACTOR and any Subcontractor or Supplier and require each Subcontractor and Supplier to comply with these provisions.

17.9 Historically Underutilized Business (HUB) Program:

17.9.1 The CONTRACTOR shall make a good faith effort towards meeting the OWNER's participation goal for HUBs. HUBs include historically underutilized businesses, minority business enterprises, disadvantaged business enterprises, or small-medium businesses, as determined under applicable rules of the Texas Comptroller of Public Accounts. The participation goal may be met either by the CONTRACTOR being a HUB, or by the CONTRACTOR subcontracting a portion of the Work to one or more qualified HUBs. The CONTRACTOR included in its Proposal a proposed HUB Participation Plan describing the methods the CONTRACTOR would use to achieve this participation goal. The CONTRACTOR shall ensure that all elements of the HUB participation plan are carried out throughout the course of the Work, including in circumstances in which the CONTRACTOR changes a Subcontractor or uses a different Subcontractor than was identified in the CONTRACTOR's Proposal.

- 17.9.2** The ability or desire of CONTRACTOR to perform the Work with its own organization will not relieve the CONTRACTOR of the responsibility to make good faith efforts towards meeting the HUB participation goal.
- 17.10 Survival:** The terms and conditions of this Contract, which contemplate a period of time beyond completion or termination will survive such completion or termination and not be merged therein or otherwise terminated.
- 17.11 No Waiver:** The waiver of any provision of this Contract will not be deemed to be a waiver of any other provision of this Contract. No waiver of any provision of this Contract will be deemed to constitute a continuing waiver unless expressly provided in writing, nor will a waiver of any default be deemed a waiver of any subsequent defaults of the same type. The failure at any time to enforce this Contract, whether the default is known or not, shall not constitute a waiver or estoppel of the right to do so.
- 17.12 Conditions Precedent to Right to Sue:** Notwithstanding anything herein to the contrary, the CONTRACTOR shall comply with the contractual claim and alternative dispute resolution processes set forth herein, failing which the CONTRACTOR shall give 90 Calendar Days' Written Notice to the OWNER of any claim for damages, all as conditions precedent to filing any suit against the OWNER in connection with this Contract.
- 17.13 Waiver of Trial by Jury:** The OWNER and the CONTRACTOR agree that they have knowingly waived the right to trial by jury and have instead agreed that, in the event of any litigation arising out of or connected to this Contract, to proceed with a trial before the court, unless both parties subsequently agree otherwise in writing.
- 17.14 Waiver of Attorney's Fees:** The OWNER and the CONTRACTOR knowingly and intentionally waive any right to attorney's fees in any administrative proceeding, alternative dispute resolution proceeding, or litigation arising out of or connected to this Contract.

END OF SECTION

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Canyon Regional Water Authority Standard Contract Documents
SUPPLEMENTAL CONDITIONS

The Supplemental Conditions in this Section amend or supplement the Section 00 72 00 - General Conditions. These Supplemental Conditions supersede the General Conditions to the extent of any conflict.

ARTICLE 1 - DEFINITIONS

SC-1 Replace the following definitions in Article 1 to read as follows:

- 1.3 Calendar Day** – Any day of the week; no days being excepted. Work on Saturdays, Sundays, and/or Legal Holidays shall be coordinated in advance with the CMI, the ENGINEER and the OWNER.
- 1.13 Defective Work** – Any of the Work that, in the opinion of the CMI or the ENGINEER, is unsatisfactory, faulty or defective, does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, has been damaged prior to final payment, or does not conform to the Contract Documents.
- 1.17 Field Order** – A written order issued by the CMI which orders or authorizes minor changes in the Work and which does not involve a change in the Contract Amount or the Contract Time.
- 1.38 Superintendent** – The representative of the CONTRACTOR designed to be responsible for supervising and directing the Work as set forth in the Contract Documents, and to receive and fulfill instructions from the CMI or the ENGINEER. The term “Superintendent” shall apply under the Contract Documents regardless of the actual title given to the Superintendent by the CONTRACTOR.

SC-1.15 Add the following to the definition of “ENGINEER” in Article 1:

The OWNER designates the following as the ENGINEER for purposes of this Contract:

Name: **ZACHARY JONES, PE**
ARDURRA
Address: **1341 W. MOCKINGBIRD LN, SUITE 310W**
DALLAS, TX 75247

SC-1.45 Add the following to Article 1:

Construction Manager and Inspector (CMI) – A person or firm designated by the OWNER to be the Owner’s Representative during construction, to perform construction observation and construction administration tasks.

The OWNER may change the person designated as the CMI by written notice to the CONTRACTOR and the ENGINEER.

TWDB Supplemental Contract Conditions – All of the contract provisions contained in Section 00 73 00, Attachment B.

SC-1.46 Add the following at the end of Article 1:

Section 3.1 of the TWDB Supplemental Contract Conditions includes definitions of “Owner”, “TWDB”, and “Engineer”. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

ARTICLE 2 - PRELIMINARY MATTERS

SC-2.4 Before Starting Construction: Amend 2.4.2 and replace with the following (subparagraphs to remain, except as noted):

The CONTRACTOR shall comply with Section 7.1.1 of the TWDB Supplemental Contract Conditions pertaining to the CONTRACTOR’s preparation of a Progress Schedule. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

SC-2.4 Before Starting Construction: Delete 2.4.2 and replace with the following (subparagraphs to remain, except as noted):

2.4.2 It is mutually agreed between the CONTRACTOR and the OWNER that successful completion of the Work within the Contract Time is of primary importance. Therefore, the CONTRACTOR hereby agrees to submit to the CMI for review and approval, or acceptance, as appropriate, all information requested within this 2.4.2, including a Baseline Schedule, within 10 Working Days after the date the OWNER notifies the CONTRACTOR of approval of award of the Contract by the OWNER, unless the time for submittal is extended by written mutual agreement. The CMI shall schedule the preconstruction conference upon the timely submittal of the required documents. The CONTRACTOR shall submit the following:

SC-2.4.2.1 Amend the first sentence of Paragraph 2.4.2.1 to the following:

A proposed baseline schedule (the “Baseline Schedule”) developed using Microsoft Project or Primavera P6 software, unless otherwise approved by the ENGINEER, to confirm that all Work will be Substantially Completed and Finally Completed within the Contract Time.

SC-2.4.2.4 Delete 2.4.2.4 and replace with the following:

.4 The CONTRACTOR shall comply with Section 7.1.2 of the TWDB Supplemental Contract Conditions pertaining to the submission of a cost breakdown, to the extent that section conflicts with the provisions of this Contract. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of this conflict;

SC-2.4.2.14 Add the following paragraph:

.14 Schedule of Anticipated Applications for Payment

SC-2.8 Add Paragraph 2.8 and 2.9 as follows:

2.8 Electronic Documents Protocol: The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol (“EDP” or “Protocol”) for exchange of electronic transmittals.

2.8.1 Basic Requirements

- .1 To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.
- .2 The contents of the information in any Electronic Document will be the responsibility of the transmitting party.
- .3 Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.
- .4 Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.
- .5 When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.
- .6 Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 2.7 of the General Conditions.

2.8.2 System Infrastructure for Electronic Document Exchange

- .1 Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.
 - .1 Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.
- .2 Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its

System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.

- .3 Each party will operate and maintain industry-standard, industry-accepted, ISO-standard, commercial-grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.
- .4 In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.
- .5 Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.
- .6 If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.
- .7 The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.
- .8 The Owner will operate a Project information management system (also referred to in this EDP as "Project Website") for use of Owner, Engineer and Contractor during the Project for exchange and storage of Project-related communications and information. Except as otherwise provided in this EDP or the General Conditions, use of the Project Website by the parties as described in this Paragraph will be mandatory for exchange of Project documents, communications, submittals, and other Project-related information. The following conditions and standards will govern use of the Project Website:
 - .1 Describe the period of time during which the Project Website will be operated and be available for reliance by the parties;
 - .2 Provide any minimum system infrastructure, software licensing and security standards for access to and use of the Project Website;

- .3 Describe the types and extent of services to be provided at the Project Website (such as large file transfer, email, communication and document archives, etc.); and
- .4 Include any other Project Website attributes that may be pertinent to Contractor’s use of the facility and pricing of such use.

2.9 Software Requirements for Electronic Document Exchange; Limitations

2.9.1 Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.

- .1 Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.

2.9.2 The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.

2.9.3 Software and data formats for exchange of Electronic Documents will conform to the following requirements, including software versions, if listed:

Item	Electronic Documents	Transmittal Means	Data Format	Note (1)
1	General communications, transmittal covers, meeting notices and responses to general information requests for which there is no specific prescribed form.	Email	Email	
2	Meeting agendas, meeting minutes, RFI’s and responses to RFI’s, and Contract forms.	Email w/ Attachment	PDF	(2)
3	Contractors Submittals (Shop Drawings, “or equal” requests, substitution requests, documentation accompanying Sample submittals and other submittals) to Owner and Engineer, and Owner’s and Engineer’s responses to Contractor’s Submittals, Shop Drawings, correspondence, and Applications for Payment.	Email w/ Attachment	PDF	
4	Correspondence; milestone and final version Submittals of reports, layouts, Drawings, maps, calculations and spreadsheets, Specifications, Drawings and other Submittals from Contractor to Owner or Engineer and for responses from Engineer and Owner to Contractor regarding Submittals.	Email w/ Attachment or LFE	PDF	

Item	Electronic Documents	Transmittal Means	Data Format	Note (1)
5	Layouts and drawings to be submitted to Owner for future use and modification.	Email w/ Attachment or LFE	DWG	
6	Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.	Email w/ Attachment or LFE	DOC	
7	Spreadsheets and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	XLS	
8	Database files and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	MDB	
Notes				
(1)	All exchanges and uses of transmitted data are subject to the appropriate provisions of Contract Documents.			
(2)	Transmittal of written notices is governed by Paragraph 2.7 of the General Conditions.			
Key				
Email	Standard Email formats (.htm, .rtf, or .txt). Do not use stationery formatting or other features that impair legibility of content on screen or in printed copies			
LFE	Agreed upon Large File Exchange method (FTP, CD, DVD, hard drive)			
PDF	Portable Document Format readable by Adobe® Acrobat Reader Version 1.6 or later			
DWG	Autodesk® AutoCAD .dwg format Version 2020			
DOC	Microsoft® Word .docx format Version 1908			
XLS	Microsoft® Excel .xls or .xml format Version 1908			
MDB	Microsoft® Access .mdb format Version 1908			

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.1 Intent, Order of Precedence and Interpretation: Add at the end of 3.1.1 the following:

The OWNER and the CONTRACTOR agree that the TWDB Supplemental Contract Conditions apply to the Work eligible for Texas Water Development Board assistance to be performed under this Contract and these clauses supersede any conflicting provisions of this Contract to the extent of this conflict.

SC-3.6 Add 3.6 as follows:

3.6 Privity of Contract: Section 2.1 of the TWDB Supplemental Contract Conditions pertains to funding for this Project from the Texas Water Development Board. Neither the state of Texas, nor any of its departments, agencies or employees is, or will be, a party to this contract or any lower tier contract. This contract is subject to applicable provisions in 31 TAC Chapter 363 in effect on the date of the assistance award for this Project.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS;
REFERENCE POINTS

SC-4.2 Subsurface and Physical Conditions: Delete 4.2 and replace with the following:

4.2 Subsurface and Physical Conditions: Add the following at the end of the paragraph:

4.2.5 Underground Facilities: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph SC-4.2.7 and not in the drawings referred to in Paragraph SC-4.2.1.2. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

4.2.6 Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplemental Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents.

4.2.7 Limitations of Other Data and Documents: Except for such reliance on 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 the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
- .4 any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

4.2.8 Geotechnical Baseline Report

- .1 N/A.

4.2.9 Differing Subsurface or Physical Conditions

- .1 Notice: If Contractor believes that any subsurface condition that is uncovered or revealed at the Site:
 - .1 differs materially from conditions shown or indicated in the GBR; or
 - .2 differs materially from conditions shown or indicated in the GDR, to the extent the GBR is inapplicable; or
 - .3 differs materially from conditions shown or indicated in Contract Documents other than the GBR or GDR, to the extent the GBR and GDR are inapplicable; or
 - .4 to the extent the GBR and GDR are inapplicable, is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraphs 4.2.1 through 4.2.5 is materially inaccurate; or

- .5 to the extent the GBR and GDR are inapplicable, is of such a nature as to require a change in the Drawings or Specifications; or
 - .6 to the extent the GBR and GDR are inapplicable, 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 conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.11.5), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.
- .2 **Engineer's Review:** After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph SC-4.2.6.1 above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption or continuation of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
 - .3 **Owner's Statement to Contractor Regarding Site Condition:** After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption or continuation of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
 - .4 **Early Resumption of Work:** If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
 - .5 **Possible Price and Times Adjustments**
 - .1 Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - .1 such condition must fall within any one or more of the categories described in Paragraph SC-4.2.6.1;

- .2 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 Paragraph 11.6 of the General Conditions; and
 - .3 Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraph 12.2.
 - .2 Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - .1 Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise; or
 - .2 the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - .3 Contractor failed to give the written notice as required by Paragraph SC-4.2.6.1.
 - .3 If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment must be set forth in a Change Order.
 - .4 Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
 - .5 Underground Facilities; Hazardous Environmental Conditions: Paragraph SC-4.2.7 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 4.4 of the General Conditions governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs SC-4.2.1 through SC-4.2.5 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.
- 4.2.10 Notwithstanding any other provision of this Contract, the CONTRACTOR is solely responsible for the location and protection of any and all public utility lines and utility customer service lines in the Work area. "Public utility lines" means all utility distribution and supply/collection system facilities, and "utility customer service lines" means the lines connecting customers to public utility lines. The CONTRACTOR shall notify "One Call" in accordance with all applicable Laws and Regulations, and exercise due care to locate, mark, uncover and otherwise protect all public utility lines and utility customer service lines in the Work area and in any of the CONTRACTOR's work or storage areas. The CONTRACTOR's responsibility for the location and protection of all public utility lines and utility customer service lines is primary and non-delegable. The CONTRACTOR acknowledges that existing utility customer service line connections are generally not

shown on the Drawings and must be located by inquiry and careful investigation of the Project Site. The CONTRACTOR shall indemnify or reimburse the OWNER for all expenses and costs (including fines that may be levied against the OWNER) in connection with any unauthorized or accidental damage to any public utility lines or utility customer service lines. The OWNER reserves the right to repair any damage the CONTRACTOR causes to such facilities at the CONTRACTOR's expense. If a public utility line or utility customer service line is damaged by the CONTRACTOR or any Subcontractor, the CONTRACTOR shall give the ENGINEER verbal notice within one hour and Written Notice within twenty-four hours.

- 4.2.11** The CONTRACTOR shall comply with Section 13.1 of the TWDB Supplemental Contract Conditions pertaining to Archaeological Discoveries and Cultural Resources. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.
- 4.2.12** The CONTRACTOR shall comply with Section 14.1 of the TWDB Supplemental Contract Conditions pertaining to Endangered Species. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

SC-4.4 Hazardous Materials: Insert the following immediately after the title:

Note: The CONTRACTOR shall comply with Section 15.1 of the TWDB Supplemental Contract Conditions pertaining to Hazardous Materials, to the extent that section conflicts with the provisions of this Contract. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

ARTICLE 5 - BONDS AND INSURANCE

SC-5.3 Insurance: Add the following:

5.2 Worker's Compensation Insurance Coverage: Add the following:

5.2.12 The CONTRACTOR shall comply with Section 8.1 of the TWDB Supplemental Contract Conditions pertaining to Workers' Compensation Insurance Coverage. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

5.3.1 CONTRACTOR-Provided Insurance - General Requirements

- .1** The CONTRACTOR shall carry insurance in the types and amounts indicated below for the duration of the Contract, which shall include coverage for items owned by the OWNER in the care, custody and control of the CONTRACTOR prior to and during the period of construction and the warranty period.
- .2** The CONTRACTOR shall complete and deliver to the OWNER a Certificate of Insurance verifying all required coverages and endorsements, before the Contract is executed. The OWNER will not issue a Notice to Proceed, and the CONTRACTOR shall not commence the Work, until the required insurance certificate has been delivered and reviewed and approved by the OWNER. Approval of insurance by the OWNER shall not relieve or decrease the liability of the CONTRACTOR hereunder and shall not be construed to be a limitation of liability on the part of the CONTRACTOR. The CONTRACTOR shall also deliver a revised or updated Certificate of Insurance to the OWNER whenever any required coverage is renewed or changed.

- .3** The CONTRACTOR's insurance coverage is to be written by companies licensed to do business in the State of Texas at the time the policies are issued and shall be written by companies with A.M. Best ratings of B+VII or better. If hazardous material insurance coverage is required, it shall be written by companies with A.M. Best ratings of A- or better.
- .4** The Certificate of Insurance and all endorsements shall be issued to the OWNER and shall name the OWNER as follows: Canyon Regional Water Authority, 850 Lakeside Pass, New Braunfels, TX 78130.
- .5** The "other" insurance clause shall not apply to the OWNER where the OWNER is an additional insured shown on any policy. It is intended that the CONTRACTOR's insurance coverage required in the Contract, covering both the OWNER and the CONTRACTOR, shall be considered primary coverage.
- .6** If insurance policies are not written in at least the amounts specified below, the CONTRACTOR shall carry Umbrella or Excess Liability Insurance for any differences in the amounts. If Excess Liability Insurance is provided, it shall follow the form of the primary coverage.
- .7** The OWNER shall be entitled, upon request and without expense, to receive certified copies of policies and endorsements thereto and may make any reasonable requests for deletion or revision or modification of particular policy terms, conditions, limitations, or exclusions except where policy provisions are established by law or regulations binding upon either of the parties hereto or the underwriter on any such policies.
- .8** The OWNER reserves the right to review the insurance requirements set forth during the effective period of this Contract and to make reasonable adjustments to insurance coverage, limits, and exclusions when deemed necessary and prudent by the OWNER based upon changes in statutory law, court decisions, the claims history of the industry, or financial condition of an insurance company or the CONTRACTOR.
- .9** The CONTRACTOR shall not cause or allow any insurance to be canceled or allow any insurance to lapse during the term of the Contract or as required in the Contract.
- .10** The CONTRACTOR shall be responsible for premiums, deductibles and self-insured retentions, if any, stated in policies. All deductibles or self-insured retentions shall be disclosed on the Certificate of Insurance.
- .11** The CONTRACTOR shall provide the OWNER 30 days' written notice of any erosion of the aggregate limits below occurrence limits for all applicable coverages indicated within the Contract.
- .12** If the CONTRACTOR is transporting or storing materials and/or equipment owned by the OWNER off of the Project Site, then the Builder's Risk policy will be endorsed for transit and storage in an amount sufficient to protect the materials and/or equipment.
- .13** The insurance coverages required under this contract are required minimums and are not intended to limit the responsibility or liability of CONTRACTOR.

- 5.3.2 Business Vehicle Liability Insurance.** Provide coverage for all owned, non-owned and hired vehicles. The coverage shall be in the amount of at least **\$1,000,000** combined single limit per occurrence for bodily injury and property damage. The policy shall contain the following endorsements in favor of the OWNER:
- .1** Waiver of Subrogation;
 - .2** 30-day Notice of Cancellation; and
 - .3** Additional Insured. **Note:** The OWNER may require that the Additional Insured endorsement also name others as additional insureds, such as the Texas Department of Transportation, a railroad, and the owners of land at or near the Project Site.
- 5.3.3 Employers' Liability Insurance.** The policy shall provide coverage that is consistent with the Workers' Compensation requirements in 5.2 of the General Conditions, Section 00 72 00. The policy limits shall be at least \$1,000,000 bodily injury per accident, and \$1,000,000 bodily injury by disease per employee. The policy shall include as endorsements a waiver of subrogation and a 30-day notice of cancellation in favor of the OWNER.
- 5.3.4 Commercial General Liability Insurance.** The policy shall provide coverage in the amount of at least \$1,000,000 combined single limit per occurrence for bodily injury and property damage. The Policy shall contain all of the following provisions or endorsements:
- .1** Contractual liability coverage for liability assumed under the Contract and all contracts relative to this Project.
 - .2** Completed Operations/Products Liability for the duration of the warranty period.
 - .3** Explosion, Collapse and Underground (X, C & U) coverage.
 - .4** Independent Contractors coverage (Contractors/Subcontractors work).
 - .5** Aggregate limits of insurance per project endorsement.
 - .6** OWNER as Additional Insured endorsement. **Note:** The OWNER may require that the Additional Insured endorsement also name others as additional insureds, such as the Texas Department of Transportation, a railroad, and the owners of land at or near the Project Site.
 - .7** 30-day notice of cancellation in favor of the OWNER.
 - .8** Waiver of Transfer of Recovery Against Others endorsement in favor of the OWNER.
- 5.3.5 Builders' Risk Insurance.** The CONTRACTOR shall maintain Builders' Risk Insurance or Installation Insurance on an all risk physical loss form in the Contract Amount. This coverage shall continue until the Project is accepted by the OWNER. The OWNER shall be a loss payee on the policy. If off-site storage of materials or equipment is permitted, the coverage shall include transit and storage in an amount sufficient to protect the property being transported or stored.
- 5.3.7 Professional Liability Insurance.** For Work which requires professional engineering or professional survey services to meet the requirements of the Contract, including but not limited to excavation safety systems, traffic control plans, and construction surveying, the CONTRACTOR or the Subcontractors responsible for performing the professional services shall provide Professional Liability Insurance with a minimum limit of \$500,000 per claim and in the aggregate for personal injuries or property damage.

SC-5.4 Bonds: Add the following 5.4.1.4 to 5.4.1:

- .4 The CONTRACTOR shall comply with Section 6.1 of the TWDB Supplemental Contract Conditions pertaining to payment and performance bonds. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

SC-6.1 Supervision and Superintendence: Add the following:

- 6.1.3 The CONTRACTOR acknowledges that the OWNER has engaged the CMI to perform construction observation and construction management functions for the Project, and has designated the CMI as the Owner's Representative in 8.1. The CONTRACTOR shall cooperate and coordinate fully with the CMI to ensure that the CMI can effectively exercise its authority and carry out its obligations as described in the Contract Documents, including (without limitation) 8.1 and 8.7, and in Project Meetings (Section 01 31 20). The CONTRACTOR acknowledges, understands and agrees that the CMI shall be the primary point of contact between the CONTRACTOR and the OWNER, and between the CONTRACTOR and the ENGINEER for all aspects of the ENGINEER's services, during the construction phase.

SC-6.2 Labor, Materials and Equipment: Amend the last sentence of 6.2.1 as follows:

The CONTRACTOR shall pay workers no less than the wage rates established in Section 00 73 00, and maintain weekly payroll reports as evidence thereof, in accordance with the requirements of Chapter 2258 of the Texas Government Code, and Section 10.1 of the TWDB Supplemental Contract Conditions.

SC-6.2.2 Labor, Materials and Equipment: Amend 6.2.2 as follows:

- 6.2.2 This Contract is a Calendar Day Contract. The CONTRACTOR shall comply with the following restrictions on times during which the Work may be performed:
 - .1 All Work shall be done between 7:00 a.m. and 6:00 p.m. unless the CMI authorizes night work. However, emergency work may be done without prior permission as indicated in 6.11.5. Authorization for night and weekend work may be revoked at any time by the CMI if the CONTRACTOR fails to maintain adequate equipment and supervision for the prosecution and control of the work.

SC-6.7 Laws and Regulations: Add the following at the end of 6.7.1:

The CONTRACTOR shall comply with Section 4.1 of the TWDB Supplemental Contract Conditions pertaining to laws to be observed by the CONTRACTOR. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

SC-6.7.4 Laws and Regulations: Add the following:

- 6.7.4 This Work is subject to Texas Pollution Discharge Elimination System (TPDES) permitting requirements for the installation and maintenance of temporary and permanent erosion and sediment controls and storm water pollution prevention measures throughout the construction period. The CONTRACTOR's responsibilities are as follows:
 - .1 The CONTRACTOR is required to prepare a Storm Water Pollution Prevention Plan (SWPPP). Reference Section 01 57 13 for this SWPPP.

- .2** File a Notice of Intent (NOI) form with the TCEQ at least two days prior to start of construction activity and pay the permit fee. Form is online: <http://www.tceq.state.tx.us/assets/public/permitting/waterquality/forms/20022.pdf>.

Mail/hand deliver the completed form, or submit it online (advance registration is required) to the TCEQ. If the CONTRACTOR is not registered with the TCEQ online service, the CONTRACTOR shall take the registration timeframe into consideration. No Time Extension shall be granted for this timeframe.

The mailing address is:

Texas Commission on Environmental Quality
Storm Water & General Permits Team; MC-228
P.O. Box 13087
Austin, TX 78711-3087

A copy of the completed Notice of Intent (NOI) form must also be mailed to the local Municipal Separate Storm Sewer Systems (MS4) representative.

- .3** Obtain a signed certification statement from each Subcontractor responsible for implementing the erosion and sediment control measures. Each statement shall indicate that the Subcontractor understands and agrees to comply with the permit requirements. The certified statement forms shall be attached to and become part of the SWPPP.

- .4** Post a notice near the main entrance of the Project Site with the following information:

- The SWPPP permit number for the Work or a copy of the NOI if a permit number has not yet been assigned,
- The name and telephone number of a local contact person,
- A brief description of the Work, and
- The location where the CONTRACTOR maintains the SWPPP if the Project Site is inactive or does not have an on-site location to store the SWPPP.

If posting this information near the main entrance is not feasible due to safety concerns, the notice must be posted in a local public building. If the Project Site is linear (pipeline, highway, etc.), the notice must be placed in a publicly accessible location near where construction is actively underway and moved as necessary. For a linear Project Site, the OWNER may require multiple postings of the information (e.g. postings at both ends of the Work under way).

- .5** Ensure the maintenance of all erosion and sediment control measures and other protective measures identified in the SWPPP in effective operating condition.

- .6** Perform inspections every five working days and after every ½ inch or more rainfall event, noting the following observations on an inspection form provided by the OWNER:

- Locations of discharges of sediment or other pollutants from the site.

- Locations of storm water / erosion / sedimentation controls that are in need of maintenance.
 - Locations of storm water / erosion / sedimentation controls that are not performing, failing to operate, or are inadequate.
 - Locations where additional storm water / erosion / sedimentation controls are needed.
- .7** Maintain at the Project Site at all times a copy of the SWPPP (with all updates, as described below) and inspection reports.
- .8** Update the SWPPP as necessary to comply with TPDES permitting requirements, which includes noting changes in erosion / sedimentation controls and other best management practices that are part of the SWPPP and which may be necessary due to the results of inspection reports. Any SWPPP revisions or updates must be signed and certified by a Certified Professional in Erosion and Sedimentation Control (CPESC) or a Registered Professional Engineer. If the SWPPP includes engineering calculations, then SWPPP must be sealed and signed by a Registered Professional Engineer.
- .9** File a Notice of Termination with the TCEQ within thirty (30) days of final stabilization on all portions of the Project Site. Form is online: <http://www.tceq.state.tx.us/assets/public/permitting/waterquality/forms/20023.pdf>.
- The Notice shall be mailed to:
Storm Water & General Permits Team; MC-228
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-4671
- .10** Upon completion of the Project, provide all TPDES records to the OWNER.

SC-6.14 Indemnification: Amend 6.14 to read as follows:

6.14.1 The CONTRACTOR shall defend, indemnify and hold harmless the OWNER, the ENGINEER, the ENGINEER's consultants, the CMI and their respective officers, directors, partners, employees, and agents (the "Indemnified Parties") 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, mediation, arbitration or other dispute resolution costs) arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage:

- .1** 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, and
- .2** Is caused in whole or in part by any negligent act or omission of the CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish 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 the Indemnified Parties hereunder or whether liability is imposed upon such Indemnified Parties by Laws and Regulations regardless of the negligence of any such person or entity.

- .3** In the event that indemnification of any of the Indemnified Parties is prohibited by law, the CONTRACTOR shall nonetheless be solely responsible for any liability arising out of or resulting from the performance of the Work, subject to the limitations set forth above, and shall indemnify and hold harmless the remaining Indemnified Parties, who may be legally indemnified, from such liability of the CONTRACTOR and the associated costs described above.
- 6.14.2** The indemnification obligation under 6.14.1 shall not be limited in any way by any limitation on the amount or type of damages, or compensation or benefits payable by or for the CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.
- 6.14.3** The obligations of the CONTRACTOR under 6.14.1 shall not extend to the liability of one or more of the Indemnified Parties for a claim, cost, loss or damage caused primarily by negligent preparation of maps, drawings, surveys, designs or specifications upon which is placed the applicable state-authorized design professional seal of an officer, director, partner, employee or agent of an Indemnified Party.
- 6.14.4** In the event the CONTRACTOR fails to follow the OWNER's directives concerning use of the Project Site, scheduling or course of construction, or engages in other conduct which proximately causes damage to property based on inverse condemnation or otherwise, then and in that event, the CONTRACTOR shall indemnify the OWNER against all costs resulting from claims related to the damage.
- 6.14.5** In the event the CONTRACTOR unreasonably delays progress of the work being done by others so as to cause loss for which the OWNER becomes liable, then the CONTRACTOR shall indemnify the OWNER from and reimburse the OWNER for such loss.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

SC-8.1 Replace 8.1 with the following:

- 8.1 Designation of CMI as Owner's Representative:** The OWNER designates the CMI to act as the Owner's Representative during construction. The CMI shall be the primary point of contact between the OWNER and the CONTRACTOR during the construction phase. Except as otherwise provided in these General Conditions, the OWNER shall issue communications to the CONTRACTOR through the CMI. The CMI shall also be the primary point of contact between the ENGINEER and the CONTRACTOR for all aspects of the ENGINEER's services during the construction phase.

SC-8.7 Add the following after 8.6:

8.7 CMI Authority and Responsibilities

- 8.7.1** The CMI shall serve as the Owner's Representative as stated in 8.1. The CMI shall be the primary point of contact for the CONTRACTOR and will coordinate between the CONTRACTOR, the OWNER, and the ENGINEER. The CMI shall not pursue a course of conduct that might jeopardize any of the OWNER's rights under the Contract Documents.
- 8.7.2** The CMI's authority and responsibilities shall include:
- .1** Establish standard operating procedures and protocols for all construction management and administration activities, including submittals, substitution

requests, construction schedule, requests for information, requests for change in the Contract Amount or the Contract Time, applications for payment, as-builts, records drawings, materials testing, record-keeping, and operating and maintenance manuals.

- .2 Establish the lines of communication, points of contact, and general schedule of communications between the OWNER, the CONTRACTOR, and the ENGINEER, regulatory agencies, and administrative staff.
- .3 Receive, log, and distribute submittals, substitution requests, construction schedule, requests for information, requests for change in Contract Amount or Contract Time, applications for payment, as-builts, materials testing, and other correspondence and documentation received from the CONTRACTOR.
- .4 Promulgate templates for standard documents associated with construction administration activities. This will not include documents used in the submittal process, which will be developed by the ENGINEER.
- .5 Organize and conduct the preconstruction conference as described in Section 01 31 20 – Project Meetings.
- .6 Provide technical support and coordinate with the OWNER and the ENGINEER to assist and resolve the CONTRACTOR’s Requests for Information (RFIs).
- .7 Establish critical points in the construction process that require approval prior to the CONTRACTOR proceeding.
- .8 Review documentation and CONTRACTOR resources to verify that CONTRACTOR, Subcontractor, and other Project team members have the required qualifications, training, licenses, and certifications as specified.
- .9 Monitor delivery, handling, and storage of materials and equipment per the approved shop drawings.
- .10 Obtain written quality control plan from the CONTRACTOR and monitor the CONTRACTOR’s compliance with the plan.
- .11 Observe the Work while the CONTRACTOR is physically performing construction activities and advancing the completion of the Project; prepare written reports, diaries, or other records of CMI’s observations.
- .12 Visually and physically observe the ongoing construction progress for compliance with the Contract Documents, for adherence to accepted trade practices and standards of good workmanship, and to determine if the integrity of the design concept as reflected in the Contract Documents has been implemented and preserved by the CONTRACTOR.
- .13 Maintain observation of the quality of the materials used, observe materials prior to installation, and immediately inform the CONTRACTOR (and as needed, the OWNER, and ENGINEER) if materials do not conform to approved submittals and/or the Contract Documents.
- .14 **Immediately notify the CONTRACTOR (and as needed, the OWNER and the ENGINEER) if a condition or act which is believed to be unsafe is observed.**
- .15 Identify deviations in the Work from the Contract Documents, note the deviations in daily reports, advise the CONTRACTOR (and as needed, the OWNER and

ENGINEER) of the deviations, and monitor the deviations until they are resolved. The CMI may issue written Field Orders to authorize minor variations in the Work which do not involve an adjustment in the Contract Price or the Contract Time and are compatible with the intent of the Contract Documents and acceptable to the ENGINEER. The CMI will thoroughly note and document Work covered by Field Orders.

- .16 Identify and report Defective Work to the CONTRACTOR and advise what Work should be corrected, rejected, uncovered for observation, or subject to special tests or observation. As needed, prepare a nonconformance report and provide the report to the CONTRACTOR, the OWNER, and the ENGINEER; monitor the Work and corrective actions by the CONTRACTOR.
- .17 Review and document erosion and sediment control measures identified in the approved sediment and erosion control plan.
- .18 Review all easement documents and verify that the CONTRACTOR is abiding by the easement requirements, special conditions and limits.
- .19 Before the CONTRACTOR submits applications for payments to the ENGINEER under Section 12.1 of the TWDB Supplemental Contract Conditions, review each application in draft form, determine whether the amount requested reflects the progress of the Work and is in accordance with the Contract Documents, and provide a recommendation to the ENGINEER as to the acceptability of the application.
- .20 Schedule and coordinate testing and compile comments from testing parties. Identify any comments that indicate nonconformance with the Contract Documents and develop lists of deficient items for correction by the CONTRACTOR.
- .21 Provide and maintain job site documents in hard copy format.
- .22 Prepare daily field reports and representative photos that generally document the CONTRACTOR's personnel, hours on job site, equipment in use and idle, general safety observations, quality control activities, weather conditions, data relative to extras or deductions in bid items, Work in progress and accomplished, whether Work is in general conformance with the Contract Documents, general observations and documentation of testing procedures and results.
- .23 Make and maintain photographs of and document approximate location of items of special interest.
- .24 Maintain progress photographs and/or videos of the CONTRACTOR's Work. The photographs will focus on subsurface Work, areas in which problems are encountered, any Defective Work, and other critical areas and items as encountered.
- .25 Verify weekly that the CONTRACTOR is preparing as-built documents that accurately show constructed conditions. Submit information to the OWNER and ENGINEER) on a monthly basis.
- .26 Verify nameplate data of all mechanical, electrical, and instrumentation equipment as it is delivered and installed.

- .27 Obtain manufacturers certifications from the CONTRACTOR prior to startup of any equipment.
- .28 Coordinate with CONTRACTOR, OWNER, and ENGINEER during startup and prepare reports of startup activities.
- .29 Coordinate and communicate with property owners regarding easements and rights of entry.
- .30 Review manufacturer and material certifications.
- .31 Attend construction progress meetings.

ARTICLE 9 – Change Article Title to: STATUS OF ENGINEER, CMI AND OWNER DURING CONSTRUCTION

SC-9 Replace 9.1, 9.2, 9.3, and 9.4 with the following:

9.1 Authority and Responsibilities of ENGINEER, CMI AND OWNER:

- 9.1.1** The duties and responsibilities and the limitations of authority of the ENGINEER and CMI are as set forth in this Article and otherwise in the Contract Documents, and these may not be modified without written consent of the ENGINEER, and CMI. The duties and responsibilities of the ENGINEER and CMI as assigned by the OWNER, or any undertaking, exercise or performance thereof by the ENGINEER or CMI are intended to be for the sole and exclusive benefit of the OWNER and not for the benefit of the CONTRACTOR or any Subcontractor, Supplier, or any other person or organization, or for any Surety or an employee or agent of any of them.
- 9.1.2** The ENGINEER OR CMI shall not have control or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, for the acts or omissions of the CONTRACTOR, Subcontractors, or any other persons performing any of the Work, or for the failure of any of them to carry out the Work in accordance with the Contract Documents, unless the acts or omissions are due to the negligence of the ENGINEER or are acts or omissions under the control of the ENGINEER or CMI. The ENGINEER shall coordinate with the CMI and shall exercise the ENGINEER’s authority on behalf of the OWNER so that all Work performed by the CONTRACTOR results in the Project being completed in accordance with the Contract Documents. If the ENGINEER, through the CMI or otherwise, becomes aware of the CONTRACTOR’s utilization of means, methods, techniques, sequences and/or procedures of construction which, in the ENGINEER’s opinion, will not result in completion of the Project in accordance with the Contract Documents, the ENGINEER, in coordination with the CMI, shall immediately inform the OWNER and shall take all necessary action which the ENGINEER is authorized to take under the Contract Documents to correct the matter.
- 9.1.3** The ENGINEER, in coordination with the CMI, shall review the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by Article 14, but only 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.

- 9.1.4** The limitations upon authority and responsibility set forth in this paragraph shall also apply to the consultants and assistants of the ENGINEER or CMI.
- 9.2 Construction Phase Services of the ENGINEER and CMI:** The ENGINEERS and CMI shall administer their respective construction phase services as set forth in the Contract Documents. The ENGINEER or CMI each agree not to pursue a course of conduct that might jeopardize any of the OWNER's rights under the Contract Documents.
- 9.3 Site Visits:** The ENGINEER, in coordination with the CMI, shall make professional on-site visitations of the Work often enough to ensure familiarity with the progress and quality of the Work, to determine if the Work is proceeding in acceptable conformance with the Contract Documents, and to review the Work with the CONTRACTOR and the CMI. On the basis of these visitations, the ENGINEER, in coordination with the CMI, shall keep the OWNER informed of the progress and quality of the Work. The ENGINEER shall also perform visits to the Project Site at the specific request of the OWNER by the next business day after a request is made.
- 9.4 Coordination with CMI.** The OWNER has designated the CMI as the Owner's Representative as stated in 8.1. The ENGINEER will coordinate its services during the construction phase with the CMI. The CMI shall be the primary point of contact between the ENGINEER and the CONTRACTOR for all aspects of the ENGINEER's services during the construction phase, including the ENGINEER's activities in 9.5, 9.6 and 9.7, changes in the Work under Article 10 of the General Conditions, changes of Contract Amount under Article 11 of the General Conditions, changes of Contract Time under Article 12 of the General Conditions, tests and inspections under Article 13 of the General Conditions, payments to the CONTRACTOR and completion under Article 14 of the General Conditions, suspension of Work under Article 15 of the General Conditions, and dispute resolution under Article 16 of the General Conditions. All communication and correspondence between the ENGINEER and CONTRACTOR shall be made through the CMI.

ARTICLE 10 - CHANGES IN THE WORK

SC-10.1 Changes in General: Insert the following immediately after the title:

Note: The CONTRACTOR shall comply with Section 16.1 of the TWDB Supplemental Contract Conditions pertaining to Changes, to the extent that section conflicts with the provisions of this Contract. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

Delete 10.4.2 and replace with the following:

10.4.2 If the CONTRACTOR believes that a Field Order would require an adjustment in the Contract Amount and/or Contract Time, the CONTRACTOR shall make a prompt written request to the CMI for a Change Order. Any request by the CONTRACTOR for an adjustment in Contract Amount and/or Contract Time must be made by Written Notice prior to beginning the work covered by the request.

ARTICLE 12 – CONTRACT TIME

SC-12.1 Compliance with Contract Time – Add the following:

The amount of liquidated damages for failure to attain Substantial Completion of the Work within the applicable Contract Time is **\$1,000.00** per day. The amount of liquidated damages for failure to attain Final Completion of the Work within the applicable Contract Time is **\$1,000.00** per day.

SC-12.1 Compliance with Contract Time – Add the following:

The amount of liquidated damages for failure to attain Substantial Completion of the Work within the applicable Contract Time is **\$1,000.00** per day. The amount of liquidated damages for failure to attain Final Completion of the Work within the applicable Contract Time is **\$1,000.00** per day.

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

SC-13.2 Access to Work: Add the following at the end:

The CONTRACTOR shall comply with Section 5.1 of the TWDB Supplemental Contract Conditions pertaining to access by the OWNER, the OWNER's authorized representatives, and the TWDB to the Project Site and to records and data related to the Project. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.1 Applications for Progress Payments: Insert the following immediately after the title:

The CONTRACTOR shall comply with Subsections 12.1.1, 12.1.2, and 12.1.3 of the TWDB Supplemental Contract Conditions pertaining to Progress Payments, to the extent those subsections conflict with the provisions of the Contract. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

SC-14.1.5 Delete 14.1.5 and replace with the following:

14.1.5 In making progress payments, 10 percent of the estimated amount shall be retained until final completion and acceptance of the Contract Work.

SC-14.9 Delete 14.9 and replace with the following:

14.9 Final Inspection; Manuals and Training; As-Built Dimensions and Drawings:

14.9.1 Upon Written Notice from the CONTRACTOR that the entire Work or an agreed portion thereof is complete, the CMI or ENGINEER will make a final inspection with the CONTRACTOR and provide Written Notice of all particulars in which this inspection reveals that the Work is incomplete or Defective Work. The CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such Defective Work.

14.9.2 The CONTRACTOR shall comply with Section 17.1 of the TWDB Supplemental Contract Conditions pertaining to manuals and training. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

14.9.3 The CONTRACTOR shall comply with Section 18.1 of the TWDB Supplemental Contract Conditions pertaining to as-built dimensions and drawings. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

SC-14.10 Changes in General: Insert the following immediately after the title:

Note: The CONTRACTOR shall comply with Subsection 12.1.4 of the TWDB Supplemental Contract Conditions pertaining to Final Payment, to the extent that the subsection conflicts with the provisions of this Contract. The TWDB Supplemental

Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

SC-14.11 Final Payment and Acceptance: Insert the following immediately after the title:

Note: The CONTRACTOR shall comply with Section 19.1 of the TWDB Supplemental Contract Conditions pertaining to Close-Out Procedures, to the extent that the section conflicts with the provisions of this Contract. The TWDB Supplemental Contract Conditions supersede any conflicting provisions of this Contract to the extent of the conflict.

ARTICLE 17 - MISCELLANEOUS

SC-17.9 Historically Underutilized Business (HUB) Program: Amend 17.9.1 by adding the following at the end of the subsection:

The HUB participation goal for this Project is 11.2%.

ATTACHMENTS:

- A. Wage Rates and Payroll Reporting.
- B. Wage Rates and Construction Trades.
- C. Texas Water Development Board (TWDB) Supplemental Contract Conditions (See TWDB-0552)

END OF SECTION

**SECTION 00 73 00 – WAGE RATES AND PAYROLL
REPORTING
ATTACHMENT A**

"General Decision Number: TX20240007 01/05/2024

Superseded General Decision Number: TX20230007

State: Texas

Construction Types: Heavy and Highway

Counties: Atascosa, Bandera, Bastrop, Bell, Bexar, Brazos, Burleson, Caldwell, Comal, Coryell, Guadalupe, Hays, Kendall, Lampasas, McLennan, Medina, Robertson, Travis, Williamson and Wilson Counties in Texas.

HEAVY (excluding tunnels and dams, not to be used for work on Sewage or Water Treatment Plants or Lift / Pump Stations in Bell, Coryell, McClennon and Williamson Counties) and HIGHWAY Construction Projects

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at

<http://www.dol.gov/whd/govcontracts>.

Modification Number Publication Date
 0 01/05/2024

SUTX2011-006 08/03/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures).....	\$ 12.56	**
ELECTRICIAN.....	\$ 26.35	
FORM BUILDER/FORM SETTER Paving & Curb.....	\$ 12.94	**
Structures.....	\$ 12.87	**
LABORER Asphalt Raker.....	\$ 12.12	**
Flagger.....	\$ 9.45	**
Laborer, Common.....	\$ 10.50	**
Laborer, Utility.....	\$ 12.27	**
Pipelayer.....	\$ 12.79	**
Work Zone Barricade Servicer.....	\$ 11.85	**
PAINTER (Structures).....	\$ 18.34	
POWER EQUIPMENT OPERATOR: Agricultural Tractor.....	\$ 12.69	**
Asphalt Distributor.....	\$ 15.55	**
Asphalt Paving Machine.....	\$ 14.36	**
Boom Truck.....	\$ 18.36	
Broom or Sweeper.....	\$ 11.04	**
Concrete Pavement Finishing Machine.....	\$ 15.48	**
Crane, Hydraulic 80 tons or less.....	\$ 18.36	
Crane, Lattice Boom 80 tons or less.....	\$ 15.87	**
Crane, Lattice Boom over 80 tons.....	\$ 19.38	
Crawler Tractor.....	\$ 15.67	**
Directional Drilling Locator.....	\$ 11.67	**
Directional Drilling Operator.....	\$ 17.24	
Excavator 50,000 lbs or Less.....	\$ 12.88	**
Excavator over 50,000 lbs...	\$ 17.71	
Foundation Drill, Truck Mounted.....	\$ 16.93	**
Front End Loader, 3 CY or Less.....	\$ 13.04	**
Front End Loader, Over 3 CY.	\$ 13.21	**
Loader/Backhoe.....	\$ 14.12	**
Mechanic.....	\$ 17.10	**
Milling Machine.....	\$ 14.18	**
Motor Grader, Fine Grade....	\$ 18.51	
Motor Grader, Rough.....	\$ 14.63	**
Pavement Marking Machine....	\$ 19.17	
Reclaimer/Pulverizer.....	\$ 12.88	**

Roller, Asphalt.....\$ 12.78 **
 Roller, Other.....\$ 10.50 **
 Scraper.....\$ 12.27 **
 Spreader Box.....\$ 14.04 **
 Trenching Machine, Heavy....\$ 18.48

Servicer.....\$ 14.51 **

Steel Worker

Reinforcing.....\$ 14.00 **
 Structural.....\$ 19.29

TRAFFIC SIGNALIZATION:

Traffic Signal Installation

Traffic Signal/Light Pole
 Worker.....\$ 16.00 **

TRUCK DRIVER

Lowboy-Float.....\$ 15.66 **
 Off Road Hauler.....\$ 11.88 **
 Single Axle.....\$ 11.79 **
 Single or Tandem Axle Dump
 Truck.....\$ 11.68 **
 Tandem Axle Tractor w/Semi
 Trailer.....\$ 12.81 **

WELDER.....\$ 15.97 **

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====
 ** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date

for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION"

"General Decision Number: TX20240251 11/08/2024

Superseded General Decision Number: TX20230251

State: Texas

Construction Type: Building

County: Guadalupe County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024
1	01/12/2024

2	04/05/2024
3	06/14/2024
4	07/05/2024
5	08/30/2024
6	10/11/2024
7	11/08/2024

ASBE0087-014 06/03/2024

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)....	\$ 29.50	8.79

BOIL0074-003 07/01/2023

	Rates	Fringes
BOILERMAKER.....	\$ 37.00	24.64

BRTX0005-006 06/01/2024

	Rates	Fringes
BRICKLAYER.....	\$ 31.08	14.84

ELEC0060-003 01/01/2024

	Rates	Fringes
ELECTRICIAN (Communication Technician Only).....	\$ 33.50	18%+5.45

ELEC0060-004 01/01/2024

	Rates	Fringes
ELECTRICIAN (Excludes Low Voltage Wiring).....	\$ 33.50	18%+5.45

ELEV0133-002 01/01/2024

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 49.38	37.885

Footnote:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and Veterans Day.

* ENGI0450-002 04/01/2024

	Rates	Fringes
POWER EQUIPMENT OPERATOR Cranes.....	\$ 39.47	10.39

IRON0066-013 06/01/2023

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 26.00	7.53

IRON0084-011 06/01/2023

	Rates	Fringes
IRONWORKER, ORNAMENTAL.....	\$ 27.51	8.13

PLUM0142-009 07/01/2024

	Rates	Fringes
HVAC MECHANIC (Electrical Temperature Control Installation & Unit Installation Only).....	\$ 36.87	11.48
PIPEFITTER (Including HVAC Pipe Installation).....	\$ 36.87	11.48
PLUMBER..... Including HVAC Pipe Installation Excludes HVAC Pipe Installation	\$ 36.87	11.48

SFTX0669-002 04/01/2024

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 36.15	23.88

SHEE0067-004 07/03/2024

	Rates	Fringes
Sheet metal worker Excludes HVAC Duct Installation.....	\$ 32.24	15.89
HVAC Duct Installation Only.	\$ 32.24	15.89

* SUTX2014-027 07/21/2014

	Rates	Fringes
CARPENTER (Acoustical Ceiling Installation Only).....	\$ 18.00	0.00
CARPENTER (Form Work Only).....	\$ 13.63 **	0.00
CARPENTER, Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work, and Metal Stud Installation.....	\$ 16.64 **	2.12
CAULKER.....	\$ 15.00 **	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 22.27	5.30
DRYWALL FINISHER/TAPER.....	\$ 13.81 **	0.00
DRYWALL HANGER AND METAL STUD INSTALLER.....	\$ 15.38 **	0.00

ELECTRICIAN (Low Voltage Wiring Only).....	\$ 20.19	3.75
IRONWORKER, REINFORCING.....	\$ 12.27 **	0.00
LABORER: Common or General.....	\$ 11.91 **	0.00
LABORER: Mason Tender - Brick...	\$ 12.00 **	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 12.00 **	0.00
LABORER: Pipelayer.....	\$ 11.00 **	0.00
LABORER: Roof Tearoff.....	\$ 11.28 **	0.00
LABORER: Landscape and Irrigation.....	\$ 8.00 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 19.43	3.49
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 14.00 **	0.00
OPERATOR: Bulldozer.....	\$ 14.00 **	0.00
OPERATOR: Drill.....	\$ 14.50 **	0.00
OPERATOR: Forklift.....	\$ 13.06 **	0.00
OPERATOR: Grader/Blade.....	\$ 19.30	0.00
OPERATOR: Loader.....	\$ 13.90 **	0.00
OPERATOR: Mechanic.....	\$ 18.75	5.12
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 16.03 **	0.00
OPERATOR: Roller.....	\$ 11.25 **	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping.....	\$ 13.13 **	0.00
ROOFER.....	\$ 12.00 **	0.00
TILE FINISHER.....	\$ 11.32 **	0.00
TILE SETTER.....	\$ 16.09 **	0.00
TRUCK DRIVER: Dump Truck.....	\$ 12.39 **	1.18
TRUCK DRIVER: Flatbed Truck.....	\$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck.....	\$ 12.50 **	0.00
TRUCK DRIVER: Water Truck.....	\$ 12.00 **	4.11
TRUCK DRIVER.....	\$ 16.52 **	5.03

WELDERS - Receive rate prescribed for craft performing

operation to which welding is incidental.

=====

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the ""SA"" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R. 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination

- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
 Wage and Hour Division
 U.S. Department of Labor
 200 Constitution Avenue, N.W.
 Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
 U.S. Department of Labor
 200 Constitution Avenue, N.W.
 Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
 U.S. Department of Labor
 200 Constitution Avenue, N.W.
 Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION"

**SECTION 00 73 00 – TWDB SUPPLEMENTAL
CONTRACT CONDITIONS**

ATTACHMENT B

SEE TWDB-0552

STATE OF TEXAS
COUNTY OF _____

§
§
§

**SITE
CERTIFICATE**

Before me, the undersigned notary, on this day personally appeared _____, a person whose identity is known to me or who has presented to me a satisfactory proof of identity. After I administered an oath, this person swore to the following:

- (1) My name is _____. I am over 18 years of age and I am of sound mind, and capable of swearing to the facts contained in this Site Certificate. The facts stated in this certificate are within my personal knowledge and are true and correct.
- (2) I am an authorized representative of _____, an entity that has filed an application for financial assistance with the Texas Water Development Board for a (water) (wastewater) project.

Please complete only those sections that apply to your project:

LEGAL CERTIFICATION – LEASE/CONTRACT

I certify that: _____
(Legal Name of Applicant, i.e., City, District, etc.)

has executed a written lease or other contractual agreement to use the property needed for this (water)(wastewater) project that extends through _____ (date), the life of the Texas Water Development Board loan or grant that will be used to finance this project, either in whole or in part. A copy of this lease or agreement is attached hereto.

LEGAL CERTIFICATION – PROPERTY EASEMENT

I certify that: _____
(Legal Name of Applicant, i.e., City, District, etc.)

has executed an express easement to use the property needed for this (water) (wastewater) project that extends through the life of the Texas Water Development Board loan or grant that will be used to finance this project, either in whole or in part. The express easement to use the property needed for this (water) (wastewater) project extends through _____ (date). A copy of the express easement agreement is attached hereto.

LEGAL CERTIFICATION – OWNERSHIP INTEREST

I certify that _____
(Legal Name of Applicant, e.g. City, District, etc.)

Option A: has acquired the necessary real property interest, as evidenced by fee simple purchase, deed, fully executed earnest money contracts, or completion of eminent domain proceedings; that such acquisition will guarantee access and egress; and such interest will contain the necessary easements, rights of way, or unrestricted use as is required for the project being financed by the Texas Water Development Board. The legal description is referenced below.

Option B: is in the process of acquiring the necessary real property interest, as evidenced by earnest money contracts, contracts for sale, firm option agreements to purchase the subject property, or the initiation of eminent domain procedures; that such acquisition will guarantee access and egress; and such interest will contain the necessary easements, rights of way, or unrestricted use as is required for the project being financed by the Texas Water Development Board. The legal description is referenced below. The anticipated date of acquisition is:
_____.

The property has been/will be acquired with the use of eminent domain: True False

Location and Description of Property Interests acquired for Project:

Any deeds or other instruments required to be recorded to protect the title(s) held by _____ (Legal Name of Applicant) have been recorded or filed for the record in the County deed records or other required location. The following documents are attached hereto:

Description of documents that were used or will be used to acquire the property:

EXECUTED this _____ day of _____, 20_____.

_____ (Signature)

_____ (Print Name)

_____ (Title)

Sworn to and subscribed before me by _____ on this _____ day
of _____, 20_____.

_____ (Notary Public in and for the State of Texas)

[SEAL]

CONTRACTOR'S ACT OF ASSURANCE

STATE OF TEXAS §
§
COUNTY OF _____ §

BEFORE ME _____, a Notary Public duly commissioned and qualified in and for the County of _____ in the State of Texas came and appeared _____, as represented by _____, the Corporation's _____, who declares he/she is authorized to represent _____ pursuant to provisions of a resolution adopted by said Corporation on the ____ day of _____, 20____ (a duly certified copy of such resolution is attached to and is hereby made a part of this document).

_____, as the representative of, _____ declares that _____ assures the Texas Water Development Board that it will construct _____ project at _____, Texas, in accordance with sound construction practice, all laws of the State of Texas, and the rules of the Texas Water Development Board.

GIVEN UNDER MY HAND and seal of office this _____ day of _____, 20_____.

_____ (Notary Public in and for the State of Texas)

_____ (Print Name)

[SEAL]

CONTRACTOR'S ACT OF ASSURANCE RESOLUTION

I hereby certify that it was RESOLVED by a quorum of the directors of the _____ (Name of Corporation), meeting on the _____ day of _____, 20____, that:

Authorized Representative(s):

be, and hereby is/are authorized to act on behalf of _____ (Name of Corporation), as its representative in all business transactions conducted in the State of Texas, and;

That all above resolution was unanimously ratified by the Board of Directors at said meeting and that the resolution has not been rescinded or amended and is now in full forces and effect; and;

In authentication of the adoption of this resolution, I subscribe my name and affix the seal of the Corporation this _____ day of _____, 20____.

_____(Secretary)

[SEAL]

VENDOR COMPLIANCE WITH RECIPROCITY ON NON- RESIDENT BIDDERS

Texas Government Code Section 2252.002 provides that in order for nonresident bidders to be awarded a governmental contract, the bidder must bid projects for construction, improvements, supplies, or services in Texas at an amount lower than the lowest Texas resident bidder by the same amount that a Texas resident bidder would be required to underbid the nonresident bidder in order to obtain a comparable contract in the nonresident bidder's state. A nonresident bidder is a person, including a contractor, whose principal place of business or corporate office is outside of the state of Texas. This requirement does not apply to a contract involving Federal funds. The appropriate blanks in Section A must be filled out by all nonresident bidders in order for your bid to meet specifications. The failure of a nonresident bidder to do so will automatically disqualify that bidder. Resident bidders must check the blank in Section B.

A. Non-resident vendors in _____ (give state), our principal place of business, are required to be _____ percent lower than resident bidders by state law. A copy of the statute is attached.

Non-resident vendors in _____ (give state), our principal place of business, are not required to underbid resident bidders.

B. Our principal place of business or corporate office is in the state of Texas: _____.

BIDDER:

Company

City

State

Zip

By (print name)

Signature

Title (print)

THIS FORM MUST BE RETURNED WITH THE BID



Texas Water Development Board
Supplemental Contract Conditions and
Instructions

For Construction Services for
Projects Funded through State Programs

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Forms and Guidance:

The Texas Water Development Board (TWDB) forms and guidance documents noted in this instruction document may be accessed through the TWDB's Financial Assistance web site at:

<http://www.twdb.texas.gov/financial/instructions/index.asp>

Search by either the document number or name.

I. INSTRUCTIONS TO APPLICANT

1. Applicability

These Supplemental Conditions contain provisions that are worded to comply with certain statutes and regulations which specifically relate to projects receiving state funds only. Except as noted, these supplemental conditions apply to projects funded by the following financial assistance programs:

- ✓ Agricultural Water Conservation Fund (AWCF)
- ✓ Economically Distressed Areas Program (EDAP)
- ✓ Rural Water Assistance Fund (RWAFF)
- ✓ State Participation (SP)
- ✓ State Water Implementation Fund for Texas (SWIFT)
- ✓ Texas Water Development Fund II (WDF)

Provisions that are applicable to the project's funding source or dollar value of the contract are so noted within these provisions.

NOTES:

- Per Section 17.183(c)(4), Texas Water Code (TWC), U.S. Iron and Steel requirements do not apply to SWIFT projects funded prior to May 1, 2019.
- Effective September 1, 2017, TWC §17.183 eliminated the requirement for *Manufactured Goods*. Thus, projects approved for funding after September 1, 2013 and which are not currently under construction, will only need to meet the requirements of TWC §17.183 as amended by S.B. 1289, 85th Legislative Session, and as outlined in these Contract Conditions.
- Texas Water Code § 17.183 does not apply to the Agricultural Water Conservation Fund; however, the US I&S provisions in Texas Government Code, Chapter 2252, Subchapter F may apply to certain conservation projects funded through the Agricultural Water Conservation Fund. See Attachment 1 for supplemental guidance regarding Agricultural Water Conservation Fund projects.

2. Use of Conditions

The language and conditions listed under ***Section II: Instructions to Bidders*** are to be included in the instructions to bidders for construction services. The provisions listed under ***Section III: Supplemental Contract Conditions*** shall be included in their entirety with the other general and special conditions that are typically included in the construction contract documents by the design engineer.

3. Modifications to Provisions

These provisions shall be included as a stand-alone section in the contract documents. The Applicant and the consulting engineer (Engineer) should carefully study these provisions before incorporating them into the construction contract documents. In particular, Water Districts and other types of districts should be aware of statutes relating to their creation and operation which may affect the application of these conditions. **The TWDB Project Engineer/Reviewer should be consulted if the Applicant thinks there is a need to modify parts of these provisions.**

Supplemental Condition #13 (Archeological Discoveries and Cultural Resources) and #14 (Endangered Species) may be superseded or modified by project specific conditions established during the environmental review process.

These documents may confer certain duties and responsibilities on the Engineer that are beyond, or short of, what the Applicant intends to delegate. The Applicant should ensure that the contractual agreement with the Engineer provides for the appropriate services. Otherwise the Applicant should revise the wording in these special conditions to agree with actually delegated functions.

4. Good Business Practices

There are other contract provisions that the Applicant (Owner) and Engineer should include as a matter of good business practices. It is recommended that provisions addressing the following matters be included in the construction contract.

- (a) Specifying the time frame for accomplishing the construction of the project, and the consequences of not completing on time, including liquidation damages.
- (b) Specifying the type, dollar value, and documentation of insurance the contractor is to carry. At a minimum the contractor should carry worker's compensation, liability and builder's risk insurance.
- (c) Identifying the responsibility of the contractor – Responsibility and Warranty of Work.
- (d) Price reduction for defective pricing of negotiated costs.
- (e) Differing site conditions - notice and claims regarding site conditions differing from indicated conditions.
- (f) Covenants against contingent fees - prohibit contingent fees for securing business.
- (g) Gratuities - prohibitions against offering and accepting gratuities.
- (h) Audit and access to records.
- (i) Suspension of work - conditions under which the Owner may suspend work.
- (j) Termination - conditions under which the Owner may terminate the contract.
- (k) Remedies - procedures for resolving disputes.

5. Other Requirements

There may be other local government requirements and applicable Federal and State statutes and regulations that are not accommodated by these conditions. It is the Applicant's responsibility to ensure that the project and all contract provisions are consistent with the relevant statutes and regulations.

6. Advertisements for Bids

State procurement statutes require advertising a contract for bids for at least two (2) consecutive weeks. By not following this requirement, the project may need to be re-advertised. The official advertisement for bids that is published in newspapers shall include certain information such as, but not limited to, the following:

- (a) A clear description of what is being procured.
- (b) How to obtain plans and specifications (P&S) and necessary forms and information.
- (c) The date and time by which bids are to be submitted (deadline).
- (d) The address where bids are to be provided.
- (e) This contract is contingent upon release of funds from the Texas Water Development Board (TWDB).
- (f) Any contract(s) awarded under this Invitation for Bids is/are subject to the United States Iron and Steel (US I&S) requirements of Texas Water Code §17.183 and/or Texas Government Code, Chapter 2252, Subchapter F, as amended by SB 1289, 85th Legislative Session, as applicable. (NOTE: does not apply to SWIFT projects funded prior to May 1, 2019).
- (g) Acknowledgement of any special requirements such as mandatory pre-bid conference.
- (h) Right to reject any and all bids.
- (i) General bond requirements.

Bid Proposal

The Bid Proposal form should account for the following:

- (a) If lump sum bid, include a list of the materials used and associated costs.
- (b) Distinguish eligible and ineligible items.
- (c) Accommodate trench safety requirements with separate per unit pay item for trench excavation safety protection, Health and Safety Code Chapter 756, Subchapter C.
- (d) Include space for the Contractor to acknowledge receipt of each Addendum issued during the bidding process.

7. Bidding Process

The Plans and Specifications (P&S) should include an explanation of how the bids will be processed. The explanation should include the following components:

- (a) Whether a pre-bid conference will be held, whether it is optional or mandatory, where and when it will be held.
- (b) Specify the criteria and process for determining responsiveness and responsibility of the bidder.
- (c) Specify the method of determining the successful bidder and award (e.g., award to the lowest responsive, responsible bidder, accounting for any multiple parts to bids) and accounting for non-resident bidder reciprocity requirements.
- (d) Allow for withdrawal of a bid due to a material mistake.
- (e) Identify the time frame that the bids may be held by the Applicant before awarding a contract (e.g., typically for 60 or 90 days).
- (f) Acknowledge right of the Applicant to reject any and all bids.

8. Release of Funds

- (a) Submittal of Bid Documents to TWDB Project Engineer/Reviewer to allow contingent award of contract:
 - (1) Advertisement and affidavit of advertisement.
 - (2) Bid tabulation.
 - (3) All addenda submitted and approved for the contract.
 - (4) Bid proposal of apparent low bidder (or chosen bidder, with explanation) with bid bond.
 - (5) Site certificate (ED-101).
 - (6) Consulting engineer's recommendation to award letter.
 - (7) A description of any bidding irregularities.
 - (8) Construction inspection proposal.
 - (9) Vendor Compliance with Reciprocity of Non-Resident Bidders Form (TWDB-0459).

(b) Following contingent award of the contract, TWDB Project Engineer/Reviewer should receive a bound copy of the executed contract documents (including specifications). This document should include:

- (1) Executed agreement.
- (2) Contractor's act of assurance (ED-103).
- (3) Contractor's act of assurance resolution (ED-104).
- (4) Payment and Performance bond (must be executed on or after the date of execution of the contract).
- (5) Contractor's Certificate of Insurance.
- (6) Sufficiency of funds letter (if the project is not 100% funded with TWDB funds).

After reviewing and approving the executed bid documents, the TWDB will issue an authorization for the Applicant to issue a notice to proceed. At this time, TWDB staff can begin releasing construction funds, in accordance with program specific requirements.

For any questions or proposed modifications to these conditions, please contact your TWDB Project Engineer/Reviewer.

II. INSTRUCTIONS TO BIDDERS

The language and conditions listed in this section shall be included in the “Instructions to Bidders” section of the construction contract document.

1. Contingent Award of Contract

This contract is contingent upon release of funds from the Texas Water Development Board. Any contract or contracts awarded under this Invitation for Bids is/are expected to be funded in part by a loan or grant from the Texas Water Development Board. Neither the state of Texas, nor any of its departments, agencies, or employees are or will be a party to this Invitation for Bids or any resulting contract.

2. U.S. Iron and Steel (Does not apply to SWIFT Projects funded prior to May 1, 2019)

Any contract(s) awarded under this Invitation for Bids is/are subject to the United States Iron and Steel requirements of Texas Water Code §17.183 and/or Texas Government Code, Chapter 2252, Subchapter F, as amended by SB 1289, 85th Legislative Session. The contractor must complete the statement of understanding regarding this requirement, found in the Supplemental Contract Conditions, Item No. 9. Refer to TWDB-1105 – United States Iron and Steel (US I&S) Guidance.

3. Bid Guarantee

Each bidder shall furnish a bid guarantee equivalent to five percent of the bid price (Water Code §17.183). If a bid bond is provided, the Contractor shall utilize a surety company which is authorized to do business in Texas in accordance with Surety Bonds and Related Instruments, Chapter 3503 of the Insurance Code.

4. Award of Contract to Nonresident Bidder

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located. A non-resident bidder is a Contractor whose corporate offices or principal place of business is outside of the state of Texas (Source: Texas Government Code, Chapter 2252, Subchapter A, Nonresident Bidders, §2252.002).

The bidder will complete form TWDB-0459, Vendor Compliance with Reciprocity on Non-Resident Bidders, **which must be submitted with the bid.**

III. SUPPLEMENTAL CONTRACT CONDITIONS

1. Supersession

The Owner and the Contractor agree that the TWDB Supplemental Conditions apply to the work eligible for Texas Water Development Board assistance to be performed under this contract and these clauses supersede any conflicting provisions of this contract.

2. Privity of Contract

Funding for this project is expected to be provided in part by a loan or grant from the Texas Water Development Board. Neither the state of Texas, nor any of its departments, agencies or employees is, or will be, a party to this contract or any lower tier contract. This contract is subject to applicable provisions in 31 TAC Chapter 363 in effect on the date of the assistance award for this project.

3. Definitions

- (a) The term "Owner" means the local entity contracting for the construction services.
- (b) The term "TWDB" means the Executive Administrator of the Texas Water Development Board, or other person who may be at the time acting in the capacity or authorized to perform the functions of such Executive Administrator, or the authorized representative thereof.
- (c) The term "Engineer" means the Owner's authorized consulting engineer for the project.

4. Laws to be Observed

In the execution of the contract, the Contractor must comply with all applicable local, state and federal laws, including but not limited to laws concerned with labor, safety, minimum wages, and the environment. The Contractor shall be familiar with and at all times shall observe and comply with all federal, state, and local laws, ordinances and regulations which in any manner affect the conduct of the work, and shall indemnify and save harmless the Owner, Texas Water Development Board, and their representatives against any claim arising from violation of any such law, ordinance or regulation by the Contractor, their Subcontractor or their employees.

5. Review by Owner and TWDB

- (a) The Owner, authorized representatives and agents of the Owner, and the TWDB shall, at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this contract, provided, however that all instructions and approval with respect to the work will be given to the Contractor only by the Owner through authorized representatives or agents.
- (b) Any such inspection or review by the TWDB shall not subject the state of Texas, or its representatives, to any action for damages.

6. Performance and Payment Bonds

Each Contractor awarded a construction contract must furnish performance and payment bonds:

- (a) the performance bond shall include without limitation guarantees that work done under the contract will be completed and performed according to approved plans and specifications and in accordance with sound construction principles and practices;
- (b) the performance and payment bonds shall be in a penal sum of not less than 100 percent of the contract price and remain in effect for one year beyond the date of approval by the Engineer of the political subdivision; and
- (c) the Contractor shall utilize a surety company that is authorized to do business in Texas in accordance with Surety Bonds and Related Instruments, Chapter 3503 of the Insurance Code.

7. Payments Schedule and Cost Breakdown

- (a) The Contractor shall submit for approval immediately after execution of the Agreement, a carefully prepared Progress Schedule, showing the proposed dates of starting and completing each of the various sections of the work, the anticipated monthly payments to become due to the Contractor, and the accumulated percent of progress each month.

- (b) The following paragraph applies only to contracts awarded on a lump sum contract price:

COST BREAKDOWN - The Contractor shall submit to the Owner a detailed breakdown of the estimated cost of all work to be accomplished under the contract, so arranged and itemized as to meet the approval of the Owner or funding agencies. This breakdown shall be submitted promptly after execution of the agreement and before any payment is made to the Contractor for the work performed under the contract. After approval by the Owner the unit prices established in the breakdown shall be used in estimating the amount of partial payments to be made to the Contractor.

8. Workers' Compensation Insurance Coverage (as applicable, consistent with Texas Labor Code § 406.096)

- (a) The Contractor shall certify in writing that they provide workers' compensation insurance coverage for each employee of the Contractor employed on the public project.
- (b) Each Subcontractor on the public project shall provide such a certificate relating to coverage of the Subcontractor's employees to the general Contractor, who shall provide the Subcontractor's certificate to the governmental entity.
- (c) A Contractor who has a contract that requires workers' compensation insurance coverage may provide the coverage through a group plan or other method satisfactory to the governing body of the governmental entity.
- (d) The employment of a maintenance employee by an employer who is not engaging in building or construction as the employer's primary business does not constitute engaging in building or construction.

(e) In this section:

- (1) "Building or construction" includes:
 - i. erecting or preparing to erect a structure, including a building, bridge, roadway, public utility facility, or related appurtenance;
 - ii. remodeling, extending, repairing, or demolishing a structure; or
 - iii. otherwise improving real property or an appurtenance to real property through similar activities.
- (2) "Governmental entity" means this state or a political subdivision of this state. The term includes a municipality.

9. U.S. Iron and Steel (Does not apply to SWIFT Projects funded prior to May 1, 2019)

The following statement must be completed by the Contractor and made a part of the agreement between the Owner and the Contractor.

The Contractor acknowledges to and for the benefit of the Applicant ("Purchaser") and the Texas Water Development Board ("TWDB") that it understands the goods and services under this Agreement are being funded with monies made available by the Water Development Fund, Rural Water Assistance Fund, Economically Distressed Areas, State Participation Fund and/or Agricultural Water Conservation Fund. That these funds have statutory requirements commonly known as "United States Iron and Steel" that requires all of the iron and steel products used in the project to be produced in the United States ("United States Iron and Steel Requirement") including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the TWDB that (a) the Contractor has reviewed and understands the United States Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the United States Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the United States Iron and Steel Requirement, as may be requested by the Purchaser or the TWDB. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser to enforce this Agreement and recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the TWDB or any damages owed to the TWDB by the Purchaser). Neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the TWDB.

In the execution of the Contract, the Contractor shall be familiar with and at all times shall observe and comply with all applicable federal, state, and local laws, ordinances and regulations concerned with the use of iron and steel made in the United States which in any manner affect the conduct of the work, and shall indemnify and save harmless the Texas Water Development Board against any claim arising from violation of any such law, ordinance or regulation by the Contractor or by their Subcontractor or their employees.

Additional information on the United States Iron and Steel (US I&S) and its applicability to this contract can be found in the TWDB-11005 guidance.

It is recommended the Owner receive and maintain files documenting the Contractor's use of US I&S. Compliance with US I&S will be verified by the Owner through the submittal of the TWDB form TWDB-1105-A.

10. Prevailing Wage Rates

This contract is subject to Government Code Chapter 2258 concerning payment of Prevailing Wage Rates. The Owner will determine what the general prevailing rates are in accordance with the statute. The applicable provisions include, but are not limited to the following:

§2258.021. Right to be Paid Prevailing Wage Rates

- (a) A worker employed on a public work by or on behalf of the state or a political subdivision of the state shall be paid:
 - (1) not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed; and
 - (2) not less than the general prevailing rate of per diem wages for legal holiday and overtime work.
- (b) Subsection (a) does not apply to maintenance work.
- (c) A worker is employed on a public work for the purposes of this section if the worker is employed by a Contractor or Subcontractor in the execution of a contract for the public work with the state, a political subdivision of the state, or any officer or public body of the state or a political subdivision of the state.

§2258.023. Prevailing Wage Rates to be Paid by Contractor and Subcontractor; Penalty

- (a) The Contractor who is awarded a contract by a public body or a Subcontractor of the Contractor shall pay not less than the rates determined under Section 2258.022 to a worker employed by it in the execution of the contract.
- (b) A Contractor or Subcontractor who violates this section shall pay to the state or a political subdivision of the state on whose behalf the contract is made, \$60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the contract. A public body awarding a contract shall specify this penalty in the contract.
- (c) A Contractor or Subcontractor does not violate this section if a public body awarding a contract does not determine the prevailing wage rates and specify the rates in the contract as provided by Section 2258.022.
- (d) The public body shall use any money collected under this section to offset the costs incurred in the administration of this chapter.
- (e) A municipality is entitled to collect a penalty under this section only if the municipality has a population of more than 10,000.

§2258. 024. Records

- (a) A Contractor and Subcontractor shall keep a record showing:
- (1) the name and occupation of each worker employed by the Contractor or Subcontractor in the construction of the public work; and
 - (2) the actual per diem wages paid to each worker.
- (b) The record shall be open at all reasonable hours to inspection by the officers and agents of the public body.

§2258. 025. Payment Greater Than Prevailing Rate Not Prohibited

This chapter does not prohibit the payment to a worker employed on a public work an amount greater than the general prevailing rate of per diem wages.

11. Employment of Local Labor (only applicable to projects funded by EDAP)

The Contractor shall, to the maximum feasible extent, employ local labor for construction of the project. The Contractor and every Subcontractor undertaking to do work on the project which is, or reasonably may be done as on-site work, shall employ qualified persons who regularly reside within the political subdivision boundary of the Owner and the economically distressed area where the project is located (Texas Water Code, Section 17.183).

12. Payments

- (a) Progress Payments:
- (1) The Contractor shall prepare their requisition for progress payment as of the last day of the month and submit it, with the required number of copies, to the Engineer for review. Except as provided in paragraph (3) of this subsection, the amount of the payment due the Contractor shall be determined by adding to the total value of work completed to date, the value of materials properly stored on the site and deducting: (1) five percent (5%) minimum of the total amount, as a retainage and (2) the amount of all previous payments. The total value of work completed to date shall be based on the actual or estimated quantities of work completed and on the unit prices contained in the agreement (or cost breakdown approved pursuant to section 7b relating to lump sum bids) and adjusted by approved change orders. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of all invoices shall be available for inspection by the Engineer.
 - (2) The Contractor shall be responsible for the care and protection of all materials and work upon which payments have been made until final acceptance of such work and materials by the Owner. Such payments shall not constitute a waiver of the right of the Owner to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this contract complete and satisfactory to the Owner in all details.

- (3) This clause applies to contracts when the Owner is a District or Authority. The retainage shall be ten percent of the amount otherwise due until at least fifty percent of the work has been completed. After the project is fifty percent completed, and if the District or Authority's Board finds that satisfactory progress is being made, then the District may authorize any of the remaining progress payments to be made in full. The District is not obligated to pay interest earned on the first 50% of work completed (Texas Water Code Sec. 49.276(d)).
 - (4) The five percent (5%) retainage of the progress payments due to the Contractor may not be reduced until the building of the project is substantially complete and a reduction in the retainage has been authorized by the TWDB.
- (b) Withholding Payments. The Owner may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the Owner and if so elects may also withhold any amounts due from the Contractor to any Subcontractors or material dealers, for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the Owner and will not require the Owner to determine or adjust any claims or disputes between the Contractor and their Subcontractors or Material dealers, or to withhold any monies for their protection unless the Owner elects to do so. The failure or refusal of the Owner to withhold any monies from the Contractor shall in no way impair the obligations of any surety or sureties under any bond or bonds furnished under this contract.
- (c) Payments Subject to Submission of Certificates. Each payment to the Contractor by the Owner shall be made subject to submission by the Contractor of all written certifications required of the Contractor, their Subcontractors and other general and special conditions elsewhere in this contract.
- (d) Final Payment.
- (1) Upon satisfactory completion of the work performed under this contract, as a condition before final payment under this contract or as a termination settlement under this contract the Contractor shall execute and deliver to the Owner a release of all claims against the Owner arising under, or by virtue of, this contract, except claims which are specifically exempted by the Contractor to be set forth therein. Unless otherwise provided in this contract, by state law or otherwise expressly agreed to by the parties to this contract, final payment under this contract or settlement upon termination of this contract shall not constitute a waiver of the Owner's claims against the Contractor or their sureties under this contract or applicable performance and payment bonds.
 - (2) After final inspection and acceptance by the Owner of all work under the Contract, the Contractor shall prepare their requisition for final payment which shall be based upon the carefully measured or computed quantity of each item of work at the applicable unit prices stipulated in the Agreement or cost breakdown (if lump sum), as adjusted by approved change orders. The total amount of the final payment due to the Contractor under this contract shall be the amount computed as described above less all previous payments.

- (3) The retainage and its interest earnings, if any, shall not be paid to the Contractor until the TWDB has authorized a reduction in, or release of, retainage on the contract work.
- (4) Withholding of any amount due to the Owner, under general and/or special conditions regarding "Liquidated Damages" shall be deducted from the final payment due the Contractor.

13. Archaeological Discoveries and Cultural Resources

No activity which may affect properties listed or properties eligible for listing in the National Register of Historic Places or eligible for designation as a State Archeological Landmark is authorized until the Owner has complied with the provisions of the National Historic Preservation Act and the Antiquities Code of Texas. The Owner has previously coordinated with the appropriate agencies and impacts to known cultural or archeological deposits have been avoided or mitigated. However, the Contractor may encounter unanticipated cultural or archeological deposits during construction.

If archeological sites or historic structures which may qualify for designation as a State Archeological Landmark according to the criteria in 13 TAC Chapter 26, or that may be eligible for listing on the National Register of Historic Places in accordance with 36 CFR Part 800, are discovered after construction operations are begun, the Contractor shall immediately cease operations in that particular area and notify the Owner, the TWDB, and the Texas Historical Commission, 1511 N. Colorado St. , P. O. Box 12276, Capitol Station, Austin, Texas 78711-2276. The Contractor shall take reasonable steps to protect and preserve the discoveries until they have been inspected by the Owner's representative and the TWDB. The Owner will promptly coordinate with the State Historic Preservation Officer and any other appropriate agencies to obtain any necessary approvals or permits to enable the work to continue. The Contractor shall not resume work in the area of the discovery until authorized to do so by the Owner.

14. Endangered Species

No activity is authorized that is likely to jeopardize the continued existence of a threatened or endangered species as listed or proposed for listing under the Federal Endangered Species Act (ESA), and/or the State of Texas Parks and Wildlife Code on Endangered Species, or to destroy or adversely modify the habitat of such species.

If a threatened or endangered species is encountered during construction, the Contractor shall immediately cease work in the area of the encounter and notify the Owner, who will immediately implement actions in accordance with the ESA and applicable State statutes. These actions shall include reporting the encounter to the TWDB, the U.S. Fish and Wildlife Service, and the Texas Parks and Wildlife Department, obtaining any necessary approvals or permits to enable the work to continue, or implement other mitigation actions. The Contractor shall not resume construction in the area of the encounter until authorized to do so by the Owner.

15. Hazardous Materials

Materials utilized in the project shall be free of any hazardous materials, except as may be specifically provided for in the specifications.

If the Contractor encounters existing material on sites owned or controlled by the Owner or in material sources that are suspected by visual observation or smell to contain hazardous materials, the Contractor shall immediately notify the Engineer and the Owner. The Owner will be responsible for the testing and removal or disposal of hazardous materials on sites owned or controlled by the Owner. The Owner may suspend the work, wholly or in part during the testing, removal or disposal of hazardous materials on sites owned or controlled by the Owner.

16. Changes

*Provisions identified with an asterisk below are consistent with Local Government Code 271.060. Counties and Municipalities may modify the identified provisions, when applicable, to conform to Local Government Code 262.031 (Counties) or 252.048 (Municipalities).

- (a) The Owner may at any time, without notice to any surety, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including but not limited to changes:
 - (1) In the specifications (including drawings and designs);
 - (2) In the time, method or manner of performance of the work;
 - (3) To decrease or increase the quantity of work to be performed or materials, equipment or supplies to be furnished;
- (b) *The total price of a contract may not be increased by a change order unless provision has been made for the payment of the added cost by the appropriation of current funds or bond funds for that purpose, by the authorization of the issuance of certificates, or by a combination of those procedures.
- (c) *A contract with an original contract price of \$1 million or more may not be increased by more than 25 percent. If a change order for a contract, with an original contract price of less than \$1 million, increases the contract amount to \$1 million or more, subsequent change orders may not increase the revised contract amount by more than 25 percent.
- (d) *A governing body may grant authority to an official or employee responsible for purchasing or for administering a contract to approve a change order that involves an increase or decrease of \$50,000 or less.
- (e) Changes that involve an increase in price will be supported by documentation of the cost components. For projects funded through the EDAP program, or with grant proceeds, TWDB staff may request this information to be provided in a format equivalent to the Cost and Pricing Information form (No. WRD-277).
- (f) Any change orders involving a change in the project requiring a relocation of project components, sizing, or process may require additional environmental approval. A map and description of the proposed changes should be sent to the TWDB Environmental

Reviewer for coordination and approval as soon as possible to avoid any delay.

17. Operation and Maintenance Manuals and Training

- (a) The Contractor shall obtain installation, operation, and maintenance manuals from manufacturers and suppliers for equipment furnished under the contract. The Contractor shall submit three copies of each complete manual to the Engineer within 90 days after approval of shop drawings, product data, and samples, and not later than the date of shipment of each item of equipment to the project site or storage location.
- (b) The Owner shall require the Engineer to promptly review each manual submitted, noting necessary corrections and revisions. If the Engineer rejects the manual, the Contractor shall correct and resubmit the manual until it is acceptable to the Engineer as being in conformance with the design concept of the project and for compliance with information given in the contract documents. Owner may assess Contractor a charge for reviews of same items in excess of three (3) times. Such procedure shall not be considered cause for delay.
- (c) Acceptance of manuals by Engineer does not relieve Contractor of any requirements of terms of Contract.
- (d) The Contractor shall provide the services of trained, qualified technicians to check final equipment installation, to assist as required in placing same in operation, and to instruct operating personnel in the proper manner of performing routine operation and maintenance of the equipment.
- (e) Operations and maintenance manuals specified hereinafter are in addition to any operation, maintenance, or installation instructions required by the Contractor to install, test, and start-up the equipment.
- (f) Each manual is to be bound in a folder and labeled to identify the contents and project to which it applies. The manual shall contain the following applicable items:
 - (1) A listing of the manufacturer's identification, including order number, model, serial number, and location of parts and service centers.
 - (2) A list of recommended stock of parts, including part number and quantity.
 - (3) Complete replacement parts list.
 - (4) Performance data and rating tables.
 - (5) Specific instructions for installation, operation, adjustment, and maintenance.
 - (6) Exploded view drawings for major equipment items.
 - (7) Lubrication requirements.
 - (8) Complete equipment wiring diagrams and control schematics with terminal identification.

18. As-built Dimensions and Drawings

- (a) Contractor shall make appropriate daily measurements of facilities constructed and keep accurate records of location (horizontal and vertical) of all facilities.

- (b) Upon completion of each facility, the Contractor shall furnish the Owner with one set of direct prints, marked with red pencil, to show as-built dimensions and locations of all work constructed. As a minimum, the final drawings shall include the following:
- (1) Horizontal and vertical locations of work.
 - (2) Changes in equipment and dimensions due to substitutions.
 - (3) "Nameplate" data on all installed equipment.
 - (4) Deletions, additions, and changes to scope of work.
 - (5) Any other changes made.

19. Close-Out Procedures

To close-out the contract and release final retainage, the following steps must be completed:

- (a) TWDB Staff must conduct a construction contract final inspection (CCFI).
- (b) The following submittals must be received, reviewed, and accepted by TWDB:
- (1) The final change order, adjustment of quantities, or a statement that all change orders have previously been submitted and there will be no more change orders;
 - (2) The final pay request from the Contractor;
 - (3) An affidavit by the Contractor that all bills have been paid;
 - (4) Certification by the consulting Engineer that the work has been completed and was constructed in accordance with the approved plans and specifications and sound engineering principles and construction practices;
 - (5) Acceptance of the project by the Owner in the form of a written resolution or other formal action;
 - (6) Notification of the beginning date of the warranty period for the contract; and
 - (7) Confirmation that the Owner has received as-built drawings from the Contractor.
 - (8) Certificate of Compliance with U.S. Iron and Steel Requirements (TWDB-1105A)
- (c) TWDB will issue a Certificate of Approval allowing the release of retainage.

IV. FORMS AND GUIDANCE LIST

The following documents, mentioned throughout this guidance are available on the TWDB website at: <http://www.twdb.texas.gov/financial/instructions/index.asp>

Forms:

The following forms must be included in the bid documents:

- Contractor's Act of Assurance (ED-103)
- Contractor's Act of Assurance Resolution (ED-104)
- Certificate of Compliance with U.S. Iron and Steel Requirements (TWDB-1105A)
- Site Certificate (ED-101)
- Vendor Compliance with Reciprocity of Non-Resident Bidders (TWDB-0459).

Guidance Document:

- United States Iron and Steel Guidance (TWDB-1105)



**United States Iron and Steel
(U.S. I&S) Guidance for
Projects Funded through
State Programs**

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Overview

United States Iron and Steel (U.S. I&S) provisions are outlined in Texas Water Code § 17.183 and Texas Government Code (TGC), Chapter 2252, Subchapter G, as amended by Senate Bill (SB) 1289, 85th Legislative Session, and Texas Administrative Code (TAC) § 363.41. These provisions require recipients of financial assistance from the programs identified below, to use iron and steel products that are produced in the United States for projects for the construction, remodel, or alteration of a building, a structure, or infrastructure. These projects could include public water systems, treatment works, and flood control measures. This requirement applies to all bid documents submitted to the TWDB and contracts entered into on or after September 1, 2017, except for projects funded through the State Water Implementation Revenue Fund for Texas where the Board has adopted a resolution approving an application for financial assistance before May 1, 2019 for any portion of the project.¹

It is the intent of the Texas Water Development Board (TWDB) to ensure that applicants, consultants, and contractors are provided with procedures and recommendations for implementation of the U.S. I&S provisions for construction projects receiving financial assistance from the following accounts:

- ✓ Agricultural Water Conservation Fund (AWCF)²
- ✓ Economically Distressed Areas Program (EDAP)
- ✓ Flood Infrastructure Fund (FIF)
- ✓ Rural Water Assistance Fund (RWAFF)
- ✓ State Participation (SP)
- ✓ Texas Water Development Fund II (WDF)

Definitions

Construction Contract: A contract between the political subdivision and a construction contractor.

Construction Material³: For the purpose of U.S. I&S requirements, construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered “structural steel”. This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels,

¹ Texas Water Code §17.183 and Texas Government Code §2252 and Texas Water Code §15.432 or §15.472.

² Texas Water Code § 17.183 does not apply to the Agricultural Water Conservation Fund; however, the U.S. I&S provisions in Texas Government Code, Chapter 2252, Subchapter G may apply to certain conservation projects funded through the Agricultural Water Conservation Fund. See **Attachment 1** for supplemental guidance regarding Agricultural Water Conservation Fund projects.

³ Adopted from EPA's AIS Guidance

dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

EPA's AIS Guidance:: As used in this document, the term refers to the Environmental Protection Agency's State Revolving Fund American Iron and Steel (AIS) Requirement Guidance found at: <https://www.epa.gov/cwsrf/american-iron-and-steel-requirement-guidance-and-questions-and-answers>.

Manufacturing process: The application of a process to alter the form or function of materials or elements of a product in a manner that adds value and transforms the materials or elements into a new finished product functionally different from a finished product produced merely from assembling the materials into a product or elements into a product. Manufacturing process includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the U.S. for any part of the manufacturing process, it becomes foreign source material. However raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-U.S. sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.⁴

Mechanical and electrical components, equipment, systems, and appurtenances⁵--Include, but are not limited to, pumps, motors, gear reducers, drives (including variable frequency drives), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, dewatering equipment, electrical supports/covers/shielding, and other appurtenances related to an electrical system necessary for operation or concealment. An electrical system includes all equipment, facilities, and assets owned by an electric utility, as that term is defined in Section 31.002 Utilities Code.

⁴ Adopted from EPA's AIS Guidance

⁵ See **Attachment 1** for additional exceptions pertaining to the Agricultural Water Conservation Fund

Municipal castings⁶: Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

- Access Hatches;
- Ballast Screen;
- Benches (Iron or Steel);
- Bollards;
- Cast Bases;
- Cast Iron Hinged Hatches, Square and Rectangular;
- Cast Iron Riser Rings;
- Catch Basin Inlet;
- Cleanout/Monument Boxes;
- Construction Covers and Frames;
- Curb and Corner Guards;
- Curb Openings;
- Detectable Warning Plates;
- Downspout Shoes (Boot, Inlet);
- Drainage Grates, Frames and Curb Inlets;
- Inlets;
- Junction Boxes;
- Lampposts;
- Manhole Covers, Rings and Frames, Risers;
- Meter Boxes;
- Service Boxes;
- Steel Hinged Hatches, Square and Rectangular;
- Steel Riser Rings;
- Trash receptacles;
- Tree Grates;
- Tree Guards;
- Trench Grates; and
- Valve Boxes, Covers and Risers.

Political subdivision: Includes a county, municipality, municipal utility district, water control and improvement district, special utility district, and other types of water districts created under Texas Constitution Article III, Section 52 or Article XVI, Section 59, and nonprofit water supply corporations created and operating under Texas Water Code, Chapter 67.⁷

⁶ Adopted from EPA's AIS Guidance

⁷ Political subdivision is defined differently in Texas Water Code §17.871, which pertains to the Agricultural Water

Produced in the United States: With respect to iron or steel products, a product for which all manufacturing processes, from initial melting through application of coatings, occur in the United States, other than metallurgical processes to refine steel additives.

Project: A contract between the TWDB and a person or political subdivision.

Structural steel⁸: structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

Conservation Fund. See **Attachment 1** for supplemental guidance.

⁸Adopted from EPA's AIS Guidance

Covered Iron and Steel Products

If a construction contract for which the TWDB provides funds must comply with the U.S. I&S requirements, then all covered iron and steel products must be made in the United States, no matter whether the TWDB-provided-funds was the source to purchase a particular covered iron and steel product. The entity may not use other funding sources, including the entity's own funds, to pay for a non-compliant iron or steel product used in a TWDB funded construction contract.

U.S. I&S requirements apply to products made primarily of iron or steel that are permanently incorporated into the public water system, treatment works, or agricultural water conservation project, such as

- lined or unlined pipes or fittings;
- manhole covers;
- municipal castings;
- hydrants;
- tanks;
- flanges;
- pipe clamps and restraints;
- valves;
- structural steel;
- reinforced precast concrete; and
- construction materials.

For one of the listed products to be considered subject to the U.S. I&S requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

The following components are exempt from complying with U.S. I&S requirements:

- Iron or steel products that are not permanently incorporated into a Project.
- Mechanical and electrical components, equipment, systems, and appurtenances.⁹

⁹ See **Attachment 1** for additional exemptions pertaining to the Agricultural Water Conservation Fund.

Projects exempt from U.S. Iron and Steel

U.S. I&S requirements do not apply to a SWIFT-funded project that:

- (As detailed in SB 1289) is subject of a resolution approving an application for financial assistance from any TWDB funding program adopted by the TWDB before May 1, 2019, for any portion of the financing of the project, including the planning phase.

Compliance

To ensure compliance with the U.S. I&S requirements, specific U.S. I&S contract language must be included in each contract, including the construction material purchase agreements and bid documents.

It is the applicant's responsibility to assure that all construction and purchase contracts and associated bid documents are executed in compliance with U.S. I&S, and a record of all forms and certifications necessary to demonstrate compliance with U.S. I&S is maintained. To demonstrate compliance with U.S. I&S requirements either the final manufacturer, supplier or vendor that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the United States, or the applicant may use a step certification process similar to the Federal Highway Administration process.

TWDB relies on self-certification by the applicant to document compliance with U.S. I&S. The programs affected by U.S. I&S requirements were identified earlier in this guidance. For projects which require an Outlay Report to release funds, as it is the case for EDAP projects and for some FIF projects, a certification of compliance will be required with each outlay report. For projects funded through programs which are not subject to submittal of Outlay Requests, the applicant is required to maintain compliance certification records. In all cases, compliance records should be available for TWDB staff inspection or request. TWDB staff may also request that the applicant submit interim Certificates of Compliance (TWDB-1105A) throughout the project construction. For each construction contract a final Certificate of Compliance with U.S. I&S Requirements is required prior to the approval of final release of retainage and issuance of a Certificate of Approval by the TWDB Executive Administrator. Certificate of Compliance with U.S. I&S requirements is attached as **Attachment 2**.

TWDB Compliance Procedures

In order to comply with the requirements for implementation of U.S. I&S, entities will need to do the following:

1. The applicant should submit any waiver request to the TWDB project engineer as soon as possible. Until a waiver is granted, U.S. I&S requirements stand. A checklist detailing the types of information required for a waiver to be processed, and TWDB's waiver determination checklist is attached as **Attachment 3**.
2. Applicants shall include the following language in the advertisement for bids for all construction contracts funded by the TWDB's WDF, RWAF, EDAP, and SP programs. For appropriate language regarding projects funded through the AWCF, see Attachment 1.

Any contract(s) awarded under this Invitation for Bids is/are subject to the United States Iron and Steel (U.S. I&S) requirements of Texas Water Code § 17.183 and/or Texas Government Code, Chapter 2252, Subchapter G, as amended by SB 1289, 85th Legislative Session, as applicable.

3. Applicants shall include the following U.S. I&S requirements in all construction contracts:

*The Contractor acknowledges to and for the benefit of the **Applicant** ("Purchaser") and the Texas Water Development Board ("TWDB") that it understands the goods and services under this Agreement are being funded with monies made available by the Water Development Fund, Rural Water Assistance Fund, Economically Distressed Areas, State Participation Fund and/or Agricultural Water Conservation Fund. That these funds have statutory requirements commonly known as "United States Iron and Steel" that requires all of the iron and steel products used in the project to be produced in the United States ("United States Iron and Steel Requirement") including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the TWDB that (a) the Contractor has reviewed and understands the United States Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the United States Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the United States Iron and Steel Requirement, as may be requested by the Purchaser or the TWDB. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser to enforce this*

Agreement and recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the TWDB or any damages owed to the TWDB by the Purchaser). Neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the TWDB.

In the execution of the Contract, the Contractor shall be familiar with and at all times shall observe and comply with all applicable federal, state, and local laws, ordinances and regulations concerned with the use of iron and steel made in the United States which in any manner affect the conduct of the work, and shall indemnify and save harmless the Texas Water Development Board against any claim arising from violation of any such law, ordinance or regulation by the Contractor or by their Subcontractor or their employees

4. The applicant shall include the following language on the General Notes Plan Sheet(s).
This project is subject to the U.S. Iron and Steel (U.S. I&S) requirements of Texas Water Code § 17.183 and/or Texas Government Code, Chapter 2252, Subchapter G, as amended by SB 1289, 85th Legislative Session, as applicable. All iron and steel products used in project construction must be produced in the United States.
5. The applicant and prime construction contractor must obtain certifications from the final manufacturer that delivers the iron and steel product to the worksite, vendor, or contractor asserting that all manufacturing processes occurred in the United States.
6. The prime construction contractor and applicant will be required to maintain a file that contains the certifications from the final manufacturers and any TWDB approved waivers. This file must be available for review by TWDB representatives and/or State Auditors. Sample Certification letters and step certification log are included as **Attachment 4**.
7. The applicant may be requested to submit interim certificates of compliance with U.S. I&S requirements (TWDB-1105A) **Attachment 2**.
8. The applicant will provide a final Certificate of Compliance with U.S. I&S requirements (TWDB-1105A), after the completion of the construction contract and prior to issuance of a Certificate of Approval by the TWDB, stating that the project was completed in compliance with the U.S. I&S requirements.

Recommendations and Best Management Practices

The following recommendations are not required but should be considered by the applicant in implementation of the U.S. I&S requirements:

1. To any practical extent, the applicant and its consulting engineer should consider the applicability and availability of U.S. I&S products during all phases of the projects. Whenever is clear that a waiver may be necessary, the entity should request that waiver as soon as possible.
2. While a waiver application may be submitted at any time during the project, the applicant should consider TWDB's review schedule (10 days public comment period plus. review time) when scheduling projects. It is not recommended to request a waiver after the advertisement for bids or start of construction unless absolutely necessary.
3. Develop procedures for maintaining a record of U.S. I&S documentation. TWDB recommends the entity maintain a record of either Step Certification or Final Vendor Certification documents.
4. Distinguish separate bid items that must comply with U.S. I&S requirements on the Bid Form.
5. Consideration of U.S. I&S compliance documentation when developing the contractor submittal procedures for shop drawings, material lists, and manufacturer certifications, etc.
6. Discuss U.S. I&S requirements during pre-bid conference and pre-construction meetings, to address contractor's responsibilities, and availability of iron and steel products needed to complete the project.

Waivers

TGC § 2252.203, as added by SB 1289, 85th Legislative Session, permits TWDB to issue waivers for a case or category where it is demonstrated that:

1. Iron and steel products produced in the United States are not:
 - a. produced in sufficient quantities,
 - b. reasonably available, or
 - c. of satisfactory quality.
2. Use of iron and steel products produced in the United States will increase the cost of the overall project by more than 20 percent, or
3. Complying with the U.S. I&S requirements is inconsistent with the public interest.

Waivers Process

Waiver requests must be submitted by the applicant. It is not recommended to request a waiver after the advertisement for bids or start of construction unless absolutely necessary. If a waiver is requested after bid advertisement or start of construction, the U.S. I&S requirements stand until TWDB grants a waiver.

To apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) or PDF to the TWDB project engineer (or the TWDB contract manager, in the case of an AWCf grant project). Proper and sufficient documentation must be provided by the assistance recipient.

After receiving an application for waiver of the U.S. I&S requirements, TWDB will publish the request on its website for 10 days and receive informal comment. TWDB will then determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver and will determine whether to grant the waiver.

TWDB will notify the applicant that a waiver request has been approved or denied as soon as such a decision has been made. Approved waivers will be posted on the TWDB's website. The applicant should keep a copy of the signed waiver in their U.S. I&S Certification File.

Attachment 1: Supplemental Guidance for the Agricultural Water Conservation Fund

Overview:

The following information is provided as supplemental guidance for projects funded through the Agricultural Water Conservation Fund, in accordance with the United States Iron and Steel (U.S. I&S) provisions outlined in Texas Government Code (TGC), Chapter 2252, Subchapter G, as amended by Senate Bill (SB) 1289, 85th Legislative Session, and Texas Water Code §§ 17.871–17.912.

Definitions:

Political subdivision: Includes a district or authority created under Section 52, Article III, or Section 59, Article XVI, of the Texas Constitution, a municipality, a county, an institution of higher education as defined by Section 61.003, Education Code, any interstate compact commission to which the state is a party, and any nonprofit water supply corporation created and operating under Chapter 67.

Person: An individual, corporation, partnership, association, or other legal entity that is not a political subdivision.

Applicability:

As applied to TWDB programs, the U.S. I&S requirements of TGC, Chapter 2252, Subchapter G only pertain to contracts between the TWDB and a political subdivision to finance, refinance, or provide money to construct, remodel, or alter a building, a structure, or infrastructure. For the Agricultural Water Conservation Fund, these requirements would not apply to projects undertaken by “persons” (commonly referred to as “participants”) receiving money from the political subdivision funded by the TWDB.

Project Examples, Exemptions, and Construction Requirements:

U.S. I&S requirements only apply to projects to construct, remodel, or alter a building, a structure, or infrastructure. Explicit exemptions detailed in TGC § 2252.203 are discussed in the “Waivers” section on page 11 of this document. Furthermore, “mechanical and electrical components, equipment, systems, and appurtenances” such as those listed on page 3 of this document are not subject to U.S. I&S requirements.

U.S. Iron and Steel Required:

Examples of the types of projects and project components funded through the Agricultural Water Conservation Fund that would be required to follow U.S. I&S guidance include, but are not limited to: Rebar and structural steel used in canal lining projects, Pipes for canal-to-pipeline and pipeline replacement projects, and Well casing for projects involving well drilling activities.

Exempt Components:

In addition to the “mechanical and electrical components, equipment, systems, and appurtenances” listed on page 4, the following types of projects and project components would also be considered exempt from the U.S. I&S provisions (this is not an exhaustive list):

Equipment cost share projects to purchase and install meters, surge-flow valves, soil-moisture probes, center pivots (including the pad/slab construction), center pivot and pumping plant efficiency improvements, pivot control, telemetry, remote monitoring, supervisory control and data acquisition (SCADA), automated gates (including fabrication and construction), and weather stations (including footings, foundations, pads or slabs)

Provisions for Bid Documents:

In addition to the Construction Requirements contained within Texas Administrative Code § 367.12, applicants shall include the following language in the advertisement for bids for all construction contracts funded through the AWCF:

Any contract(s) awarded under this Invitation for Bids is/are subject to the United States Iron and Steel (U.S. I&S) requirements of Texas Government Code, Chapter 2252, Subchapter G, as amended by SB 1289, 85th Legislative Session, as applicable.

Attachment 2:1105-A Certificate of Compliance with U.S. Iron and Steel Requirements

Compliance Submittal by Owner

TWDB Project: _____

Contract Name and ID: _____

TWDB Commitment Number: _____

This executed certificate must be submitted after the completion of construction and prior to the issuance of a Certificate of Approval.

I, _____ (Full Name Printed) swear or affirm under penalty of law that I am _____ (Title) of the _____ (Name of Entity)

and to the best of my knowledge and in reliance of the certifications provided by manufacturers, vendors, contractors and consultants, hereby certify that the above-mentioned entity is in full compliance with the U.S. Iron and Steel requirements of Texas Water Code Section 17.183 and/or Texas Government Code Chapter 2252, Subchapter G, as applicable and subject to any waivers granted by the Texas Water Development Board (TWDB).

I understand that a false statement herein may subject me and/or the Entity to any and all civil and criminal penalties available pursuant to applicable federal and state laws.

EXECUTED this _____ day of _____, 20_____.

(Signature)

(Printed Name)

(Title)

Sworn to and subscribed before me by _____ on this _____ day of _____, 20_____.

(Notary Public in and for the State of Texas)

(SEAL)

Attachment 3: Waiver Request

Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to TWDB. This checklist is for informational purposes only and does not need to be included as part of a waiver application

Items	☑	Notes
<p>General</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> ○ Description of the foreign and domestic construction materials ○ Unit of measure ○ Quantity ○ Price ○ Time of delivery or availability ○ Location of the construction project ○ Name and address of the proposed supplier(s) ○ Name of contact person(s) for the proposed supplier(s) ○ A detailed justification for the use of foreign construction materials • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime contractor. 		
<p>Cost Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> ○ Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products ○ Relevant excerpts from the bid documents used by the contractors to complete the comparison ○ Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers. ○ Signed and sealed statement from the consulting engineer, indicating that he/she has reviewed the conditions for the waiver request and certify to their veracity. 		
<p>Availability Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: <ul style="list-style-type: none"> ○ Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials ○ Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. ○ Documentation of contacted suppliers' responses ○ Project schedule ○ Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the applicant, engineer and/or prime contractor and/or supplier, with supporting documentation, confirming the non-availability of the domestic construction materials for which the waiver is sought <p>To the best of your knowledge, has the State received other waiver requests for the materials described in this waiver request, for comparable projects?</p>		

TWDB Checklist for Waiver Request

Instructions: To be completed by TWDB. Review all waiver requests using the questions in the checklist, and mark the appropriate box as Yes, No or N/A. Marks that fall inside the shaded boxes may be grounds for denying the waiver. If none of your review markings fall into a shaded box, the waiver is eligible for approval if it indicates that one or more of the following conditions applies to the domestic product for which the waiver is sought:

1. The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.
2. The inclusion of iron and/or steel products produced in the United States will increase the cost of the overall project by more than 20 percent ("cost of the project" means the total amount of the Board's funding commitment for the construction portion of the project)

Review Items	Yes	No	N/A	Notes
Cost of Waiver Request <ul style="list-style-type: none"> • Does the waiver request include the following information? <ul style="list-style-type: none"> o Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products 				
<ul style="list-style-type: none"> o Relevant excerpts from the bid documents used by the contractors to complete the comparison 				
<ul style="list-style-type: none"> o A sufficient number of bid documents or pricing information from domestic sources to constitute a reasonable survey of the market 				
<ul style="list-style-type: none"> • Does the Total Domestic Project exceed the Total Foreign Project Cost by more than 20%? 				
Availability Waiver Requests <ul style="list-style-type: none"> • Does the waiver request include supporting documentation sufficient to show the availability, quantity, and/or quality of the iron and/or steel product for which the waiver is requested? <ul style="list-style-type: none"> o Supplier information or other documentation indicating availability/delivery date for materials o Project schedule o Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of materials 				
<ul style="list-style-type: none"> • Contractors made a reasonable effort to locate domestic suppliers of materials, such as a description of the process for identifying suppliers and a list of contacted suppliers? 				
<ul style="list-style-type: none"> • Based on the materials delivery/availability date indicated in the supporting documentation, will the materials be unavailable when they are needed according to the project schedule? (By item, list schedule date and domestic delivery quote date or other relevant information) 				
<ul style="list-style-type: none"> • Is TWDB aware of any other evidence indicating the non-availability of the materials for which the waiver is requested? Examples include: <ul style="list-style-type: none"> o Multiple waiver requests for the materials described in this waiver request, for comparable projects in Texas o Multiple waiver requests for the materials described in this waiver request, for comparable projects in other States o Correspondence with construction trade associations indicating the non-availability of the materials • Are the available domestic materials indicated in the bid documents of inadequate quality compared those required by the project plans, specifications, and/or permits? 				

Attachment 4: Sample Certifications

U.S. I&S Certification must document the location of the manufacturing process involved with the production of iron and steel materials. Each handler (supplier, fabricator, manufacturer, processor, etc.) of the iron and steel products and their step in the process must be recorded and certified as domestically performed.

The applicant may utilize either:

1. a Final Manufacturer Certification process, in which the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification identifying all handlers of the iron or steel product, and asserting that all manufacturing processes occurred in the U.S.; or
2. a Step Certification process in which each handler of the iron or steel product provides a separate certification letter certifying that their step in the process was domestically performed.

Final Manufacturer Certification

The following information is provided as a sample letter of certification for U.S. I&S compliance. Documentation must be provided on company letterhead. The Final Manufacturer's Certification should list everyone who has handled the product, starting with the processor of the raw iron or steel through the contractor who installs the final product.

Date

Company Name

Company Address

City, State Zip

Subject: United States Iron and Steel Certification for Project (XXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the United States Iron and Steel requirement as required in Texas Water Code § 17.183 and/or Texas Government Code, Chapter 2252, Subchapter G, as amended by SB 1289, 85TH Legislative Session, as applicable.

Item, Products and/or Materials:

1. Xxxx

2. Xxxx

3. Xxxx

Such process took place at the following location:

*Contractor: _____
(Name) (Item) (Process)*

*Supplier: _____
(Name) (Item) (Process)*

*Manufacturer: _____
(Name) (Item) (Process)*

*Processor: _____
(Name) (Item) (Process)*

If any of the above compliance statements change while providing material to this project, we will immediately notify the prime contractor and the engineer.

Signed by company representative

Step Certification

A step certification is a process under which each handler (supplier, fabricator, manufacturer, processor, etc.) of the iron and steel products certifies that their step in the process was domestically performed. The step certification process requires receipt of a separate letter from everyone who handles the product, starting with the processor of the raw iron or steel through the contractor that installs the final product.

Step Certification Letter

The following information is provided as a sample letter of step certification for U.S. I&S compliance. Documentation must be provided on company letterhead of each handler responsible for that process of the iron or steel product.

Date

Company Name

Company Address

City, State Zip

Subject: United States Iron and Steel Step Certification for Project (XXXXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the United States Iron and Steel requirement required in Texas Water Code § 17.183 and/or Texas Government Code, Chapter 2252, Subchapter G, as amended by SB 1289, 85TH Legislative Session, as applicable.

Item, Products and/or Materials:

1. Xxxx

2. Xxxx

3. Xxxx

Such process took place at the following location:

Handler: _____
(Name) (Item) (Process)

If any of the above compliance statements change while providing material to this project, we will immediately notify the prime contractor and the engineer.

Signed by company representative

Step Certification Log

The following information is provided as a sample log to keep track of step certification for U.S. I&S compliance. The TWDB makes no claims regarding the legality of the step certification log with respect to U.S. I&S compliance.

United States Iron and Steel Step Certification Log for

(Iron or Steel Product)

CONTRACTOR:		
(NAME)	(ITEM)	(PROCESS)
SUPPLIER:		
(NAME)	(ITEM)	(PROCESS)
MANUFACTURER:		
(NAME)	(ITEM)	(PROCESS)
PROCESSOR:		
(NAME)	(ITEM)	(PROCESS)

Attachment 2:1105-A

Certificate of Compliance with U.S. Iron and Steel Requirements

Certificate of Compliance with U.S. Iron and Steel Requirements
Compliance Submittal by Owner

TWDB Project: _____

Contract Name and ID: _____

TWDB Commitment Number: _____

This executed certificate must be submitted after the completion of construction and prior to the issuance of a Certificate of Approval.

I, _____ (Full Name Printed) swear or affirm under penalty of law that I am _____ (Title) of the _____ (Name of Entity)

and to the best of my knowledge and in reliance of the certifications provided by manufacturers, vendors, contractors and consultants, hereby certify that the above-mentioned entity is in full compliance with the U.S. Iron and Steel requirements of Texas Water Code Section 17.183 and/or Texas Government Code Chapter 2252, Subchapter G, as applicable and subject to any waivers granted by the Texas Water Development Board (TWDB).

I understand that a false statement herein may subject me and/or the Entity to any and all civil and criminal penalties available pursuant to applicable federal and state laws.

EXECUTED this _____ day of _____, 20_____.

(Signature)

(Printed Name)

(Title)

Sworn to and subscribed before me by _____ on this _____ day of _____, 20_____.

(Notary Public in and for the State of Texas)

(SEAL)

SECTION 01025
MEASUREMENT AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for measurement and payment of Work.
- B. Conditions for nonconformance assessment and nonpayment for rejected Work.

1.02 AUTHORITY

- A. Units and methods delineated in this Section are intended to complement the criteria of the Technical Specifications and 00 41 00 – Proposal Form.
- B. In the event of conflict, the unit specified for Bid Items in 00 41 00 – Proposal Form shall govern.
- C. Measurements and quantities submitted by the Contractor will be verified by the Engineer.
- D. Contractor shall provide necessary equipment, workers, and survey personnel as required by Engineer to verify quantities.

1.03 UNIT QUANTITIES SPECIFIED

- A. Quantity and measurement estimates stated in 00 41 00 – Proposal Form are for contract purposes only. Quantities and measurements supplied or placed in the Work, authorized and verified by the Owner shall determine payment as stated in General Conditions.
- B. If the actual Work requires greater or lesser quantities than those quantities indicated in Section 03 – Bid Proposal, provide the required quantities at the unit prices contracted except as otherwise stated in General Conditions or in executed Change Order.

1.04 MEASUREMENT OF QUANTITIES

- A. Measurement by Weight: Measured by unit of weight as submitted on certified load tickets.
- B. Measurement by Volume:
 - 1. Stockpiles: Measured by cubic dimension using mean length, width, and height or thickness.
 - 2. Excavation and Embankment Materials: Measured by cubic dimension using the average end area method.
- C. Measurement by Area: Measured by square dimension using mean length and width or radius.
- D. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- E. Stipulated Price Measurement: By unit designated in the Agreement.

- F. Other: Items measured by weight, volume, area, or lineal means or combination, as appropriate, as a completed item or unit of the Work.

1.05 PAYMENT

- A. Payment includes full compensation for all required supervision, labor, products, tools, equipment, plant, transportation, services, and incidentals; and erection, application or installation of an item of the Work; and Contractor's overhead and profit. The price bid shall include the total cost for required Work. Claims for payment as Unit Price Work not specifically covered in the Bid Proposal will not be accepted.
- B. The total lump sum bid proposal in the Bid Form shall cover all Work required by the Contract Documents. The lump sum bid shall include all costs in connection with the proper and successful completion of the Work, including but not limited to: 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. All Work not specifically set forth in the Bid Form shall be considered subsidiary obligations of Contractor and all costs in connection therewith shall be included in the price bid.
- C. Total compensation for required Unit Price work shall be included in Unit Price bid in Bid Proposal. Claims for payment as Unit Price work, but not specifically covered in the list of Unit Prices contained in the Bid Proposal, will not be accepted.
- D. Progress Payments for Unit Price Work will be based on the Engineer's and Owner's observations and evaluations of quantities incorporated in the Work multiplied by the unit price.
- E. Progress Payments for Lump Sum Work will be based on the Engineer's and Owner's observations and evaluations of the percentage of quantities included in the schedule of values incorporated in the Work.
- F. Final Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities determined by Engineer and Owner multiplied by the unit price for Work which is incorporated in or made necessary by the Work.

1.06 NONCONFORMANCE ASSESSMENT

- A. Remove and replace the Work, or portions of the Work, not conforming to the Contract Documents.
- B. If, in the opinion of the Owner or Owner's Construction Manager, it is not practical to remove and replace the Work, the Owner or Owner's Construction Manager will direct one of the following remedies:
 - 1. The nonconforming Work will remain as is, but the unit price will be adjusted to a lower price at the discretion of the Owner or Owner's Construction Manager.
 - 2. The nonconforming Work will be modified as authorized by the Owner or Owner's Construction Manager, and the unit price will be adjusted to a lower price at the discretion of the Owner or Owner's Construction Manager, if the modified Work is deemed to be less suitable than originally specified.

- C. Individual Technical Specifications may modify these options or may identify a specific formula or percentage price reduction.
- D. The Owner or Owner's Construction Manager shall make a recommendation to the Owner on the assessment of nonconformance and adjustment of payment based on the nonconformance if such condition of nonconformance is not specifically resolved within the contract documents. The Owner will have final approval of the assessment and adjustment of payment.

1.07 NONPAYMENT FOR REJECTED PRODUCTS

- A. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable to the Owner.
 - 2. Products determined as nonconforming before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required Work.
 - 5. Products remaining on hand after completion of the Work, unless specified otherwise.
 - 6. Loading, hauling, and disposing of rejected products.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01100
SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Summary of the Work including work by Contractor, Work sequence, future Work, Contractor use of Premises, and Owner occupancy.

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of the contract is to improve various process areas to repair and replace equipment and structure that have been damaged during Hurricane Harvey. Generally, the work consists of the following:
 - 1. Mobilization, bonds, and insurance by the Contractor to initiate project start-up, as specified in Contract Documents.
 - 2. Storm water pollution prevention plan and storm water control measures during construction as specified in Contract Document.
 - 3. Proposed Improvements as shown on the Drawings and specified herein.
 - a. Wagner Booster Pump Station:
 - 1) Modification of existing main breaker to replace trip 1600A unit with 2500A trip unit, replace 1600A current sensors with 2500A rated current sensors
 - 2) Demolition of existing ATS
 - 3) Demolition of existing ductbank (including conduit & wire) to generator from ATS and wire from ATS to bus transition section.
 - 4) Temporary relocation of generator and demolition of existing generator pad
 - 5) Installation of new non-SE rated ATS with enclosure, ductbank from new SE rated ATS (including conduit & wire), new wire from ATS to MCC, new generator concrete pad.
 - 6) Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - 7) Replacement of circuit breaker feeding ancillary generator circuit panelboard and replacement of ancillary generator circuits panelboard main circuit breaker.
 - 8) Installation of all required control wiring associated with generator, and ATS to the site PLC.
 - 9) Inclusive of all testing and power system studies.
 - b. Leissner Booster Pump Station:
 - 1) Demolition of existing ductbank (including conduit & wire) to generator from ATS, wire from ATS to MCC.
 - 2) Temporary relocation of generator and demolition of existing generator pad

- 3) Installation of new pull box on exterior of the electrical building, new overhead conduit & wire runs from existing SE rated ATS to new pull box and new ductbank (including conduit & wire) from pull box to generator, new wire from ATS to MCC, new generator concrete pad.
 - 4) Demolition of existing 208V generator engine block heater and replacement with a 240V engine block heater with same wattage
 - 5) Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - 6) Replacement of existing generator ancillary circuit panelboard and installation of new transformer and MCC feeder breaker to serve the proposed generator ancillary circuit panelboard.
 - 7) Installation of all required control wiring associated with generator, and ATS to the site PLC.
 - 8) Inclusive of all testing and power system studies.
- c. Dead Man Well:
- 1) Demolition of existing ATS and main breaker
 - 2) Installation of new ATS and main breaker
 - 3) Installation of new generator 120V circuits (battery blanket heaters and receptacles)
 - 4) Installation of all required control wiring associated with generator, and ATS to the site PLC.
 - 5) Inclusive of all testing and power system studies.
- d. Wells Ranch WTP - Service No.1
- 1) Demolition of existing wire/conduit previously installed to and from main breaker/ATS/generator (non-utility wire)
 - 2) Demolition of the existing main breaker section
 - 3) Demolition of existing ATS
 - 4) Temporary relocation of generator and demolition of existing generator pad
 - 5) Modification of existing Siemens switchboard line-up to decouple the main breaker section from the distribution sections.
 - 6) Installation of new main breaker section
 - 7) Installation of new MLO section at the end of switchboard line up
 - 8) Installation of new wire and cable tray system from new main breaker to ATS, from ATS to new MLO section.
 - 9) Installation of new wire and cable tray system from new ATS to new pull box on exterior of the building.
 - 10) Installation of new ductbank from pull box to the existing 1600kW generator
 - 11) Installation of new dry-type transformer and panelboard for new circuits to generator panels
 - 12) Installation of new generator 120V circuits (battery blanket heaters and receptacles)
Installation of all required control wiring associated with PQM, generator, and ATS to the plant PLC.
 - 13) Inclusive of all testing and power system studies.
- e. Wells Ranch WTP – Service No. 2
- 1) Demolition of existing wire/conduit previously installed to ATS/generator
 - 2) Demolition of the existing empty pull section adjacent to the switchboard
 - 3) Demolition of existing ATS
 - 4) Temporary relocation of generator and demolition of existing generator pad

- 5) Modification of existing Eaton switchboard line up to decouple the main breaker section from the distribution section.
- 6) Installation of new MLO section at the end of switchboard line up
- 7) Installation of new wire and cable tray system from existing main breaker to ATS, from ATS to new MLO section.
- 8) Installation of new wire and cable tray system from new ATS to pull box on exterior of the building.
- 9) Installation of new ductbank from pull box to the existing 1250kW generator
- 10) Installation of new generator 120V circuits (battery blanket heaters and receptacles)
- 11) Installation of all required control wiring associated with PQM, generator, and ATS to the plant PLC
- 12) Installation of all required control wiring associated with PQM, generator, and ATS to the plant PLC.
- 13) Inclusive of all testing and power system studies.

1.4 LOCATION OF WORK

A. The work of this Contract is located at multiple sites:

1. Wagner Booster Pump Station: 1084 Farm-To-Market Rd 78, Cibolo, TX 78108
2. Leissner Booster Pump Station: 2797 Leissner School Rd, Seguin, TX 78155
3. Dead Man Well: About 1.5 miles past the Wells Ranch WTP on High Point (383 High Point Ridge, Seguin, TX 78155)
4. Wells Ranch WTP: 383 High Point Ridge, Seguin, TX 78155

1.5 WORK SEQUENCE

A. Furnish all labor, materials, equipment and incidentals required to and construct the modification and improvements at the above listed sites in its entirety as shown on the Drawings and specified herein.

B. Plant Operational Requirements

1. Interruption of process flows of any kind and plant, facility, or process shutdowns are not permitted without prior written approval of the Owner. Contractor shall submit a request for approval to the Owner at least fourteen (14) calendar days prior to the planned shutdown. The submittal request shall include construction plans which detail schedule, techniques, and method to be used for interruptions of wastewater flow and shutdowns. The Construction Manager shall be copied on all correspondence.
2. Flow interruptions and shutdowns should be scheduled for low flow periods for as short a duration as practical. Shut down of treatment facilities is not allowed during peak flow conditions. Contractor shall make provisions for accommodating peak flow if necessary.

3. Once the request of proposed process shutdowns is approved by Owner, the Owner and Construction Manager must be notified a minimum of 48 hours prior to any plant or facility shut down.
 - C. The Contractor is required to determine his own means and method of construction and detailed work sequence, within the general terms of the Contract, and the specific requirements, so long as the restraints are observed, and the final project completion dates are met.
 - D. The general sequence of construction is described in general order in this specification section and as shown on the Drawings. The general work sequence is provided to demonstrate the facilities that must remain on-line and in service for maintenance of plant flow and regulatory requirements. The provided sequence is not meant to limit the contractor's ingenuity or prescribe a particular means and methods.
 - E. The Contractor shall serve as an overall coordinator among all Sub-contractors.
 - F. The major operational constraints are defined in Part 1.6.
 - G. Demolition: Prior to start of demolition:
 1. Contractor shall tag all the equipment, piping, HVAC, electrical, concrete, etc. that will be removed as shown on the Drawings and specifications.
 2. Obtain permission from the Owner prior to start of demolition.
 3. Refer to Drawings for demolition requirement details.
 - H. It is the Contractor's responsibility to prepare a construction schedule that will adequately complete all work outlined in the Contract Documents within the allotted Contract Time.
 - I. **The Contractor/manufacturer or supplier shall meet the following schedule:**
 1. **Submit electrical shop drawings to the Engineer and Owner for review within six (6) weeks after Notice of Award.**
- 1.6 UTILITY OUTAGE AND SHUTDOWN
- A. Contractor to submit planned outage schedule and detailed sequence of installation and switchover anticipated to meet shutdown requirements in the paragraphs below.
 - B. The Contractor shall coordinate shut down of power to each facility and give a minimum of two (2) week notice before shut-down needs to occur.
 - C. Wagner BPS:
 1. The facility shall not be shut down without power for more than three (3) consecutive days.
 - D. Leissner BPS:
 1. The facility shall not be shut down without power for more than three (3) consecutive days.

E. Dead Man Well:

1. During the summer, power to the equipment at the facility shall not be shut down. Temporary wiring shall be provided from generator to power pump motors and ancillary loads during periods of required shut down to maintain continuity of facility uptime.
2. During off-peak periods, the maximum allowable shut down period is eight (8) hours.

F. Wells Ranch WTP Service No. 1:

1. During the summer, power to the equipment at the facility shall not be shut down. Temporary wiring shall be provided from generator to power pump motors and ancillary loads during periods of required shut down to maintain continuity of facility uptime.
2. During off-peak periods, the maximum allowable shut down period is eight (8) hours.

G. Wells Ranch WTP Service No. 2:

1. The Electrical Service No. 2 at the facility shall not be shut down for more than 24 hours.

1.7 CONTRACTOR'S USE OF PREMISES

- A. Coordinate use of premises with Owner, considering work by other contractors.
- B. Assume full responsibility for security of all materials and equipment stored on the site.
- C. If directed by the Owner, move any stored items which interfere with operations of Owner or other contractors.
- D. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

1.8 OWNER OCCUPANCY

- A. The Owner will occupy the site during the entire period of construction for the conduct of normal operation.
- B. Cooperate with the Owner to minimize conflict, and to facilitate the Owner's operations.
- C. Coordinate Contractor's activities with Engineer.
- D. Schedule work to accommodate this requirement.
- E. If owner occupies any or all parts of the premises, this action does not signify substantial completion or any limits on the contractor's liability or contractual responsibility of premises.
- F. A single Substantial Completion date will be established for the entire project. The Owner will not be providing partial Substantial Completion.

1.9 GEOTECHNICAL INVESTIGATIONS

- A. N/A.

- B. Contractor may perform additional soil investigations as he/she deems appropriate.

1.10 PERMITS

- A. Contractor is responsible for obtaining all building permits required for this project including Building, Electrical, Plumbing, Mechanical, ROW Excavation, etc, and building permit fee.
- B. Contractor shall coordinate and schedule any building inspection or approval as required by the Owner.
- C. Contractor shall obtain all required Storm Water Pollution Prevention Permit from Texas Commission on Environmental Quality and other applicable state and federal review agencies.

1.11 GENERAL CONSTRUCTION NOTES

- A. Contractor shall be responsible for providing required security to protect his own property, equipment, and work in progress in accordance with the Contract Documents.
- B. The Contractor is responsible for verifying the location(s) of all underground utility lines shown on the drawings before beginning construction.
- C. The information contained within the project Drawings with regards to the existing facilities was taken from the original construction plans with the original work shown light and proposed work shown dark. Original work shown light is for the Contractor's information only. Its accuracy is not guaranteed and its use in no way relieves the contractor or others of any responsibility for loss due to inaccuracies.
- D. Contractor shall be responsible for adequately protecting existing structures, utilities, trees, shrubs, and other adjoining facilities and repair or replace due to damage caused by Contractor.
- E. Contractor shall field verify all dimensions and conditions before commencing work. All landscaping features shall be field verified. It shall be the Contractor's responsibility to report any discrepancies to the engineer in a timely manner.
- F. Interruption of water flows of any kind and plant, facility, or process shutdowns are not permitted without prior written approval of the Owner. Submit for approval construction plans which detail schedule, techniques, and method to be used for interruptions of water flow and shut-downs. Flow interruptions and shut-downs should be scheduled for low flow periods for as short a duration as practical. Shut down of water pumping and processing facilities are not allowed during peak flow conditions. Make provisions for accommodating peak flow if necessary. The Owner shall be notified when any interruptions or shut-downs are to be made.
- G. Any existing plant process piping or utilities in conflict with proposed construction, whether explicitly identified on the Drawings or not, shall be temporarily relocated as required so as to provide continuous service by the plant and/or by the utility (no separate pay). After construction, piping and/or utility shall be returned to original location (no separate pay), unless notification is provided in writing that relocated piping or utility can remain in modified location (or abandoned as appropriate) and clear identification of new location (or abandonment as appropriate) is noted on the As-Built Drawings.

- H. Contractor to keep access road to existing plants open at all times, unless specific permission is granted by the Owner for the purposes of safety or completion of construction activities. Contractor staging area used for Contractor's personnel, parking, material, and storage. Stockpile, material fabrication and related construction uses will not be allowed to interfere with normal plant operation. Contractor to provide temporary all-weather access roads as needed to maintain access to all plant facilities, including the chemical storage and sludge handling areas, throughout the duration of the project.
- I. The Contractor to give notice to all authorized inspectors, superintendents or persons in charge of private and public utilities affected by his operations prior to commencement of work.
- J. Obtain all required construction permits prior to commencement of work.
- K. The finished grade elevations shown are intended to provide drainage away from treatment plant facilities. Minor changes may be necessary to provide adequate drainage.
- L. Maintain drainage of site during all phases of construction. Do not block drainage from adjacent areas or add flow to adjacent areas.
- M. These Drawings, prepared by Ardurra Group, Inc., do not extend to or include designs or systems pertaining to the safety of the construction Contractor or its employees or agents. Ardurra Group, Inc.'s registered professional engineer(s) that have sealed these bid documents does not extend to any such safety systems that may now or hereafter be incorporated in these Drawings. The construction Contractor shall prepare or obtain the appropriate safety systems, including the drawings and specifications required by the House Bills 662 and 665 enacted by the Texas Legislature in the 70th Legislature – Regular Session.
- N. The Contractor shall contact the following, a minimum of 48 hours prior to beginning construction:
 - Texas One Call - (800) 545-6005
- O. Contractor shall not operate any existing valves, plant appurtenances or plant equipment. Provide sufficient lead time for Plant Operator where it becomes necessary to actuate or de-actuate valves, plant appurtenances, or plant equipment.
- P. Owner shall be notified 48 hours in advance of any existing process equipment or pump "shutdown."
- Q. All the buried fittings (valves, bends, wyes, plugs, tees, fire hydrants, etc.) shall be installed with joint restraining system to withstand the test pressures listed in Section 01445. Contractor is responsible for calculating restraint length requirements and providing required restraint piping as necessary. Concrete thrust blocks may be used only for special conditions when approved or directed by the engineer.
- R. Contractor shall comply with all Federal, State, and local laws and regulations of utility companies concerning safety and health practices.
- S. Contractor shall provide hydro-mulch in all areas disturbed as a result of construction operations that are not covered by structures or pavement.

- T. Piping drawings indicate invert elevations for gravity flow lines. Slope pipe uniformly between elevations shown. No valleys or peaks permitted in gravity flow lines. For other piping, refer to detail sheets for pipe elevations at each structure. Yard piping drawings do not indicate vertical bends and transitions. When necessary, make vertical transitions or furnish and install vertical bends at no extra cost. Do not exceed manufacturer's recommendations for curvature of lines and/or deflection of pipe joints. All vertical transitions and bends to be documented on required "red line drawings."
- U. Yard piping locations shown are approximate. Field verify locations of existing pipe. Arrange new piping as necessary to avoid interference and provide clearance noted. All changes in piping shown, to be documented on required "red line drawings."
- V. Maintain minimum clearance of 3 feet from edge of structures to closest edge of pipeline adjacent and parallel to edge of structure unless otherwise noted on plans.
- W. The Contractor to provide tape, fittings, plugs, and other devices for use in filling, flushing, testing, etc. (no separate pay).
- X. Overhead lines exist along and with the project boundary. Contractor to locate them prior to beginning any construction and comply with special restrictions. Texas Law, Session 752, Health and code governing any activities which may cause people or objects to approach live overhead high-voltage lines shall be strictly adhered to. Contractor and owners are legally responsible for safety of construction workers under this law. This law carries both criminal and civil liability.
- Y. The Contractor shall abide by all CenterPoint restrictions including all recommended safety precautions. The contractor shall not operate any equipment or have any persons within 10 feet (vertical and horizontal) of any electrical power lines.
- Z. Provide sheeting, shoring, and bracing of excavations where required to properly and safely complete the work as shown. Construct sheeting, shoring, and bracing to prevent the excavation from extending beyond specified or indicated limits and to protect adjacent structures or improvements. The sheeting, shoring, and bracing that is used to protect workmen and the public shall comply to OSHA, state of Texas, federal regulations, deemed as applicable and concerning trenching, tunneling, or other excavations.
- AA. Unless specifically noted elsewhere in the Drawings or Specifications, all hardware provided for piping, including nuts, bolts, supports, straps, etc. shall be Type 316SS.
- BB. Trench Excavation for Owner. On this Project, the Contractor, and the Contractor's agents, employees, subcontractors and vendors, shall not do any trench excavation exceeding a depth of five feet unless: (1) the Occupational Safety and Health Administration standards for trench safety in effect at the time of the excavation are referenced in the Contract Documents; (2) the Contractor has obtained from the Owner the Owner's geotechnical information, if any, for the trench excavation site; and (3) there is a separate pay item approved by the Owner for trench excavation safety protection for the trench excavation. Texas Health & Safety Code Section 756.023.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01200
PROJECT MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Section includes general coordination including Preconstruction Conference, Site Mobilization Conference, and Progress Meetings.
- B. References to Technical Specifications:
 - 1. Section 01100 – Summary of Work

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 RELATED DOCUMENTS

- A. Coordination is required throughout the documents. Refer to all of the Contract Documents and coordinate as necessary.

1.04 ENGINEER AND REPRESENTATIVES

- A. The Engineer may act directly or through designated representatives as defined in General Conditions, 2.1.1 “General”, and as identified by name at the Preconstruction Conference.

1.05 CONTRACTOR COORDINATION

- A. Coordinate scheduling, submittals, and work of the various Technical Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Coordinate completion and cleanup of the Work for Substantial Completion and for portions of the Work designated for Owner’s partial occupancy.
- C. Coordinate access to Project Site for correction of nonconforming work to minimize disruption of Owner’s activities where Owner is in partial occupancy.

1.06 PRECONSTRUCTION CONFERENCE

- A. Contractor will schedule a Preconstruction Conference.
- B. Attendance Required: Owner, Owner’s Representative, Engineer's Representatives, Contractor, and major Subcontractors. Need to have at least one attendee present from each entity with decision making authority.
- C. Agenda:
 - 1. Distribution of Contract Documents.

2. Designation of personnel representing the parties to the Contract, and the Engineer.
3. Discussion of formats proposed by the Contractor for Schedule of Values, Scheduling of Work and coordination with other contractors.
4. Discussion of required Submittals, including, but not limited to, Work Plans, Traffic Control Plans, Safety Programs, Construction Photographs.
5. Procedures and processing of Shop Drawings and other submittals, substitutions, Applications for Payment, Requests for Information, Request for Proposal, Change Orders, and Contract Closeout.
6. Review of Subcontractors.
7. Appropriate agenda items listed in this Section, 1.07 “Site Mobilization Conference”, when Preconstruction Conference and Site Mobilization Conference are combined. It is encouraged to combine these two meetings into one.
8. Procedures for testing.
9. Procedures for maintaining Project Record Documents.
10. Designation of the individual authorized to execute change documents and their responsibilities.
11. Discussion of requirements of a Trench Safety Program.

1.07 SITE MOBILIZATION CONFERENCE

- A. When required by Section 01100 – Summary of Work, Contractor will schedule a Site Mobilization Conference at the Project Site prior to occupancy.
- B. Attendance Required: Owner, Owner’s Representative, Engineer representatives, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 1. Use of premises by Owner, Owner’s Representative, Engineer(s) and Contractor / Subcontractors and other governmental entities.
 2. Safety and first aid procedures.
 3. Construction controls provided by Owner.
 4. Temporary utilities.
 5. Survey and layout.
 6. Security and housekeeping procedures.
 7. Field office requirements.

1.08 PROGRESS MEETINGS

- A. Progress Meetings shall be held at Project Site or other location as designated by the Owner or Owner's Representative. Meeting shall be held at monthly intervals.
- B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Owner's Representative, Engineer Representatives as appropriate to agenda topics for each meeting.
- C. Owner's Representative will make arrangements for meetings and recording minutes.
- D. Owner's Representative will prepare the agenda and preside at meetings.
- E. Contractor shall provide required information and be prepared to discuss each agenda item.
- F. Agenda:
 - 1. Review minutes of previous meeting.
 - 2. Review of Construction Schedule, Applications for Payment, payroll and compliance submittals.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of Submittal Schedule and status of submittals.
 - 6. Review status of Requests for Information, Requests for Proposal.
 - 7. Review status of Change Orders.
 - 8. Review of off-site fabrication and delivery schedules.
 - 9. Maintenance of updates to Construction Schedule.
 - 10. Corrective measures to regain projected schedules.
 - 11. Planned progress during succeeding work period.
 - 12. Coordination of projected progress.
 - 13. Maintenance of quality and work standards.
 - 14. Effect of proposed changes on Construction Schedule and coordination.
 - 15. Other items relating to the Work.

1.09 FACILITY COMMISSIONING AND START-UP MEETINGS

- A. Contractor to attend and facilitate commissioning and startup meetings.

B. Commissioning and Startup Meetings:

1. Meetings should begin no later than 1 month before commissioning and start-up is anticipated to begin.
2. Meetings shall be held on a weekly basis while commissioning and start-up is ongoing.

C. Meeting agenda shall include but not be limited to:

1. Impacts to process operation.
2. Coordination of vendor personnel presence on-site.
3. Schedule for testing and training.
4. Integration of changes to SCADA and controls.
5. Submittal status pertaining to commissioning and start-up.

D. Attendees will include:

1. Contractor's representative with full authority to make decision on behalf of subcontractor.
2. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
3. Engineer's personnel as needed.
4. Owner's Representative(s) and Commissioning and Start-up Specialist Team.
5. Owner staff.
6. Others as required by Contract Documents or as deemed necessary by the Contractor.

1.10 SAFETY MEETINGS

A. Monthly Mass Safety Meeting:

1. Attend monthly mass safety meetings to be held at the Project site or as directed by Contractor.
2. Meeting agenda shall include but not limited to:
 - a. Status of the project from Contractor.
 - b. Overall site safety performance.
 - c. Safety issues.
 - d. Health and Safety Program (HASP) reviews as required.
 - e. Safety recognitions.
 - f. Upcoming medium/high risk Work activities.
 - g. Excellence Safety Program (ESP) progress.
 - h. Any other items deemed necessary by the Contractor.

3. Attendees shall include all employees working on site. This includes lower-tier subcontractors, vendors, visitors, etc.

B. Safety Committee Meeting:

1. Contractor shall designate one craft level employee to participate in Project's Safety Committee while subcontractor's Work is in progress.
2. The committee shall meet as directed by the Contractor, to conduct job wide safety audit, discuss pertinent safety concerns, or any other items deemed necessary for project safety.

C. High Hazard Activity Hazard Analysis (AHA) reviews:

1. Contractor's Safety Manager shall determine Work that is considered high hazard based on scope of activity and Work in surrounding areas.
2. Any high hazard Work must have AHA prepared at least 2 weeks prior to activity.
3. Upon completion of the AHA a meeting must be held to review the AHA to verify it is adequate. The Contractor is responsible for safety on site including the review and approval of the AHA.
4. Attendees shall be safety staff, project supervisors and anyone else the Contractor has deemed necessary.
5. Weekly meeting to review safety performance and issues with Subcontractor's safety representative.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01311
CONSTRUCTION SCHEDULE

PART 1 GENERAL

1.01 CONSTRUCTION SCHEDULING GENERAL PROVISIONS

- A. No work shall be done between 6:00 P.M. and 7:00 A.M. nor on Sundays or legal holidays without the written permission of the Owner. However, emergency work may be done without prior permission. Emergency work shall include work to mitigate or prevent conditions that may pose an immediate threat to the health and well-being of workers under the supervision of the Contractor or Owner or the general population, including maintenance of operations of the treatment process, as well as work to mitigate or prevent conditions that may cause damage to existing facilities or work in-progress. Efforts shall be made at the earliest convenience to notify the Owner and Engineer or such work deemed to be emergency work and documentation shall be provided in writing.
- B. If night work is required, the Contractor should coordinate with the Owner for permission. Such permission, however, may be revoked at any time by the Owner if the Contractor fails to maintain adequate lighting equipment, and supervision for the proper prosecution and control of the work at night, or if the off-site effects of night construction are deemed by the Owner to be unacceptable.
- C. Due to the potential health hazards, and requirements of the State of Texas and the U.S.
- D. Environmental Protection Agency, water treatment facilities must be maintained in operation throughout the construction period. It is required that the degree of treatment during construction be equal to or exceed the efficiency required by the Plant's discharge permits.
- E. The Contractor shall be fully responsible for providing all temporary piping, plumbing, electrical hook-ups, heating, ventilating, air conditioning, lighting, temporary structures, and such other items required to maintain the treatment plant operations. All details of temporary piping and temporary construction are not indicated in the plans or these Specifications. However, this does not relieve the Contractor of the responsibility to ensure the construction will not interrupt proper water treatment.
- F. Several areas of construction under this contract must be coordinated with the Plant Operating Personnel and accomplished in a logical order to maintain the process flow through the plant and to allow construction to be completed within the time allowed by Contract Documents. Coordinate the activities with the other contractors, if any, to allow orderly and timely completion of all the work.
- G. When access through construction areas must be disrupted, provide alternate acceptable access for the plant operators.
- H. Coordinate the activities in the interface or common areas with the plant operators. Submit to the Engineer a description and schedule as to how the common areas will be utilized, recognizing the required coordination with the plant operators.

- I. Various interconnections within the plant will depend on the closure of various valves and/or gates. Only Plant Operation Personnel may close or open existing facilities (i.e. valves, gates, lift stations, hydrants, etc.).
- J. Various interconnections within the plant may require temporary partial power shutdown. Make every effort necessary to minimize the shutdown time and coordinate with the Plant Operating Personnel and/or utility authorities prior to attempting any such power shutdown. Furthermore, provide any corrective measure or temporary facilities necessary to perform the work at no additional cost to the Owner and without interrupting the plant operation.
- K. When the work requires an existing facility to be taken out of operation, temporarily or permanently, notify the Engineer and Owner one week in advance.
- L. Where water is required in large quantity for preoperational testing or other use, plant process water may be used, upon coordination with Owner. If the plant water (washdown hydrants, etc) is not sufficient to be used for testing the water retaining structures, it is the Contractor's responsibility to coordinate the acquisition of water.
- M. During Start-Up Testing, make available the manpower, equipment and manufacturer's representatives required to make any necessary adjustments and training.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item.

1.03 PROGRESS OF THE WORK

- A. The Work shall be started within 15 days following the effective date of the Agreement, the work shall be executed with such progress as may be required to prevent any delay to the general completion of the project. The work shall be executed at such times and in or on such parts of the project, and with such personnel, materials, and equipment to assure completion of the work in the time established by the Agreement.
- B. If the Contractor for his convenience and at his own expense, should desire to carry on his work at night or outside regular hours, he shall submit written notice to the Engineer and he shall allow ample time for satisfactory arrangements to be made for inspecting the work in progress. The Contractor shall pay the expenses for extra inspection required for work outside regular hours at the current hourly rates at the time of construction. The Contractor shall illuminate the different parts of the project as required to comply with all applicable Federal and State regulations.

1.04 CONSTRUCTION SCHEDULE

- A. In lieu of the progress schedules specified in the General Conditions, the Contractor shall, within ten (10) days after the effective date of the Agreement, provide and submit to the Engineer for approval, the Schedule for the first 60 days of activities. Within 45 days after the effective date of the Agreement the Contractor shall provide and submit to the Engineer the schedule he plans to maintain in order to successfully construct the entire project within the time allotted. The completed schedule shall be approved before additional monthly payments

are made. This Schedule shall include a Critical Path Network and a computer-generated printout. The Schedule shall account for all the work of the Contractor and his Subcontractors and suppliers. In addition to all reasonably important construction activities, the Schedule shall provide for the proper sequence of construction the various key milestones and various crafts, purchasing time, submittal approval, material delivery, equipment fabrication, and similar time consuming factors.

- B. The Schedule shall include as a minimum, the earliest starting and finish dates, and latest starting and finish dates, and the total float for each task or item. The Contractor shall update (monitor) and rerun the schedule at least monthly and shall submit to the Engineer both the network and computer print-out, both in duplicate, at the same time the pay estimate is prepared. The schedule shall contain all of the items of the Periodic Estimate and Pay Schedule.
- C. While the Contractor bears full responsibility for scheduling the Work to ensure its successful prosecution and completion within the time specified in accordance with all provisions of these Specifications, the Contractor is specifically required to complete fully or complete such stages of work to enable his Subcontractors and suppliers to complete their work within the respective time specified.
- D. The monthly schedule update (monitoring) shall include the following items:
 - 1. Network
 - a. Activities that are completed or in process are to be identified on the Network by contrasting heavy lines, colors, fill patterns, etc. Each activity worked on should be proportional to the percentage of progress achieved to date, as shown in the Periodic Estimate and Pay Schedule.
 - b. Restraints imposed by material deliveries, precedent activity durations or schedule adjustments, are to be appropriately represented on the monthly update of the Network.
 - 2. Computer Print-out
 - a. The percentage progress status of each activity shall be shown on the computer print-out. The percentage progress status will be used to support the Contractor's periodic pay estimate.
 - b. Actual start and completion dates are to be included in the computer printout.
 - c. All activities started and in progress should be flagged in the computer printout.
- E. Supplemental to the Critical Path Schedule, the Contractor shall provide a detailed work schedule, projected at least a month in advance. The implementation of the work schedule and the coordination required will constitute the basic agenda of the coordination and planning meetings.
- F. If the Engineer determines that operations are falling behind schedule at any time during the construction period, the Owner may require the Contractor to add to his plant, equipment and/or construction forces, including increases in working hours, in such quantities as are required to bring operations back on schedule. Upon receipt of written communication from the Owner requiring such addition, the Contractor shall furnish same at no additional cost to the Owner.

1.05 PARTIAL OWNER OCCUPANCY

- A. The Contractor shall schedule his operations for completion of portions of the Work, as designated, for the Owner's occupancy prior to Pre-Final Inspection of the entire work.

1.06 SUBSTANTIAL COMPLETION

- A. In addition to requirements outlined in document 00 72 00 – General Conditions, for Contractor to be substantially complete with the Work and call for inspection by Owner Engineer to confirm, the following minimum conditions must be met or completed:
 - 1. All new structures and buildings fully constructed and complete with all utilities connected, tested, in service and operational.
 - 2. All equipment installed, tested, and functional in all modes of operation as defined in respective Divisions and manufacturer certificates of installation have been provided where required.
 - 3. All yard piping, site electrical and all other site work installed, tested, and complete and accepted by Owner.
 - 4. All programming, control narratives and system startup procedures and equipment interaction fully demonstrated.
 - 5. Final O&M manuals have been delivered to the Owner in hard copy and electronic format. Electronic manuals shall be provided in a format acceptable to the Engineer and Owner.
 - 6. Completion of installations of all required safety structures and equipment, including, but not limited to, guard rails, warning signs, pipe and equipment painting, labeling, and tagging. All safety related systems and equipment shall be installed, accepted by manufacturer's representative and approved for use.
 - 7. All training completed using Draft O&M Manuals.
 - 8. Elevation Certificate completed and submitted at three stages for each proposed building. The first stage requires an elevation certificate submittal with the construction plans as part of the permitting process. The second stage requires a submittal when the finished floor is placed or when the vertical beam is placed in a new building, The third stage requires a submittal once construction has been completed.

1.07 WORK SEQUENCE

- A. All work to be done under this Contract shall be done with minimum inconvenience to the existing treatment facilities. The Contractor shall coordinate his work with the Owner such that the facilities are maintained to the maximum extent possible.
- B. Construct Work in stages to accommodate the Owner's use of the premises during the construction period; coordinate the Construction schedule and operations with the Owner's Representative.

- C. See Section 01100 for additional details.

1.08 CONSTRUCTION AREAS

- A. Contractor shall limit his use of the construction areas for Work and for storage, to allow for:
 - 1. Work by other contractors, if any.
 - 2. Owner use.
 - 3. This section and other sections of these specifications, for existing construction operations and coordination of the work.
- B. Coordinate use of work site under direction of Engineer.
- C. Assume full responsibility for the protection and safekeeping of Products under this Contract, stored on the site.
- D. Move any stored Products under Contractor's control which interfere with operations of the Owner or separate contractor.
- E. Obtain and pay for the use of additional storage or work areas needed for operations.
- F. Construction Operations on Plant Property at various sites.
 - 1. The Contractor shall conduct his plant access, hauling, parking and storage operations as specified and within the construction site plans for each site. Any staging/storage areas are tentative and subject to change until Contractor issued a Notice to Proceed.

1.09 ADDITIONAL PROVISIONS

- A. Before commencing work on any of the existing structures or equipment, the Contractor shall notify the Engineer, in writing, at least 14 calendar days in advance of the date he proposes to commence such work.
- B. The Contractor shall provide at his own cost all necessary temporary facilities for access to, and for protection of, all existing structures. The treatment plant personnel must have ready access at all times to the existing structures. The Contractor is responsible for all damage to existing structures, equipment, and facilities caused by his construction operations, and must repair all such damage when and as ordered by the Engineer.

1.10 OWNER OCCUPANCY

- A. Owner shall have full access to and use of all existing utilities during the entire period of construction for the conduct of his normal operations. Cooperate with Owner's Representative in all construction operations to minimize conflict, and to facilitate Owner usage.
- B. Contractor shall at all times conduct his operations as to ensure the least inconvenience to the general public and plant operating/maintenance personnel.

1.11 PARTIAL OWNER OCCUPANCY

- A. The Contractor shall schedule his operations for completion of portions of the Work, as designated, for the Owner's occupancy prior to Pre-Final Inspection of the entire work.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01350
SUBMITTALS

PART 1 GENERAL

This Section contains general lists of Submittals and Technical Specifications that may be required for the Work. When Submittals are required elsewhere in these Technical Specifications, refer to this Section for Submittal requirements and procedures.

1.01 SECTION INCLUDES

A. Submittal procedures for:

1. Schedule of Values
2. Construction Schedules
3. Shop Drawings, Product Data, and Samples
4. Operations and Maintenance Data
5. Manufacturer's Certificates
6. Construction Photographs
7. Project Record Documents
8. Design Mixes

B. References to the following Technical Specifications:

1. Section 01200 – Project Meetings
2. Section 01630 – Product Options & Substitutions
3. Section 01100 – Summary of Work
4. Section 01380 – Construction Photographs
5. Section 01720 – Project Record Documents

1.02 SUBMITTAL PROCEDURES

A. Scheduling and Handling

1. Schedule Submittals well in advance of the need for material or equipment for construction. Allow time to make delivery of material or equipment after Submittal is approved.
2. Develop a Submittal Schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. The Engineer will review and return submittals to the Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a Submittal Schedule be acceptable which allows less than 30 days for initial review by the Engineer. This time for review shall in no way be justification for delays or additional compensation to the Contractor.
3. The Engineer's review of submittals covers conformity to the Plans, Technical Specifications, and dimensions which affect the layout. The Contractor is responsible for quantity determination. The Contractor is responsible for any errors, omissions or deviations from the Contract requirements; review of
4. submittals in no way relieve the Contractor from his obligation to furnish required items according to the Plans and Technical Specifications.
5. Submit 5 copies of documents unless otherwise specified in this Section or by individual Technical Specifications.

6. Revise and resubmit submittals as required. Identify all changes made since previous submittal.
7. The Contractor shall assume the risk for material or equipment which is fabricated or delivered prior to approval. No material or equipment shall be incorporated into the Work or included in Applications for Payment until approval has been obtained in the specified manner.

B. Transmittal Form and Numbering

1. Transmit each submittal to the Engineer with a transmittal form.
2. The Contractor shall utilize a 10-character submittal identification numbering system with a work package designation in the following manner:
3. The first character shall be a D, S, P, M, or R, which represents Shop/Working Drawing and other Product Data (D), Sample (S), Preliminary Submittal (P), Operating/Maintenance Manual (M), or Request for Information (R).
4. The next five digits shall be the applicable Specification Section Number.
5. The next three digits shall be the numbers 001-999 to sequentially number each initial separate item or drawing submitted under each specific Section number.
6. The last character shall be a letter, A-Z, indicating resubmission of the same Drawing (i.e. 0=1st submission, A=2nd submission, B=3rd submission, etc.). A typical submittal number would be as follows:

D-03300-008-A

D	= Shop Drawing or Product Data
03300	= Specification Section for Concrete
008	= The eighth initial submittal under this specification section
A	= The second submission (first resubmission) of that particular shop drawing

7. Identify variations from requirements of Contract Documents and identify product or system limitations.
8. For submittal numbering of video tapes, see this Section, 1.10 "Video".

C. Contractor's Certification

1. Each submittal shall contain a statement or stamp signed by the Contractor, certifying that the items have been reviewed in detail and are correct and in accordance with Contract Documents, except as noted by any requested variance.

D. Submittal Organization

1. Each Submittal PDF file will contain bookmark in hierarchical table format to access information pertaining to the submittal.
2. No bookmark links will reference files external to the PDF file containing the bookmark links.
3. Each bookmark will access the beginning location of the related information.
4. Submittal PDF should be searchable. Scanned PDF and submittals not bookmarked submittal will be returned.

1.03 SCHEDULE OF VALUES

- A.** Submit a Schedule of Values at least 10 days prior to the first Application for Payment. A Schedule of Values shall be provided for each of the items indicated as Lump Sum (LS) in Section 00300 – Bid Proposal for which the Contractor requests to receive Progress Payments.

- B. Schedule of Values shall be provided electronically in typewritten format such as Microsoft Excel or other spreadsheet format. Use the Table of Contents of this Project Manual as a format for listing costs of Work by Section.
- C. Round off figures for each listed item to the nearest \$100.00 except for the value of one item, if necessary, to make the total price for all items listed in the Schedule of Values equal to the applicable Lump Sum in Section 00300 – Bid Proposal.
- D. For Unit Price Contracts, items should include a proportional share of Contractor's overhead and profit, such that the total of all items listed in the Schedule of Values equals the Contract amount. For Stipulated Price Contracts, Mobilization, Bonds, and Insurance may be listed as separate items in the Schedule of Values.
- E. For Lump Sum equipment items, where Submittals for Testing, Adjusting, and Balancing Reports in conjunction with Operation and Maintenance Data are required, include a separate item for equipment Operation and Maintenance Data Submittals and a separate item for Submittals of equipment Testing, Adjusting, and Balancing Reports, each valued at five (5) percent of the Lump Sum.
- F. Revise the Schedule of Values and resubmit for items affected by contract modifications, Change Orders, and Work Change Directives. Submit revised Schedule of Values 10 days prior to the first Application for Payment after the changes are approved by the Engineer.

1.04 CONSTRUCTION SCHEDULES

- A. Submit Construction Schedules for the Work in accordance with the requirements of this Section. The Construction Schedule Submittal shall be, at a minimum, a bar chart, (computer generated or prepared manually) and a narrative report. The critical path for construction shall be clearly identified.
- B. During the Preconstruction Meeting, as noted in Section 01310 - Coordination and Meetings, the Contractor shall provide a sample of the format to be used for the Construction Schedule Submittal. The format is subject to approval by the Engineer. Review of the Submittal will be provided within 7 days of the Submittal of the sample.
- C. Within 7 days of the receipt of approval of the Contractor's format, or 14 days of the Notice to Proceed, whichever is later, the Contractor shall submit a proposed Construction Schedule for review. The Construction Schedule Submittal shall meet the following requirements:
 - 1. The Construction Schedule shall usually include a total of at least 20 but not more than 50 activities. Fewer activities may be accepted, if approved by the Engineer.
 - 2. For Projects with work at different physical locations, each location should be indicated separately within the Construction Schedule.
 - 3. For projects with multiple crafts or significant subcontractor components, these elements should be indicated separately within the Construction Schedule.
 - 4. For Projects with multiple types of tasks within the scope, these types of work should be indicated separately within the Construction Schedule.
 - 5. For Projects with significant major equipment items or materials worth over 25 percent of the Total Contract Price, the Construction Schedule shall indicate dates when these items are to be purchased, when they are to be delivered, and when installed.
 - 6. For Projects where operating plants are involved, each period of work which will require the shutdown of any process or operation shall be identified in the Construction Schedule and must be

agreed to by the Engineer prior to starting work in the area.

7. A Billing Schedule (tabulation of the estimated monthly billings) for the Work shall be prepared and submitted by the Contractor with the first Construction Schedule. This information is not required in the monthly updates, unless significant changes in Work require re-submittal of the Construction Schedule for review. The total for each month and a cumulative total will be indicated.

These monthly forecasts are only for planning purposes of the Engineer. Monthly payments for actual work completed will be made by the Engineer in accordance with Section 00700 - General Conditions of Agreement.

- A. The Contractor must receive approval of the Engineer for the Construction Schedule and Billing Schedule prior to the first monthly Application for Payment. No payment will be made until these are accepted.
- B. Upon written request from the Engineer, the Contractor shall revise and submit for approval all or any part of the Construction Schedule to reflect changed conditions in the Work or deviations made from the original plan and schedule.
- C. The Contractor's Construction Schedule shall thereafter be updated with the Actual Start and Actual Finish Dates, Percent Complete, and Remaining Duration of each Activity and submitted monthly. The date to be used in updating the monthly Construction Schedule shall be the same Date as is used in the monthly Application for Payment. This monthly update of the Construction Schedule shall be required before the monthly Application for Payment will be processed for payment.
- D. The narrative Construction Schedule Report shall include a description of changes made to the Construction Schedule; Activities Added to the Construction Schedule; Activities Deleted from the Construction Schedule; any other changes made to the Construction Schedule other than the addition of Actual Start Dates and Actual Finish Dates and Remaining Durations.

1.05 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- A. Shop Drawings
 1. Submit Shop Drawings for review as required by the Technical Specifications.
 2. Contractor's Certification, as described in this Section, 1.02 "Submittal Procedures" shall be placed on each Shop Drawing.
 3. The Shop Drawing shall accurately and distinctly present the following:
 - a. Field and erection dimensions clearly identified as such.
 - b. Arrangement and section views.
 - c. Relation to adjacent materials or structure including complete information for making connections between work under this Contract and work under other contracts.
 - d. Kinds of materials and finishes.
 - e. Parts list and descriptions.
 - f. Assembly Shop Drawings of equipment components and accessories showing their respective positions and relationships to the complete equipment package.
 - g. Where necessary for clarity, identify details by reference to sheet numbers and detail numbers, schedule or room numbers as shown on the Plans.
 4. Shop Drawing Drawings shall be to scale, and shall be a true representation of the specific equipment or item to be furnished.

B. Product Data

1. Submit Product Data for review when required in individual Technical Specifications.
2. Contractor's Certification, as described in this Section, 1.02 "Submittal Procedures" shall be placed on each data item submitted.
3. Mark each copy to identify applicable products, models, options to be used in this Project. Supplement manufacturers' standard data to provide information unique to this Project, where required by the Technical Specification.
4. For products specified only by reference standard, submit manufacturer, trade name, model or catalog designation, and applicable reference standard.
5. For Approved Products, those designated in the Technical Specifications followed by the words "or approved equal", submit manufacturer, trade name, model or catalog designation, and applicable reference standard.
6. For products proposed as alternates to Approved Products, refer to Section 01630 - Product Options and Substitutions, 1.04 "Selection Options" and 1.07 "Substitution Procedures".
7. For products that are neither Pre-Approved, Approved, specified only by reference standard, nor proposed as alternates; submit product description, trade name, manufacturer, and supplier. Contractor shall provide additional information upon written request by Engineer or Owner.

C. Samples

1. Submit samples for review as required by the Technical Specification.
2. Contractor's Certification, as described in this Section, 1.02 "Submittal Procedures", shall be placed on each sample or a firmly attached sheet of paper.
3. Submit the number of samples specified in the Technical Specification; one of which will be retained by the Engineer.
4. Reviewed samples which may be used in the Work are identified in the Technical Specifications.

1.06 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed as:
1. permitting any departure from the Contract requirements;
 2. relieving the Contractor of responsibility for any errors, including details, dimensions, and materials; and/or
 3. approving departures from details furnished by the Owner's Representative, except as otherwise provided herein.
- B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- C. If the shop drawings, data or samples as submitted describe variations and show a departure from Contract requirements which Owner's Representative finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Owner's Representative may return the reviewed drawings without noting an exception.
- D. Submittals will be returned to the Contractor under one of the following codes.

- Code 1 - “APPROVED” is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
- Code 2 - “APPROVED AS NOTED/COMMENTS ATTACHED”. This code is assigned when a confirmation of the notations and comments is NOT required by the contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
- Code 3 - “APPROVED AS NOTED/CONFIRM”. This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Owner’s Representative within 15 calendar days of the date of the Engineer’s transmittal requiring the confirmation.
- Code 4 - “APPROVED AS NOTED/RESUBMIT”. This combination of codes is assigned when notations and comments are extensive enough to require resubmittal of the entire package. This resubmittal is to address all comments, omissions, and nonconforming items that were noted. Resubmittal is to be received by the Engineer within 30 calendar days of the date of the Engineer’s transmittal requiring the resubmittal.
- Code 5 - “NOT APPROVED” is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.
- Code 6 - “FOR RECORD ONLY (RECEIPT ACKNOWLEDGED)” is Assigned where a submittal is provided for record purposes only and does not require a response. This code is assigned to acknowledge receipt of a submittal that is not subject to the Engineer’s review and approval and is being filed for informational purposes only. This code is generally used in acknowledging receipt of means and methods of construction work plans, field conformance test reports, and health safety plans.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 providing documents for record purposes only with no response required.

- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Owner’s Representative, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the contractor. The Contractor shall make corrections to any work done because of this type of revision that is not in accordance to the Contract Documents as may be required by the Owner’s Representative.
- F. For resubmittals, the Contractor shall address and respond to comments provided by the submittal reviewer(s) and include this input in the following resubmission. **Resubmission without responses to reviewers’ comments from prior submittals/resubmittals will be rejected and returned.**

- G. Partial submittals may not be reviewed. The Owner’s Representative will be the judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered “Not Approved” until resubmitted. The Owner’s Representative may at his/her option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

1.07 OPERATIONS AND MAINTENANCE DATA

- A. When specified in Technical Specification, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, operation, adjusting, finishing, and maintenance.
- B. Contractor's Certification, as described in this Section. 1.02 “Submittal Procedures”, shall be placed on front page of each document.
- C. Identify conflicts between manufacturers' instructions and Contract Documents.

1.08 MANUFACTURER'S CERTIFICATES

- A. When specified in Technical Specification, submit manufacturers' certificate of compliance for review by Engineer.
- B. Contractor's Certification, as described in this Section, 1.02 “Submittal Procedures”, shall be placed on front page of the certificate.
- C. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Manufacturer’s Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.09 CONSTRUCTION PHOTOGRAPHS

- A. Submit photographs in accordance with Section 01380 – Construction Photographs.
 - 1. Prints: Prepare 2 prints of each view and submit 1 print directly to the Owner’s Representative within 7 days of taking photographs. One print shall be retained by the Contractor and made available at all times for reference on the job site.
- B. PRECONSTRUCTION PHOTOGRAPHS:
 - 1. Prior to the commencement of any construction, take digital color photographs on the entire route of the project
 - 2. Photographs: digital photographs are acceptable, and must be clear, in focus and clearly labeled.
 - 3. The photographs shall show:
 - a. Date photographs were taken
 - b. Location of the photograph, house number and street name. (This information may be shown on a chalk board in the photograph by a label on the mountings.)
 - 4. Photographs should show the condition of the following
 - a. Existing conditions, building facilities
 - b. Esplanades and boulevards
 - c. Yards (near, side and far side of street)
 - d. Housewalk, sidewalk and driveway; curb
 - e. Area between walk and curb

- 1) Particular features (yard lights, shrubs, fences, trees, etc.)
- 2) Landscaping and decorative features.

C. POST CONSTRUCTION PHOTOGRAPHS

1. On completion of construction, provide photographs of any public or private property which has been repaired or restored and any damage which is or may be the subject of complaints.

1.10 PROJECT RECORD DOCUMENTS

- A. Submit Project Record Documents in accordance with Section 01720– Project Record Documents.

1.11 VIDEO

- A. Submit television video in digital format as required in individual Technical Specifications.
- B. Transmittal forms for video disks shall be numbered sequentially beginning with T01, T02, T03, etc.

1.12 DESIGN MIXES

- A. When specified, submit design mixes for review.
- B. Contractor's Certification, as described in this Section, 1.02 “Submittal Procedures”, shall be placed on front page of each design mix.
- C. Mark each design mix to identify proportions, gradations, and additives for each class and type of design mix submitted. Include applicable test results on samples for each mix.
- D. Maintain a copy of approved design mixes at mixing plant.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01380
CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Comprehensive digital photographic documentation of the construction process for all plant facility work (one or more distinct sites) and pipeline work (more than one segment usually linear in nature) progressively and at selected milestones.
- B. Documentation inclusive of electronic indexing, navigation, storage and remote access throughout construction.
- C. Support, security of information and technological requirements related to the documentation.
- D. Qualifying credentials.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 RELATED REQUIREMENTS

- A. Section 01100 – Summary of Work
- B. Section 01350 – Submittals

1.04 SUBMITTALS

- A. When required by Section 01100 – Summary of Work, submit photographs in accordance applicable provisions of this Section and in accordance with the project's Document Control Management System.
- B. Make Submittals required by this and related Sections under the provisions of Section 01350 – Submittals.
- C. When requested by the Engineer, the Contractor shall submit extra prints of photographs, for distribution directly to designated parties who will pay the costs for the extra prints directly to the photographer.
- D. When required by Contract Documents, submit photographs with Application for Payment.
- E. When required by individual Sections, submit photographs taken following completion of the Work to show the condition in which the Project Site will be left.
- F. Format and Media. Digital photography shall be used for all types of photographs. Submit digital Joint Photographic Experts Group (JPEG) images for electronic submittals in the Electronic Document Management System.

G. File Naming Conventions:

1. Photographs shall be submitted by zip file in the Document Control Management System. The zip file shall be named as follows_____
 - a. Zipped File names shall include Facility Description, Inspector, Date (YYYYMMDD).
Example 1: BWWC2_JDoe_20211025. Would be pictures of backwash waste clarifier no. 2 by John Doe on October 25, 2021.
 - b. Individual File JPG names shall have a unique identifier and shall be approved by the Program Manager prior to submitting. File names shall be named by Subcontractor in such a way that they are uniquely identifiable without opening the individual file.
 - 1) EXAMPLE 1: PRETREATMENT BASIN SOUTH-072020.jpg

H. Submit Preconstruction Photograph digital images with embedded GPS coordinates (latitude, longitude, and compass direction of view) shown on the image. Contractor shall download digital images and GPS coordinates to the Project's GIS system.

I. Submit Progress Photograph digital images with embedded GPS coordinates (latitude, longitude, and compass direction of view) shown on the image.

J. Submit Completed Project Photograph images. GPS coordinates shall not be shown on Completed Project digital images.

K. Submit Post Construction Photograph digital images. GPS coordinates to be shown on the image.

L. Submittal Quantities and Frequencies

1. Preconstruction photographs: Submit one set of digital images. All photos (images) shall have embedded GPS coordinates (latitude, longitude) and the compass bearing (N, NE, E ...) such that this information appears on the image.
2. Progress Photographs: Submit Progress Photos monthly with each Application for Payment. Monthly Applications for Payment shall be deemed incomplete if not accompanied by the required Progress Photographs. Contractor's failure or election to not submit a monthly Application for Payment shall not affect the requirement for monthly Progress Photographs

1.05 QUALITY ASSURANCE

A. Contractor Qualifications: The commercial photographer or the subcontractor used for this work shall meet the following qualifications:

1. Demonstrable minimum experience of five (5) years in operation providing expert and independent third-party digital photography construction documentation using advanced indexing/navigation systems.
2. Representative portfolio of completed construction projects of similar type, size, duration and complexity as the Project.

3. In-house programming division for customizable documentation solutions required.
 4. At least three (3) references may be required.
 5. Demonstrable ability and current capacity for both data and personnel to service and conform to this specification on projects of similar type, size, duration and complexity as the project.
- B. Images shall be taken by a commercial photographer and must show distinctly, at as large a scale as possible, all parts of work embraced in the picture.
- C. Field personnel to undertake the documentation shall be provided exclusively by this Contractor. Field personnel shall be OSHA certified and certified per the project-specific safety programs. This Contractor will also attend construction team meetings as necessary. This Contractor's operations team shall provide regular updates regarding the status of the documentation, including completed elements of the documentation, the availability of recent documentation on-line and anticipated future shoot dates.
- D. All on-line domain/web hosting, industry standard security measures and redundant server back-up of the documentation shall be furnished by the Contractor.
- E. Any software required for all indexing, navigation, hosting and remote access shall be furnished by this Contractor (excepting web browsers) to the Owner and all others designated by the Owner.
- F. This Contractor shall furnish technical support related to using the system or service.
- G. This Contractor shall be able to create off-line or stand-alone (on-site) version of entire documentation platform required by this specification, if applicable, for high security or sensitive facilities.
- H. Upon completion of the Project, final copies of the documentation (the "Permanent Record") with the underlying housing software, indexing and navigation system embedded shall be provided in a digital media format (DVD). On-line access shall terminate upon delivery of the Permanent Record to the Owner. Intellectual property rights associated with the digital media prepared in direct service of the project shall transfer, along with the media itself, to the Owner. One multiple-user license for use of the underlying housing software, indexing and navigation shall be included for accessing the digital media.

PART 2 PRODUCTS

2.01 PHOTOGRAPHS

- A. Executive Summary Slideshows – A sampling of photos shall be provided that shows the overall stage of construction for the project in a slideshow format. The slideshow section also shall allow for the inclusion of Owner pictures, aerial photographs (minimum of 3), and other timely images which do not fit into any regular photo path. Submit monthly.
- B. Detailed Pre-Slab Exact-Built™ of all structural slabs after installation of the underground utilities, waterproofing and rebar, just prior to placing concrete or as directed by the Owner.

- C. Existing Interior Exact Built- captures all walls, floors, and ceilings at current state of construction (renovations).
- D. Existing Conditions Survey of the existing building pad as well as all streets, curbs, parking, landscaping and structures immediately adjacent to the proposed project area. This shall also include any interior renovations spaces prior to demolition. The existing conditions survey shall occur just prior to the start of construction or as scheduled by Owner.
- E. Monthly Sets of Exterior Progressions 360 degrees around each structure to include all elevations and building envelope on monthly intervals or as directed by the Owner.
- F. 4 Sets of Regular Interior Wall Progressions that captures each major wall at framing, substantial MEP, finish application, or as directed by Owner.
- G. 3 Sets of Vertical Ceiling Progressions to capture the overall progress of construction for all systems above ceilings prior to cover-up or as directed by Owner.
- H. Detailed Interior Exact-Built of the entire building to include documentation of all mechanical, electrical and plumbing systems, to be conducted after rough-ins are complete, just prior to insulation and or drywall, or as directed by Owner.
- I. Detailed Exterior Skin Exact-Built of the entire exterior skin of the building and the subgrade waterproofing to be conducted after installation of the doors and windows, just prior to the exterior skin being applied and just prior to backfill, or as directed by Owner.

The frequencies and schedules listed above shall be included in the project as stated. Should the Owner direct more frequent documentation, quotes for the additional service shall be provided and approved by the Owner prior to proceeding

PART 3 EXECUTION

3.01 REQUIRED DOCUMENTATION ELEMENTS

- A. Each digital image shall be taken with a professional grade camera with minimum size of 6 megapixels (MP) capable for producing 200x250 mm (8x10 inch) prints with a minimum of 2272 x 1704 pixels and 400 x 500 mm (n 16 x 20 inch) prints with a minimum of 2592 x 1944 pixels.
- B. Indexing and navigation system shall utilize actual construction drawings or equivalent as the basis for an interactive on-line interface. For all documentation referenced herein, indexing and navigation must be organized by both time (date-stamped) and location throughout the Project.
- C. Documentation shall combine indexing and navigation system with inspection-grade high-resolution digital photography designed to capture actual conditions throughout construction and at critical milestones. Documentation shall be accessible to the Owner, Owner's Representative, Engineer, Consultants, and Contractor without copyright on-line through use of an Internet connection arranged by this Contractor during construction. Documentation shall allow for multiple-user access, simultaneously, on-line. Access shall adhere to industry standards for information security and protection of data. Multi-tiered access levels shall be achievable through use of individual passwords, if required by the Owner.

- D. Before construction, the building pad, adjacent streets, roadways, parkways, driveways, curbs, sidewalks, landscaping, adjacent utilities and adjacent structures surrounding the building pad and site shall be photographed. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation accomplished through interactive architectural drawings. If site work or pad preparation extensive, this documentation shall be provided immediately before construction and at several pre-determined intervals before first work commences.
- E. Construction progress for all trades shall be tracked at pre-determined intervals, but not less than once every thirty (30) calendar days (“Progressions”). Progression documentation shall comprehensively track both the exterior and interior construction and renovation of the building(s). Exterior Progressions shall track 360 degrees around the site and each building. Interior Progressions shall track interior improvements beginning when stud work commences and continuing until Project completion.
- F. As-built condition of pre-slab utilities and site utilities shall be documented prior to pouring slabs, placing concrete and/or backfilling. This process shall include all underground and in-slab utilities within the building(s) envelope(s) and utility runs in the immediate vicinity of the building(s) envelope(s). This shall also include utilities enclosed in slab-on-deck in multi-story buildings. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation shall be accomplished through interactive site utility plans.
- G. As-built conditions of mechanical, electrical, plumbing and all other systems shall be documented post-inspection and pre-insulation, wall finish installation or as near to this milestone as is reasonably possible. This process shall include all finished systems located in the walls and ceilings of all buildings at the Project. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation shall be accomplished through interactive architectural drawings.
- H. As-built conditions of exterior skin and elevations shall be documented with an increased concentration of digital photographs as directed by Owner in order to capture pre-determined focal points, such as waterproofing, window flashing, radiused steel work, architectural or plaster detailing. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation shall be accomplished through interactive elevations or elevation details.
- I. As-built finished conditions of the interior of each building including floors, ceilings and walls shall be documented at certificate of occupancy or equivalent, or just prior to tenant/owner occupancy, or both, as directed by Owner. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation shall be accomplished through interactive architectural drawings.
- J. Miscellaneous events that occur during any Contractor site visit, or events captured by the Owner independently, shall be dated, labeled and inserted into a Section in the navigation structure entitled “Slideshows,” allowing this information to be stored in the same “place” as the formal scope.
- K. Customizable project-specific digital photographic documentation shall take place of other details or milestones. Indexing and navigation shall be accomplished through interactive architectural plans.

END OF SECTION

SECTION 01400
CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Quality assurance and control of installation and manufacturer's field services and reports.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 RELATED WORK

- A. Submittal procedures are included in Section 01350.
- B. Testing Laboratory Services are included in Section 01410
- C. Manufacturer's Services are included in Section 01640.

1.04 SUBMITTALS

- A. Make Submittals required by this Section under the provisions of Section 01350 – Submittals.

1.05 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Contractor will maintain an adequate internal inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents, and conforms to the Construction Schedule.
- B. Monitor quality control over suppliers, Manufacturers, products, services, site conditions, and workmanship, to produce the Work of specified quality at no additional cost to the Owner.
- C. Comply fully with Manufacturers' installation instructions, including each step in sequence.
- D. Request clarification from Engineer before proceeding should Manufacturers' instructions conflict with Contract Documents.
- E. Comply with specified Standards as minimum requirements for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- F. Perform work by persons qualified to produce the specified level of workmanship.
- G. Obtain copies of Standards and maintain at Project Site when required by individual Technical Specifications.
- H. Maintain complete inspection records and make them available at all times to the Engineer and Owner. Records shall include a Daily Report, Daily Inspection Log and Daily Quality Control

tasks complete with date stamped photos. All records shall be uploaded to Owner's Electronic Document Management System.

1.06 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual Technical Specifications, provide material or product suppliers' or manufacturers' technical representative to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, operator training, test, adjust, and balance of equipment as applicable, and to initiate operation, as required. Conform to minimum time requirements for start-up operations and operator training if defined in Technical Specifications.
- B. At the Owner's Representative request, submit qualifications of Manufacturer's representative fifteen (15) days in advance of required representative's services. The representative shall be subject to approval of Owner's Representative .
- C. Manufacturer's representative shall report observations and site decisions, or instructions given to applicators or installers that are supplemental or contrary to Manufacturers' written instructions. Submit report within one (1) day of observation to Owner's Representative for review.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01450
TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing Laboratory Services and Contractor responsibilities related to those services.
- B. References to Technical Specifications:
 - 1. Section 01350 – Submittals
- C. Referenced Standards:
 - 1. American Society for Testing and Materials (ASTM)
 - a. ASTM D 3740, “Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction”
 - b. ASTM E 329, “Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction”

1.02 SELECTION AND PAYMENT

- A. Owner will select, employ, and pay for services of an independent testing laboratory to perform inspection and testing identified in individual Technical Specifications.
- B. Employment of testing laboratory shall not relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.
- C. Owner or designated representative shall schedule and monitor testing as required to provide timely results and to avoid delay to the Work.
- D. Contractor shall be responsible for paying for services of commercial testing laboratory, with prior approval of Owner, to perform the following:
 - 1. Pipe diameter deflection tests on all flexible and semi-rigid sanitary sewer collection system pipe installation
 - 2. Laboratory services required to establish mix design proposed for use for Portland cement concrete, asphaltic concrete mixtures and other material mixes requiring control by testing laboratory when required because of change in source of materials or other conditions not caused by Owner.
 - 3. Tests required to establish optimum moisture of earth and base materials and to determine required compactive effort to meet density requirements.
 - 4. Cores to test for thickness.
 - 5. Testing and inspection performed for the Contractor’s convenience.

6. Retesting and repetitions of laboratory services when initial tests indicate work does not comply with requirements of Contract Documents.

1.03 LABORATORY REPORTS

- A. The Engineer will receive 1 copy, the Project Manager will receive 2 copies, and the Contractor will receive 2 copies of Laboratory Reports from the testing laboratory. One of the Contractor's copies shall remain at the Project Site for duration of Project. Test results which indicate non-conformance shall be transmitted immediately via fax from the testing laboratory to the Contractor and Project Manager.

1.04 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.05 CONTRACTOR RESPONSIBILITIES

- A. Notify Project Manager and laboratory 24 hours prior to expected time for operations requiring inspection and testing services. Notify Engineer if specification section requires the presence of the Engineer.
- B. Cooperate with laboratory personnel in collecting samples to be tested or collected on Project Site.
- C. Provide access to the Work and to manufacturer's facilities.
- D. Provide samples to laboratory in advance of their intended use to allow thorough examination and testing.
- E. Provide incidental labor and facilities for access to the Work to be tested; to obtain and handle samples at the site or at source of products to be tested; and to facilitate tests and inspections including storage and curing of test samples.
- F. Arrange with laboratory and pay for:
 1. Retesting required for failed tests.
 2. Retesting for nonconforming Work.
 3. Additional sampling and tests requested by Contractor for his own purposes.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONDUCTING TESTING

- A. Laboratory sampling and testing shall conform to ASTM D 3740 and ASTM E 329, as well as other test standards specified in individual Technical Specifications.

END OF SECTION

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SECTION 01500
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary facilities and the necessary controls for the Work including utilities, telephone, Internet, sanitary facilities, field office, storage sheds and building, safety requirements, first aid equipment, fire protection, security measures, protection of the Work and property, access roads and parking, environmental controls, disposal of trash, debris, and excavated material, pest and rodent control, water runoff and erosion control.
- B. Definitions:
 - 1. Underground Structures - sewer, water, gas, and other piping, and manholes, chambers, electrical and signal conduits, tunnels, and other existing subsurface installations located within or adjacent to the limits of the Work.
 - 2. Surface Structures - existing buildings, structures and other constructed installations above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks, guard cables, fencing, and other facilities that are visible above the ground surface.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item.

1.03 RELATED WORK

- A. Section 01100 – Summary of Work
- B. Section 01350 – Submittals

1.04 SUBMITTALS

- A. Make Submittals required by this Section under the provisions of Section 01350 – Submittals.

1.05 REFERENCE STANDARDS

- A. Occupational Safety and Health Administration (OSHA)
- B. National Fire Protection Association (NFPA)

1.06 CONTRACTOR'S RESPONSIBILITY

- A. The facilities and controls specified in this Section are considered minimum for the Work. The Contractor may provide additional facilities and controls for the proper execution of the Work and to meet Contractor's responsibilities for protection of persons and property.
- B. Comply with applicable requirements specified in other Technical Specifications.
- C. Maintain and operate temporary facilities and systems to assure continuous service.
- D. Modify and extend systems as Work progress requires.
- E. Completely remove temporary materials and equipment when their use is no longer required.
- F. Restore existing facilities used for temporary services to specified or to original condition.

1.07 TEMPORARY UTILITIES

A. Temporary Service

- 1. Make arrangements with utility service companies for such temporary services as are necessary to construct the work and manage the site.
- 2. Abide by rules and regulations of the utility service companies or authorities having jurisdiction.
- 3. Be responsible for utility service costs until the Work is Substantially Complete. Included are fuel, power, light, heat, and other utility services necessary for execution, completion, testing, and initial operation of the Work.

B. Water

- 1. Provide potable water required for and in connection with Work to be performed and for specified tests of piping, equipment, devices, or for other use as required for proper completion of the Work.
- 2. For water to be drawn from public water supply, obtain special permit or license and meter from the proper Owner officials. For facilities under construction, establish a water/sewer billing account with Owner's Utility Billing Department. A deposit based on rates established by latest ordinance will be required.
- 3. For water drawn from fire hydrants, apply for and receive a construction water meter from Owner's Public Works Department. Identify specific location for construction water meter installation. Once installed, water meter may not be moved without notification of Public Works Department. Install backflow preventer on fire hydrant supply if not included in Owner provided meter.
- 4. Provide and maintain an adequate supply of potable water for domestic consumption by Contractor personnel.

C. Electricity and Lighting

1. Provide temporary electric power service in Contractor's name, as required for the prosecution of the Work, including testing of Work. Provide power for lighting, operation of the Contractor's equipment, or for any other use by Contractor or as necessary to maintain any of Owner's on-going operations as may continue on the site during any scheduled shutdown. Minimum lighting level shall be 5 foot-candles for open areas; 10 foot-candles for stairs and shops.
2. Provide permanent electric power service, in the Contractor's name, to the work or site as and when required by the schedule of the work to achieve Substantial Completion or Partial Substantial Completion. Contractor to establish service billing in its name and transfer service and billing to the Owner upon acceptance of the work as Substantially Complete and suitable for beneficial occupancy by the Owner.

D. Temporary Heat and Ventilation

1. Provide temporary heat as necessary for protection or completion of the Work.
2. Provide temporary heat and ventilation to assure safe working conditions; maintain enclosed areas at a minimum of 50 degrees F.

E. Telephone

1. Provide emergency telephone service at the Project Site for use by Contractor personnel and others performing work or furnishing services.

F. Sanitary Facilities

1. Provide and maintain sanitary facilities for persons on the Project Site, in compliance with federal, state, and local regulations. Locate toilets on the Project Site near the work and secluded from view insofar as possible. Keep toilets clean and supplied throughout the course of the Work.
2. Enforce the use of sanitary facilities by construction personnel at the Project Site. Such facilities shall be enclosed. Pit-type toilets will not be permitted. No discharge will be allowed from these facilities. Collect and store sewage and waste so as not to cause a nuisance or health problem; have sewage and waste hauled off-site and properly disposed in accordance with local regulations.

G. Internet

1. Provide high speed internet service with WIFI at the Project Site for use by Contractor, Owner's Representative, Engineer, and Owner personnel and others performing work or furnishing services.

1.08 FIELD OFFICE

- A. Provision of a Field Office and other specific temporary facilities as required in paragraph B below UNLESS otherwise stated in General Conditions, or Section 01100 – Summary of Work.

Provide for transportation, move-in, set-up, tie-down and, when project is complete, removal and move-out. The Contractor shall confirm location of office and other temporary facilities with Owner's Representative prior to delivery and set up. Location of temporary facilities shall be approved by the Owner's Representative by way of the submittal process.

- B. At a minimum, the Contractor's field office shall provide for, contain or serve to: provide a secured space for project administrative operations, periodic progress meetings, on-site storage for project files and plans, office space for CONTRACTOR's field supervisory personnel and provide a separate securable office space for OWNER's Representative including: the following minimum provisions from 45 days from NTP to Final Completion:
1. Conference meeting table and ergonomic adjustable chairs and room for up to 10 people, Includes break room and restrooms. The table shall include multiple plug outlets and A/V projection connection technology; HDMI, etc. Conference room shall also include a projector ceiling mounted with motorized projection screen (96-inch wide x 73-inch H)).
 2. Lockable office for senior Owner's Representative Construction Manager.
 3. Lockable office with two workstation desks for two Owner's Representative Construction Inspectors.
 4. Cube space for two Owner's Representative Administrative staff positions.
 5. Lockable office for Owner's Engineering staff.
 6. Sufficient filing cabinet space for all related construction paperwork.
 7. Plan layout tables for 22" x 34" drawing sets; minimum four.
- C. Field Office shall be fully furnished and provide for, at a minimum
1. Complete thermostatically controlled HVAC air conditioning and heating for Pflugerville climatic conditions.
 2. Lighting.
 3. ADA compliant accessibility and restroom facilities. Restroom toilet and sink with hot and cold water.
 4. Kitchenette with water connections for a refrigerator with ice maker, a coffee maker, a microwave, , a single kitchen sink with hot and cold water, and a water dispenser.
 5. High speed wireless internet for entire trailer; highest speed available for use by Owner's Representative, Construction Manager, etc.
 6. Backup hardwire computer connections for all offices; two per office.
 7. Electrical outlets.
 8. Office furniture, ergonomic chairs, trash cans.

9. High capacity Photocopier, scanner, color copier: Sharp MX-3071 or equivalent along with toner, printing cartridge, service, supplies, etc. for project duration.
10. Nightly cleaning service; 5 days a week.
11. Toilet and hand cleaner, towel supplies, all consumables for duration of project.
12. Coffee service and supplies with one coffee machine per Break Room for the duration of the project.

1.09 STORAGE OF MATERIALS

- A. Provide for storage of materials under the provisions of Section 01600 – Delivery, Storage and Handling.

1.10 SAFETY REQUIREMENTS

- A. Contractor shall prepare, submit and follow a Safety Program that complies with federal, state, and local safety codes, statutes, and practices. Include in the Safety Program documented response to excavation, embankment, and trench safety requirements.
- B. Conduct operations in strict accord with applicable federal, state and local safety codes and statutes and with good construction practice. The Contractor is fully responsible and obligated to establish and maintain procedures for safety of all work, personnel and equipment involved in the Work.
- C. Observe and comply with Texas Occupational Safety Act (Art. 5182a, V.C.S.) and with all safety and health standards promulgated by Secretary of Labor under Section 107 of Contract Work Hours and Standards Act, published in OSHA Standards - 29 CFR, Part 1926, and adopted by Secretary of Labor under the Williams-Steiger Occupational Safety and Health Act of 1970, and to any other legislation enacted for safety and health of Contractor employees. Such safety and health standards apply to subcontractors and their employees as well as to the Contractor and its employees.
- D. Observance of and compliance with the regulations shall be solely and without qualification the responsibility of the Contractor without reliance or superintendence of or direction by the Engineer or the Engineer's representative. Immediately advise the Engineer of investigation or inspection by Federal Safety and Health inspectors of the Contractor or subcontractor's work or place of work on the Project Site under this Contract, and after such investigation or inspection, advise the Engineer of the results. Submit one copy of accident reports to Owner's Representative within ten (10) days of occurrence.
- E. Protect areas occupied by workmen using the best available devices for detection of lethal and combustible gases. Test such devices frequently to assure their functional capability. Constantly observe infiltration of liquids into the Work area for visual or odor evidence of contamination. Take immediate and appropriate steps to seal off entry of contaminated liquids to the Work area.

- F. Safety measures, including but not limited to safety personnel, first-aid equipment, ventilating equipment and safety equipment, in the Plans and Technical Specifications are obligations of the Contractor.
- G. Maintain required coordination with the local Police and Fire Departments during the entire period covered by the Contract.

1.11 FIRST AID EQUIPMENT

- A. Provide a first aid kit throughout the construction period. List telephone numbers for physicians, hospitals, and ambulance services in each first aid kit.
- B. Have at least one person thoroughly trained in first aid procedures present on the Project Site whenever work is in progress.

1.12 FIRE PROTECTION

- A. Fire Protection Standards
 - 1. Conform to specified fire protection and prevention requirements as well as those that may be established by Federal, State, or local governmental agencies.
- B. Comply with all applicable provisions of NFPA Standard No. 241, Safeguarding Building Construction and Demolition Operations.
 - 1. Provide portable fire extinguishers, rated not less than 2A or 5B in accordance with NFPA Standard No. 10, Portable Fire Extinguishers, for each temporary building, and for every 3000 square feet of floor area of facilities under construction.
 - 2. Locate portable fire extinguishers within 50 feet maximum from any point on the Project Site.
- C. Fire Prevention and Safety Measures
 - 1. Prohibit smoking in hazardous areas. Post suitable warning signs in areas that are continuously or intermittently hazardous.
 - 2. Use metal safety containers for storage and handling of flammable and combustible liquids.
 - 3. Do not store flammable or combustible liquids in or near stairways or exits.
 - 4. Maintain clear exits from all points within a structure.

1.13 SECURITY MEASURES

- A. Protect all materials, equipment, and property associated with the Work from loss, theft, damage, and vandalism. Contractor's duty to protect property includes Owner's property.

- B. If existing fencing or barriers are breached or removed for purposes of construction, provide and maintain temporary security fencing equal to existing as approved by Owner's Representative.

1.14 PROTECTION OF PUBLIC UTILITIES

- A. Prevent damage to existing public utilities during construction. These utilities are shown on the Plans at their approximate locations. Give owners of these utilities at least 48 hours' notice before commencing Work in the area, for locating the utilities during construction, and for making adjustments or relocation of the utilities when they conflict with the proposed Work.

1.15 PROTECTION OF PEOPLE AND PROPERTY

A. Preventive Actions

1. Take precautions, provide programs, and take actions necessary to protect the Work and public and private property from damage.
2. Take action to prevent damage, injury or loss, including, but not limited to, the following:
 - a. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with progress of the Work or the Work of any other contractor, any utility service company, or the Owner's operations.
 - b. Provide suitable storage for materials that are subject to damage by exposure to weather, theft, breakage, or otherwise.
 - c. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
 - d. Daily clean up refuse, rubbish, scrap materials, and debris caused by construction operations, keeping the Work safe and orderly.
 - e. Provide safe barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways, and other hazardous areas.
 - f. Obtain written consent from proper parties before entering or occupying with workers, tools, materials or equipment, privately owned land except on easements provided for construction.
 - g. Assume full responsibility for the preservation of public and private property on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect, or misconduct in execution of the Work by the Contractor, it shall be restored by the Contractor to a condition equal to or better than that existing before the damage was done.

B. Barricades and Warning Signals

1. Where Work is performed on or adjacent to any roadway, right-of-way, or public place, furnish and erect barricades, fences, lights, warning signs, and danger signals; provide watchmen; and take other precautionary measures for the protection of persons or property and protection of the Work..

C. Preserving Control Points

1. Maintain permanent benchmarks, public or private elevation or property demarcation and control monumentation, or other reference points. Unless otherwise directed in writing, replace at no cost to the Owner, those monuments, property corners or other permanent demarcations that are damaged or destroyed in accordance with Section 01760 – Field Surveying.

D. Tree and Plant Protection

1. Protect trees, shrubs, lawns, outside of grading limits and within the grading limits as designated on the Plans, and in accordance with requirements by the Owner.

E. Protection of Underground and Surface Structures

1. Known underground structures, including water, sewer, electric, and telephone services are shown on the Plans in accordance with the best information available, but is not guaranteed to be correct or complete. Contractor is responsible for making Locate Calls.
2. Explore ahead of trenching and excavation work and uncover obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption of utility services. Restore to original condition damages to underground structure at no additional cost to the Owner.
3. Immediately notify the agency or company owning any existing utility which is damaged, broken, or disturbed. Obtain approval from the Engineer and agency for any repairs or relocations, either temporary or permanent.
4. Necessary changes in location of the Work may be made by the Engineer to avoid unanticipated underground structures.
5. If permanent relocation of an underground structure or other subsurface installations is required and not otherwise provided for in the Contract Documents, the Owner's Representative will direct Contractor in writing to perform the Work, which shall be paid for under the provisions for changes in the Contract Price as described in Document 00 72 00 General Conditions.
6. Support in place and protect from direct or indirect injury to underground and surface structures located within or adjacent to the limits of the Work. Install such supports carefully and as required by the party owning or controlling such structure. Before installing structure supports, Contractor shall satisfy the Engineer that the methods and procedures to be used have been approved by the owner of the structure.
7. Avoid moving or in any way changing the property of public utilities or private service corporations without prior written consent of a responsible official of that service or public utility. Representatives of these utilities reserve the right to enter within the limits of this project for the purpose of maintaining their properties, or of making such changes or repairs to their property that may be considered necessary by performance of this Contract.
8. Notify the Owner and/or operators of utilities and pipelines of the nature of construction operations to be performed and the date or dates on which those operations will be performed. When construction operations are required in the immediate vicinity of

existing structures, pipelines, or utilities, give a minimum of five (5) working days advance notice. Probe and flag the location of underground utilities prior to commencement of excavation. Keep flags in place until construction operations reach and uncover the utility.

9. Assume risks attending the presence or proximity of underground and surface structures within or adjacent to the limits to the Work including but not limited to damage and expense for direct or indirect injury caused by the Work to any structure. Immediately repair damage caused to the satisfaction of the owner of the damaged structure.

1.16 PROTECTION OF THE WORK

- A. Provide protection of installed products to prevent damage from subsequent operations.
- B. Remove protection facilities when no longer needed, prior to completion of the Work.
- C. Control traffic to prevent damage to equipment, materials, and surfaces.

1.17 ROADS AND PARKING

- A. Prevent interference with traffic and Owner operations on existing roads.
- B. Minimize use of existing streets and driveways by construction traffic.
- C. Control traffic to prevent damage to equipment, materials, and surfaces.
- D. Construct and maintain temporary detours, ramps, and roads to provide for normal public traffic flow when use of public roads or streets is closed by necessities of the Work.
- E. Provide mats or other means to prevent overloading or damage to existing roadways from tracked equipment or exceptionally large or heavy trucks or equipment
- F. Designate temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking. Locate as approved by Engineer.
- G. Do not allow heavy vehicles or construction equipment unnecessarily in existing parking areas.

1.18 ENVIRONMENTAL CONTROLS

- A. Provide and maintain methods, equipment, and temporary construction as necessary for controls over environmental conditions at the construction site and adjacent areas.
- B. Comply with statutes, regulations, and ordinances which relate to the proposed Work for the prevention of environmental pollution and preservation of natural resources, including but not limited to the National Environmental Policy Act of 1969, PL 91-190, Executive Order 11514.
- C. Provide, install and maintain storm water runoff control including but not limited to temporary entrance, silt fencing, etc. as specified in Contract Documents.
- D. Recognize and adhere to the environmental requirements of the Project. Disturbed areas shall be strictly limited to boundaries established by the Contract Documents. Burning of rubbish, debris or waste materials is not permitted.

1.19 POLLUTION CONTROL

- A. Provide methods, means, and facilities required to prevent contamination of soil, water or atmosphere by discharge of noxious substances from construction operations.
- B. Provide equipment and personnel to perform emergency measures required to contain any spillage, and to remove contaminated soils or liquids. Excavate and dispose of any contaminated earth off-site and replace with suitable compacted fill and topsoil.
- C. Take special measures to prevent harmful substances from entering receiving streams or storm water conveyance systems in conformance with TPDES requirements in Section 01565..
- D. Provide systems for control of atmospheric pollutants.
- E. Prevent toxic concentrations of chemicals.
- F. Prevent harmful dispersal of pollutants into the atmosphere.
- G. Use equipment during construction that conforms to current federal, state, and local laws and regulations.

1.20 PEST AND RODENT CONTROL

- A. Provide quarterly rodent and pest control as necessary to prevent infestation of Project Site and Construction Trailers.
- B. Employ methods and use materials which will not adversely affect conditions at the Project Site or adjoining properties.

1.21 NOISE CONTROL

- A. Provide vehicles, equipment, and construction activities that minimize noise to the greatest degree practicable. Noise levels shall conform to OSHA Standards - 29 CFR and in no case will noise levels be permitted which create a nuisance in the surrounding neighborhoods.
- B. Conduct construction operations during daylight hours from 7:00 a.m. to 6:00 p.m, November 1st through March 31st, or from 7:00 a.m. to 8:00 p.m., April 1st through October 31st, except as approved by Engineer.
- C. Comply with NOISE CONTROL, Charter and Code of Ordinances of local jurisdictions.

1.22 DUST CONTROL

- A. Control objectionable dust caused by operation of vehicles and equipment under the provisions of Section 01566 – Source Controls for Erosion & Sedimentation.

1.23 WATER RUNOFF AND EROSION CONTROL

- A. Provide methods to control surface water, runoff, subsurface water, and water pumped from excavations and structures to prevent damage to the Work, the Project Site, or adjoining properties in accordance with Section 01565 – TPDES requirements..

- B. Inspect earthwork periodically to detect any evidence of the start of erosion. Apply corrective measures as required to control erosion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01505
MOBILIZATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mobilization of construction equipment and facilities onto the Work.
- B. Referenced Standards:
 - 1. Texas Department of Transportation (TxDOT)
 - 2. Texas Manual on Uniform Traffic Control Devices (Texas MUTCD)

1.02 MEASUREMENT AND PAYMENT

- A. Payment for Mobilization is on a Lump Sum basis and shall not exceed three percent (3%) of the total bid price.
- B. Payment for 50% of the Mobilization lump sum bid item may be included in the first monthly Application for Payment. Payment is subject to the receipt and approval by Engineer of the following items, as applicable:
 - 1. Schedule of Values (Section 01350 – Submittals)
 - 2. Construction Schedule (Section 01350 – Submittals)
 - 3. Pre-construction Photographs (Section 01380 – Construction Photographs)
 - 4. Installation and acceptance of Field Office (Section 01500 – Temporary Facilities and Controls)
 - 5. Installation and acceptance of TPDES requirements (Section 01565 - TPDES Requirements)
- C. Payment for 25% of the Mobilization lump sum bid item may be included in the second monthly Application for Payment. Payment is subject to the receipt and approval by Engineer of the following items, as applicable:
 - 1. Installation of High Speed Internet Access (Section 01500 – Temporary Facilities and Controls)
- D. Payment for 15% of the Mobilization lump sum bid item may be included in the third monthly Application for Payment.
- E. Payment for the remaining 10% of the Mobilization lump sum bid item may be included in the fourth monthly Application for Payment.
- F. For contracts with duration of less than 120 days, payment for the remaining 50% of the Mobilization lump sum bid item may be included in the second monthly Application for

Payment. Payment is subject to the receipt and approval by Engineer of the items listed in B. and C. above, as applicable.

- G. Mobilization payments will be subject to Retainage as stipulated in Section 00 72 00 General Conditions of Agreement.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01565
TPDES REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. As used herein and in conjunction with TPDES General Permit No. TXR150000, the term OPERATOR refers to the CONTRACTOR.
- B. Description of the required documentation to be prepared, signed and submitted by the Contractor before conducting construction operations, in accordance with the terms and conditions of the Texas Pollutant Discharge Elimination System (TPDES) General Permit as issued March 5, 2003, re-issued March 5, 2013, and re-issued March 5, 2018, by the Texas Commission on Environmental Quality under the provisions of Section 402 of the Clean Water Act and Section 26.040 of the Texas Water Code.
- C. Contractor's responsibility for implementation, maintenance, and inspection of storm water pollution prevention control measures including, but not limited to, erosion and sediment controls, storm water management plans, waste collection and disposal, off-site vehicle tracking, and other practices shown on the Drawings or specified elsewhere in this or other Technical Specifications. This Specification provides guidelines and Best Management Practices (BMP's) information for the Contractor to use in adhering to all local, state and federal environmental regulations with respect to storm water pollution prevention during construction activity.
- D. Referenced Standards:
 - 1. Texas Commission on Environmental Quality (TCEQ)
- E. Other References:
 - 1. Storm Water Pollution Prevention Plan (SWPPP) found in Appendix A of these Technical Specifications.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item.

1.03 RELATED WORK

- A. Section 01350 – Submittals
- B. Section 01200 – Project Meetings
- C. Section 01700 – Contract Closeout

1.04 SUBMITTALS

- A. Make Submittals required by this Section under the provisions of Section 01350 – Submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 REQUIRED NOTICES

- A. The Contractor shall complete, sign, and date the Contractor's Notice of Intent (NOI). The signed copy of the Contractor's NOI shall be returned to the TCEQ. It is Contractor's responsibility to pay for any fees associated with the permit. Submission of the NOI is required by both the Owner and the Contractor before construction operations start.
- B. Upon completion of construction and acceptance of the Work by the Owner, the Contractor shall complete, sign, and date the Contractor's Notice of Termination (NOT) attached in Appendix A.

3.02 CERTIFICATION REQUIREMENTS

- A. On the Operator's Information form attached in Appendix A, the Contractor shall complete name, address, and telephone number for the Contractor; the names of persons or firms responsible for maintenance and inspection of erosion and sediment control measures and all Subcontractors.
- B. The Contractor and Subcontractors named in the Contractor's Information form shall read, sign, and date the Contractor's/Subcontractor's Certification form, attached in Appendix A.
- C. The persons or firms responsible for maintenance and inspection of erosion and sediment control measures shall read, sign, and date the Contractor's Inspection and Maintenance Certification form, attached in Appendix A.
- D. The Contractor's Information form and all certification forms shall be submitted to the Owner before beginning construction.
- E. Contractor shall review implementation of the SWPPP in a meeting with the Owner and Owner's Representative prior to start of construction in accordance with Section 01200 – Project Meetings.

3.03 RETENTION OF RECORDS

- A. The Contractor shall keep a copy of the SWPPP at the Project Site or at the Contractor's office from the date that it became effective to the date the Work is accepted by the Owner.
- B. At Contract Closeout, the Contractor shall submit to the Owner all TPDES forms and certifications, as well as a copy of the SWPPP, in accordance with Section 01700 – Contract Closeout. The SWPPP records and data will be retained by Owner for a period of 3 years from the date the Work is accepted by the Owner.

3.04 POSTING OF NOTICES

- A. The following notices shall be posted from the date that this SWPPP goes into effect until the date the Work is accepted by the Owner:
1. Copies of the Notices of Intent submitted by the Owner and Contractor and a brief Description of Construction Activity being conducted at the Project Site, as given in Article 1 of the SWPPP, shall be posted at the Project Site or at Contractor's office in a prominent place for public viewing.
 2. Notice to drivers of equipment and vehicles, instructing them to stop, check, and wash tires of debris and mud before driving onto traffic lanes. Post such notices at every stabilized construction exit area.
 3. In an easily visible location on Project Site, post a notice of waste disposal procedures.
 4. Notice of hazardous material handling and emergency procedures shall be posted with the NOI on Project Site. Keep copies of Material Safety Data Sheets at a location on Project Site that is known to all personnel.
 5. Keep a copy of each signed certification at the Project Site or at Contractor's office.

APPENDIX A FOLLOWS THIS SECTION

END OF SECTION

Section 01565

**TPDES REQUIREMENTS
(APPENDIX A)**

Table of Contents

- NOI TCEQ Form 20022
- TCEQ Form – 20134
- TCEQ General Permit
- NOT TCEQ Form – 20023
- Site Notice Forms

ATTACHMENT 1 - TPDES REQUIREMENTS



Notice of Intent (NOI) for an Authorization for Stormwater Discharges Associated with Construction Activity under TPDES General Permit TXR150000

IMPORTANT INFORMATION

Please read and use the General Information and Instructions prior to filling out each question in the NOI form.

Use the NOI Checklist to ensure all required information is completed correctly.

Incomplete applications delay approval or result in automatic denial.

Once processed your permit authorization can be viewed by entering the following link into your internet browser: http://www2.tceq.texas.gov/wq_dpa/index.cfm or you can contact TCEQ Stormwater Processing Center at 512-239-3700.

ePERMITS

Effective September 1, 2018, this paper form must be submitted to TCEQ with a completed electronic reporting waiver form (TCEQ-20754).

To submit an NOI electronically, enter the following web address into your internet browser and follow the instructions: <https://www3.tceq.texas.gov/steers/index.cfm>

APPLICATION FEE AND PAYMENT

The application fee for submitting a paper NOI is \$325. The application fee for electronic submittal of a NOI through the TCEQ ePermits system (STEERS) is \$225.

Payment of the application fee can be submitted by mail or through the TCEQ ePay system. The payment and the NOI must be mailed to separate addresses. To access the TCEQ ePay system enter the following web address into your internet browser: <http://www.tceq.texas.gov/epay>.

Provide your payment information for verification of payment:

- If payment was mailed to TCEQ, provide the following:
 - Check/Money Order Number: [REDACTED]
 - Name printed on Check: [REDACTED]
- If payment was made via ePay, provide the following:
 - Voucher Number: [REDACTED]
 - A copy of the payment voucher is attached to this paper NOI form.

RENEWAL (This portion of the NOI is not applicable after June 3, 2018)

Is this NOI for a renewal of an existing authorization? Yes No

If Yes, provide the authorization number here: TXR15 [REDACTED]

NOTE: If an authorization number is not provided, a new number will be assigned.

SECTION 1. OPERATOR (APPLICANT)

a) If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? CN [REDACTED]

(Refer to Section 1.a) of the Instructions)

b) What is the Legal Name of the entity (applicant) applying for this permit? (The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

[REDACTED]

c) What is the contact information for the Operator (Responsible Authority)?

Prefix (Mr. Ms. Miss): [REDACTED]

First and Last Name: [REDACTED] Suffix: [REDACTED]

Title: [REDACTED] Credentials: [REDACTED]

Phone Number: [REDACTED] Fax Number: [REDACTED]

E-mail: [REDACTED]

Mailing Address: [REDACTED]

City, State, and Zip Code: [REDACTED]

Mailing Information if outside USA:

Territory: [REDACTED]

Country Code: [REDACTED] Postal Code: [REDACTED]

d) Indicate the type of customer:

- | | |
|---|---|
| <input type="checkbox"/> Individual | <input type="checkbox"/> Federal Government |
| <input type="checkbox"/> Limited Partnership | <input type="checkbox"/> County Government |
| <input type="checkbox"/> General Partnership | <input type="checkbox"/> State Government |
| <input type="checkbox"/> Trust | <input type="checkbox"/> City Government |
| <input type="checkbox"/> Sole Proprietorship (D.B.A.) | <input type="checkbox"/> Other Government |
| <input type="checkbox"/> Corporation | <input type="checkbox"/> Other: [REDACTED] |
| <input type="checkbox"/> Estate | |

e) Is the applicant an independent operator? Yes No

(If a governmental entity, a subsidiary, or part of a larger corporation, check No.)

f) Number of Employees. Select the range applicable to your company.

0-20

251-500

21-100

501 or higher

101-250

g) Customer Business Tax and Filing Numbers: (**Required** for Corporations and Limited Partnerships. **Not Required** for Individuals, Government, or Sole Proprietors.)

State Franchise Tax ID Number:

Federal Tax ID:

Texas Secretary of State Charter (filing) Number:

DUNS Number (if known):

SECTION 2. APPLICATION CONTACT

Is the application contact the same as the applicant identified above?

Yes, go to Section 3

No, complete this section

Prefix (Mr. Ms. Miss):

First and Last Name: Suffix:

Title: Credential:

Organization Name:

Phone Number: Fax Number:

E-mail:

Mailing Address:

Internal Routing (Mail Code, Etc.):

City, State, and Zip Code:

Mailing information if outside USA:

Territory:

Country Code: Postal Code:

SECTION 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) If this is an existing permitted site, what is the Regulated Entity Number (RN) issued to this site? RN

(Refer to Section 3.a) of the Instructions)

- b) Name of project or site (the name known by the community where it's located): [REDACTED]
- c) In your own words, briefly describe the type of construction occurring at the regulated site (residential, industrial, commercial, or other): [REDACTED]
- d) County or Counties (if located in more than one): [REDACTED]
- e) Latitude: [REDACTED] Longitude: [REDACTED]
- f) Site Address/Location

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete *Section A*.

If the site does not have a physical address, provide a location description in *Section B*.
 Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

Section A:

Street Number and Name: [REDACTED]

City, State, and Zip Code: [REDACTED]

Section B:

Location Description: [REDACTED]

City (or city nearest to) where the site is located: [REDACTED]

Zip Code where the site is located: [REDACTED]

SECTION 4. GENERAL CHARACTERISTICS

- a) Is the project or site located on Indian Country Lands?
 - Yes, do not submit this form. You must obtain authorization through EPA Region 6.
 - No
- b) Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?
 - Yes. Note: The construction stormwater runoff may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA Region 6.
 - No
- c) What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site? [REDACTED]
- d) What is the Secondary SIC Code(s), if applicable? [REDACTED]
- e) What is the total number of acres to be disturbed? [REDACTED]
- f) Is the project part of a larger common plan of development or sale?

Yes

No. The total number of acres disturbed, provided in e) above, must be 5 or more. If the total number of acres disturbed is less than 5, do not submit this form. See the requirements in the general permit for small construction sites.

g) What is the estimated start date of the project? [REDACTED]

h) What is the estimated end date of the project? [REDACTED]

i) Will concrete truck washout be performed at the site? Yes No

j) What is the name of the first water body(ies) to receive the stormwater runoff or potential runoff from the site? [REDACTED]

k) What is the segment number(s) of the classified water body(ies) that the discharge will eventually reach? [REDACTED]

l) Is the discharge into a Municipal Separate Storm Sewer System (MS4)?

Yes No

If Yes, provide the name of the MS4 operator: [REDACTED]

Note: The general permit requires you to send a copy of this NOI form to the MS4 operator.

m) Is the discharge or potential discharge from the site within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, as defined in 30 TAC Chapter 213?

Yes, complete the certification below.

No, go to Section 5

I certify that the copy of the TCEQ-approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) that is included or referenced in the Stormwater Pollution Prevention Plan will be implemented. Yes

SECTION 5. NOI CERTIFICATION

a) I certify that I have obtained a copy and understand the terms and conditions of the Construction General Permit (TXR150000). Yes

b) I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas. Yes

c) I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed. Yes

d) I certify that a Stormwater Pollution Prevention Plan has been developed, will be implemented prior to construction and to the best of my knowledge and belief is compliant with any applicable local sediment and erosion control plans, as required in the Construction General Permit (TXR150000). Yes

Note: For multiple operators who prepare a shared SWP3, the confirmation of an operator may be limited to its obligations under the SWP3, provided all obligations are confirmed by at least one operator.

SECTION 6. APPLICANT CERTIFICATION SIGNATURE

Operator Signatory Name: [REDACTED]

Operator Signatory Title: [REDACTED]

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature (use blue ink): _____ Date: _____

NOTICE OF INTENT CHECKLIST (TXR150000)

Did you complete everything? Use this checklist to be sure!

Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

Confirm each item (or applicable item) in this form is complete. This checklist is for use by the applicant to ensure a complete application is being submitted. **Missing information may result in denial of coverage under the general permit.** (See NOI process description in the General Information and Instructions.)

APPLICATION FEE

If paying by check:

- Check was mailed **separately** to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)
- Check number and name on check is provided in this application.

If using ePay:

- The voucher number is provided in this application and a copy of the voucher is attached.

RENEWAL

- If this application is for renewal of an existing authorization, the authorization number is provided.

OPERATOR INFORMATION

- Customer Number (CN) issued by TCEQ Central Registry
- Legal name as filed to do business in Texas. (Call TX SOS 512-463-5555 to verify.)
- Name and title of responsible authority signing the application.
- Phone number and e-mail address
- Mailing address is complete & verifiable with USPS. www.usps.com
- Type of operator (entity type). Is applicant an independent operator?
- Number of employees.
- For corporations or limited partnerships - Tax ID and SOS filing numbers.
- Application contact and address is complete & verifiable with USPS. <http://www.usps.com>

REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

- Regulated Entity Number (RN) (if site is already regulated by TCEQ)
- Site/project name and construction activity description
- County
- Latitude and longitude <http://www.tceq.texas.gov/gis/sqmaview.html>

- Site Address/Location. Do not use a rural route or post office box.

GENERAL CHARACTERISTICS

- Indian Country Lands –the facility is not on Indian Country Lands.
- Construction activity related to facility associated to oil, gas, or geothermal resources
- Primary SIC Code that best describes the construction activity being conducted at the site.
www.osha.gov/oshstats/sicser.html
- Estimated starting and ending dates of the project.
- Confirmation of concrete truck washout.
- Acres disturbed is provided and qualifies for coverage through a NOI.
- Common plan of development or sale.
- Receiving water body or water bodies.
- Segment number or numbers.
- MS4 operator.
- Edwards Aquifer rule.

CERTIFICATION

- Certification statements have been checked indicating Yes.
- Signature meets 30 Texas Administrative Code (TAC) §305.44 and is original.

Instructions for Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

GENERAL INFORMATION

Where to Send the Notice of Intent (NOI):

By Regular Mail:

TCEQ

Stormwater Processing Center (MC228)

P.O. Box 13087

Austin, Texas 78711-3087

By Overnight or Express Mail:

TCEQ

Stormwater Processing Center (MC228)

12100 Park 35 Circle

Austin, TX

Application Fee:

The application fee of \$325 is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit. Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

Mailed Payments:

Use the attached General Permit Payment Submittal Form. The application fee is submitted to a different address than the NOI. Read the General Permit Payment Submittal Form for further instructions, including the address to send the payment.

ePAY Electronic Payment: <http://www.tceq.texas.gov/epay>

When making the payment you must select Water Quality, and then select the fee category "General Permit Construction Storm Water Discharge NOI Application". You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

TCEQ Contact List:

Application - status and form questions:

512-239-3700, swpermit@tceq.texas.gov

Technical questions:

512-239-4671, swgp@tceq.texas.gov

Environmental Law Division:

512-239-0600

Records Management - obtain copies of forms:

512-239-0900

Reports from databases (as available):

512-239-DATA (3282)

Cashier's office:

512-239-0357 or 512-239-0187

Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

- **Administrative Review:** Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(es) on the form must be verified with the US Postal service as receiving regular mail delivery. Do not give an overnight/express mailing address.

- **Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.
- **Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.

or

Denial of Coverage: If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

General Permit (Your Permit)

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For **paper** NOIs, provisional coverage under the general permit begins **7 days after a completed NOI is postmarked for delivery** to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site <http://www.tceq.texas.gov>. Search using keyword TXR150000.

Change in Operator

An authorization under the general permit is not transferable. If the operator of the regulated project or site changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

TCEQ Central Registry Core Data Form

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number, if one has not already been assigned to this customer or site.

For existing customers and sites, you can find the Customer Number and Regulated Entity Number by entering the following web address into your internet browser: <http://www15.tceq.texas.gov/crpub/> or you can contact the TCEQ Stormwater Processing Center at 512-239-3700 for assistance. On the website, you can search by your permit number, the Regulated Entity (RN) number, or the Customer Number (CN). If you do not know these numbers, you can select "Advanced Search" to search by permittee name, site address, etc.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For this permit, a Notice of Change form must be submitted to the program area.

INSTRUCTIONS FOR FILLING OUT THE NOI FORM

Renewal of General Permit. Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied, a new permit number will be issued.

Section 1. OPERATOR (APPLICANT)

a) Customer Number (CN)

TCEQ's Central Registry will assign each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number.**

If the applicant is an existing TCEQ customer, the Customer Number is available at the following website: <http://www15.tceq.texas.gov/crpub/>. If the applicant is not an existing TCEQ customer, leave the space for CN blank.

b) Legal Name of Applicant

Provide the current legal name of the applicant. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, as filed in the county. You may contact the SOS at 512-463-5555, for more information related to filing in Texas. If filed in the county, provide a copy of the legal documents showing the legal name.

c) Contact Information for the Applicant (Responsible Authority)

Provide information for the person signing the application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: <https://tools.usps.com/go/ZipLookupAction!input.action>.

The phone number should provide contact to the applicant.

The fax number and e-mail address are optional and should correspond to the applicant.

d) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for an authorization.

Individual

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

Partnership

A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). If the customer is a 'General Partnership' or 'Joint Venture' filed in the county (not filed with TX SOS), the legal name of each partner forming the 'General Partnership' or 'Joint Venture' must be provided. Each 'legal entity' must apply as a co-applicant.

Trust or Estate

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

Sole Proprietorship (DBA)

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

1. be under the person's name
2. have its own name (doing business as or DBA)
3. have any number of employees.

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

Corporation

A customer that meets all of these conditions:

1. is a legally incorporated entity under the laws of any state or country
2. is recognized as a corporation by the Texas Secretary of State
3. has proper operating authority to operate in Texas

The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

Government

Federal, state, county, or city government (as appropriate)

The customer is either an agency of one of these levels of government or the governmental body itself. The government agency's 'legal name' must be provided as the applicant. A department name or other description of the organization is not recognized as the 'legal name'.

Other

This may include a utility district, water district, tribal government, college district, council of governments, or river authority. Provide the specific type of government.

e) Independent Entity

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

f) Number of Employees

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

g) Customer Business Tax and Filing Numbers

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

State Franchise Tax ID Number

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter the Tax ID number.

Federal Tax ID

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

TX SOS Charter (filing) Number

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512-463-5555.

DUNS Number

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

Section 2. APPLICATION CONTACT

Provide the name and contact information for the person that TCEQ can contact for additional information regarding this application.

Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) Regulated Entity Number (RN)

The RN is issued by TCEQ's Central Registry to sites where an activity is regulated by TCEQ. This is not a permit number, registration number, or license number. Search TCEQ's Central Registry to see if the site has an assigned RN at <http://www15.tceq.texas.gov/crpub/>. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, an RN may already be assigned for the larger site. Use the RN assigned for the larger site.

If the site is found, provide the assigned RN and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

b) Name of the Project or Site

Provide the name of the site or project as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

c) Description of Activity Regulated

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

d) County

Provide the name of the county where the site or project is located. If the site or project is located in more than one county, provide the county names as secondary.

e) Latitude and Longitude

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to:

<http://www.tceq.texas.gov/gis/sqmaview.html>.

f) Site Address/Location

If a site has an address that includes a street number and street name, enter the complete address for the site in *Section A*. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street number and street name, provide a complete written location description in *Section B*. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and zip code of the site location.

Section 4. GENERAL CHARACTERISTICS

a) Indian Country Lands

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA Region 6, Dallas. Do not submit this form to TCEQ.

b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas (RRC) and may need to obtain authorization from EPA Region 6.

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a

carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the RRC's jurisdiction must be authorized by the EPA and the RRC, as applicable. Activities under RRC jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the RRC; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The RRC also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the RRC. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the RRC prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

For more information about the jurisdictions of the RRC and the TCEQ, read the Memorandum of Understanding (MOU) between the RRC and TCEQ at 16 Texas Administrative Code, Part 1, Chapter 3, Rule 3.30, by entering the following link into an internet browser:

[http://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30](http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30) or contact the TCEQ Stormwater Team at 512-239-4671 for additional information.

c) Primary Standard Industrial Classification (SIC) Code

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 - Construction of Single Family Homes
- 1522 - Construction of Residential Buildings Other than Single Family Homes
- 1541 - Construction of Industrial Buildings and Warehouses

- 1542 - Construction of Non-residential Buildings, other than Industrial Buildings and Warehouses
- 1611 - Highway and Street Construction, except Highway Construction
- 1622 - Bridge, Tunnel, and Elevated Highway Construction
- 1623 - Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, enter the following link into your internet browser: <http://www.osha.gov/pls/imis/sicsearch.html> or you can contact the TCEQ Small Business and Local Government Assistance Section at 800-447-2827 for assistance.

d) Secondary SIC Code

Secondary SIC Code(s) may be provided. Leave this blank if not applicable. For help with SIC Codes, enter the following link into your internet browser: <http://www.osha.gov/pls/imis/sicsearch.html> or you can contact the TCEQ Small Business and Environmental Assistance Section at 800-447-2827 for assistance.

e) Total Number of Acres Disturbed

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at 512-239-4671 or by email at swgp@tceq.texas.gov.

f) Common Plan of Development

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on what a common plan of development is, refer to the definition of “Common Plan of Development” in the Definitions section of the general permit or enter the following link into your internet browser:

www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html

For further information, go to the TCEQ stormwater construction webpage enter the following link into your internet browser: www.tceq.texas.gov/goto/construction and search for “Additional Guidance and Quick Links”. If you have any further questions about the Common Plan of Development you can contact the TCEQ Stormwater Team at 512-239-4671 or the TCEQ Small Business and Environmental Assistance at 800-447-2827.

g) Estimated Start Date of the Project

This is the date that any construction activity or construction support activity is initiated at the site. If renewing the permit provide the original start date of when construction activity for this project began.

h) Estimated End Date of the Project

This is the date that any construction activity or construction support activity will end and final stabilization will be achieved at the site.

i) Will concrete truck washout be performed at the site?

Indicate if you expect that operators of concrete trucks will washout concrete trucks at the construction site.

j) Identify the water body(s) receiving stormwater runoff

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

k) Identify the segment number(s) of the classified water body(s)

Identify the classified segment number(s) receiving a discharge directly or indirectly. Enter the following link into your internet browser to find the segment number of the classified water body where stormwater will flow from the site:

www.tceq.texas.gov/waterquality/monitoring/viewer.html or by contacting the TCEQ Water Quality Division at (512) 239-4671 for assistance.

You may also find the segment number in TCEQ publication GI-316 by entering the following link into your internet browser: www.tceq.texas.gov/publications/gi/gi-316 or by contacting the TCEQ Water Quality Division at (512) 239-4671 for assistance.

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at 512-239-4671 for further assistance.

l) Discharge into MS4 – Identify the MS4 Operator

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a

copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at 512-239-4671.

m) Discharges to the Edwards Aquifer Recharge Zone and Certification

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer by entering the following link into an internet browser:

www.tceq.texas.gov/field/eapp/viewer.html or by contacting the TCEQ Water Quality Division at 512-239-4671 for assistance.

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site-specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

Section 5. NOI CERTIFICATION

Note: Failure to indicate Yes to all of the certification items may result in denial of coverage under the general permit.

a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. Electronic applications submitted through ePermits have immediate provisional coverage. You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site by entering the following link into an internet browser: www.tceq.texas.gov/goto/construction or you may contact the TCEQ Stormwater processing Center at 512-239-3700 for assistance.

b) Certification of Legal Name

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512-463 5555, for more information related to filing in Texas.

c) Understanding of Notice of Termination

A permittee shall terminate coverage under the Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has

been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

d) Certification of Stormwater Pollution Prevention Plan

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

Section 6. APPLICANT CERTIFICATION SIGNATURE

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

If you are a corporation:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

If you are a municipality or other government entity:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the TCEQ's Environmental Law Division at 512-239-0600.

30 Texas Administrative Code

§305.44. Signatories to Applications

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the

corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

Texas Commission on Environmental Quality General Permit Payment Submittal Form

Use this form to submit your Application Fee only if you are mailing your payment.

Instructions:

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- *Do not mail this form with your NOI form.*
- *Do not mail this form to the same address as your NOI.*

Mail this form and your check to either of the following:

By Regular U.S. Mail

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, TX 78711-3088

By Overnight or Express Mail

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

Fee Code: GPA General Permit: TXR150000

1. Check or Money Order No:
2. Amount of Check/Money Order:
3. Date of Check or Money Order:
4. Name on Check or Money Order:
5. NOI Information:

If the check is for more than one NOI, list each Project or Site (RE) Name and Physical Address exactly as provided on the NOI. **Do not submit a copy of the NOI with this form, as it could cause duplicate permit application entries!**

If there is not enough space on the form to list all of the projects or sites the authorization will cover, then attach a list of the additional sites.

Project/Site (RE) Name:

Project/Site (RE) Physical Address:

Staple the check or money order to this form in this space.

ATTACHMENT 2A - TPDES REQUIREMENTS



LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Stormwater Program
TPDES GENERAL PERMIT TXR150000

“PRIMARY OPERATOR” NOTICE

This notice applies to construction sites operating under Part I.I.E.3. of the TPDES General Permit Number TXR150000 for discharges of stormwater runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. Additional information regarding the TCEQ stormwater permit program may be found on the internet at:

<https://www.tceq.texas.gov/permitting/stormwater/construction>

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Stormwater Pollution Prevention Plan:	

ATTACHMENT 2B - TPDES REQUIREMENTS



SMALL CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Stormwater Program
TPDES GENERAL PERMIT TXR150000

The following information is posted in compliance with **Part II.E.2.** of the TCEQ General Permit Number TXR150000 for discharges of stormwater runoff from small construction sites. Additional information regarding the TCEQ stormwater permit program may be found on the internet at:

<https://www.tceq.texas.gov/permitting/stormwater/construction>

Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, estimated start date and projected end date, or date that disturbed soils will be stabilized</i>	
Location of Stormwater Pollution Prevention Plan:	

For Small Construction Activities Authorized Under Part II.E.2. (Obtaining Authorization to Discharge) the following certification must be completed:

I _____ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part II.E.2. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. A stormwater pollution prevention plan has been developed and will be implemented prior to construction, according to permit requirements. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title _____ Date _____

_____ Date Notice Removed

_____ MS4 operator notified per Part II.F.3.

ATTACHMENT 3

TPDES OPERATOR'S INFORMATION

Owner's Name and Address:

City of _____

Mr. _____
(City Official)

Address: _____

Phone: _____

Contractors' Names and Addresses:

General Contractor:

Telephone:

Site Superintendent:

Telephone:

Erosion Control and
Maintenance Inspection:

Telephone:

Subcontractors' Names and Addresses:

Phone: _____

Phone: _____

Note: Insert name, address, and telephone number of person or firms

ATTACHMENT 4

CONTRACTOR'S / SUBCONTRACTOR'S

CERTIFICATION FOR TPDES PERMITTING

I certify under penalty of law that I understand the terms and conditions of the general Texas Pollutant Discharge Elimination System (TPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Signature: _____

Name: (printed or typed) _____

Title: _____

Company: _____

Address: _____

Date: _____

Signature: _____

Name: (printed or typed) _____

Title: _____

Company: _____

Address: _____

Date: _____

Signature: _____

Name: (printed or typed) _____

Title: _____

Company: _____

Address: _____

Date: _____

20 In ATTACHMENT 5 - TPDES REQUIREMENTS

Purpose

This Inspection Report Template (or "template") is to assist you in preparing inspection reports for EPA's 2017 Construction General Permit (CGP). If you are covered under the 2017 CGP, you can use this template to create an inspection report form that is customized to the specific circumstances of your site and that complies with the minimum reporting requirements of Part 4.7 of the permit. Note that the use of this form is optional; you may use your own inspection report form provided it includes the minimum information required in Part 4.7 of the CGP.

If you are covered under a state CGP, this template may be helpful in developing a form that can be used for that permit; however, it will need to be modified to meet the specific requirements of that permit. If your permitting authority requires you to use a specific inspection report form, you should not use this form.

Notes:

While EPA has made every effort to ensure the accuracy of all instructions contained in the Inspection Report Template, it is the permit, not the template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between the Inspection Report Template and any corresponding provision of the 2017 CGP, you must abide by the requirements in the permit. EPA welcomes comments on the Inspection Report Template at any time and will consider those comments in any future revision of this document. You may contact EPA for CGP-related inquiries at cgp@epa.gov.

Overview of Inspection Requirements (see CGP Part 4)

Construction operators covered under the 2017 CGP are subject to the following inspection requirements:

Person(s) Responsible for Inspecting the Site (see Part 4.1)

The person(s) inspecting your site must be a "qualified person" who may be either on your staff or a third party you hire to conduct such inspections.

- A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

Inspection Frequency (see Part 4.2)

You are required to conduct inspections either:

- Once every 7 calendar days; or
- Once every 14 calendar days and within 24 hours of a storm event of 0.25 inches or greater or the occurrence of runoff from snowmelt sufficient to cause a discharge.

Your inspection frequency is increased if the site discharges to a sensitive water. See Part 4.3. Your inspection frequency may be decreased to account for stabilized areas, or for arid, semi-arid, or drought-stricken conditions, or for frozen conditions. See Part 4.4.

Areas That Need to Be Inspected (see Part 4.5)

During each inspection, you must inspect the following areas of your site:

- Cleared, graded, or excavated areas of the site;
- Stormwater controls (e.g., perimeter controls, sediment basins, inlets, exit points etc.) and pollution prevention practices (e.g., pollution prevention practices for vehicle fueling/maintenance and washing, construction product storage, handling, and disposal, etc.) at the site;
- Material, waste, or borrow areas covered by the permit, and equipment storage and maintenance areas;
- Areas where stormwater flows within the site;
- Stormwater discharge points; and
- Areas where stabilization has been implemented.

What to Check For During Your Inspection (see Part 4.6)

During your site inspection, you are required to check:

- Whether stormwater controls or pollution prevention practices are properly installed, require maintenance or corrective action, or whether new or modified controls are required;
- For the presence of conditions that could lead to spills, leaks, or other pollutant accumulations and discharges;
- For locations where new or modified stormwater controls are necessary to meet requirements of the permit;

- Whether there are visible signs of erosion and sediment accumulation at points of discharge and to the channels and streambanks that are in the immediate vicinity of the discharge;
- If a stormwater discharge is occurring at the time of the inspection, whether there are obvious, visual signs of pollutant discharges; and
- If any permit violations have occurred on the site.

Inspection Reports (see Part 4.7)

Within 24 hours of completing each inspection, you are required to complete an inspection report that includes:

- Date of inspection;
- Names and titles of person(s) conducting the inspection;
- Summary of inspection findings;
- Rain gauge or weather station readings if your inspection is triggered by the 0.25-inch storm threshold; and
- If you determine that a portion of your site is unsafe to access for the inspection, documentation of what conditions prevented the inspection and where these conditions occurred on the site

Instructions for Using This Template

This Field Version of the Inspection Report Template is intended to be used in the field and filled out by hand. If you will be filling out the Inspection Report Template electronically (i.e., you will be typing in your findings), please use the Electronic Version of the Inspection Report Template available at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. The Electronic Version includes text fields with instructions for what to enter.

Keep in mind that this document is a template and not an "off-the-shelf" inspection report that is ready to use without some modification. You must first customize this form to include the specifics of your project in order for it to be useable for your inspection reports. Once you have entered all of your site-specific information into these fields, you may print out this form for use in the field to complete inspection reports.

The following tips for using this template will help you ensure that the minimum permit requirements are met:

- **Review the inspection requirements.** Before you start developing your inspection report form, read the CGP's Part 4 inspection requirements. This will ensure that you have a working understanding of the permit's underlying inspection requirements.
- **Complete all required text fields.** Fill out all text fields. Only by filling out all fields will the template be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the template form for your inspection, you may leave those rows blank. Or, if you need more space to document your findings, you may add an additional sheet.)
- **Use your site map to document inspection findings.** In several places in the template, you are directed to specify the location of certain features of your site, including where stormwater controls are installed and where you will be stabilizing exposed soil. You are also asked to fill in location information for unsafe conditions and the locations of any discharges occurring during your inspections. Where you are asked for location information, EPA encourages you to reference the point on your SWPPP site map that corresponds to the requested location on the inspection form. Using the site map as a tool in this way will help you conduct efficient inspections, will assist you in evaluating problems found, and will ensure proper documentation.
- **Sign and certify each inspection report.** The operator or a duly authorized representative (see Appendix I, Part I.11.2) must sign and certify each inspection report for it to be considered complete. Where a contractor or subcontractor carries out your inspections, it is recommended that you also have the inspector sign and certify the form, in addition to the signature and certification required of the permitted operator. The template includes a signature block for both parties.
- **Include the inspection form with your SWPPP.** Once your form is complete, make sure to include a copy of the inspection form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all inspection reports with your records.** You must also retain in your records copies of all inspection reports in accordance with the requirements in Part 4.7.3 of the 2017 CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated.

Section-by-Section Instructions

You will find specific instructions corresponding to each section of the report form on the reverse side of each page. These instructions provide you with more details in terms of what EPA expects to be documented in these reports.

General Information
(see reverse for instructions)

Name of Project		NPDES ID No.		Inspection Date	
Weather conditions during inspection		Inspection start time		Inspection end time	
Inspector Name, Title & Contact Information					
Present Phase of Construction					
Inspection Location (if multiple inspections are required, specify location where this inspection is being conducted)					

Inspection Frequency *(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply)*

Standard Frequency:

Every 7 days

Every 14 days and within 24 hours of a 0.25" rain or the occurrence of runoff from snowmelt sufficient to cause a discharge

Increased Frequency:

Every 7 days and within 24 hours of a 0.25" rain (for areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3)

Reduced Frequency:

Twice during first month, no more than 14 calendar days apart; then once per month after first month; (for stabilized areas)

Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain (for stabilized areas on "linear construction sites")

Once per month and within 24 hours of a 0.25" rain (for arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought)

Once per month (for frozen conditions where earth-disturbing activities are being conducted)

Was this inspection triggered by a 0.25" storm event? Yes No

If yes, how did you determined whether a 0.25" storm event has occurred?

Rain gauge on site Weather station representative of site. Specify weather station source:

Total rainfall amount that triggered the inspection (in inches):

Was this inspection triggered by the occurrence of runoff from snowmelt sufficient to cause a discharge? Yes No

Unsafe Conditions for Inspection

Did you determine that any portion of your site was unsafe for inspection per CGP Part 4.5? Yes No

If "yes", complete the following:

- Describe the conditions that prevented you from conducting the inspection in this location:

- Location(s) where conditions were found:

Instructions for Filling Out “General Information” Section

Name of Project

Enter the name for the project.

NPDES ID No.

Enter the NPDES ID number that was assigned to your NOI for permit coverage.

Inspection Date

Enter the date you conducted the inspection.

Weather Conditions During Inspection

Enter the weather conditions occurring during the inspection, e.g., sunny, overcast, light rain, heavy rain, snowing, icy, windy.

Inspection start and end times

Enter the time you started and ended the inspection.

Inspector Name, Title & Contact Information

Provide the name of the person(s) (either a member of your company's staff or a contractor or subcontractor) that conducted this inspection. Provide the inspector's name, title, and contact information as directed in the form.

Present Phase of Construction

If this project is being completed in more than one phase, indicate which phase it is currently in.

Inspection Location

If your project has multiple locations where you conduct separate inspections, specify the location where this inspection is being conducted. If only one inspection is conducted for your entire project, enter “Entire Site.” If necessary, complete additional inspection report forms for each separate inspection location.

Inspection Frequency

Check the box that describes the inspection frequency that applies to you. Note that you may be subject to different inspection frequencies in different areas of your site. If your project does not discharge to a “sensitive water” (i.e., a water impaired for sediment or nutrients, or listed as Tier 2, 2.5, or 3 by your state or tribe) and you are not affected by any of the circumstances described in CGP Part 4.4, then you can choose your frequency based on CGP Part 4.2 – either every 7 calendar days, or every 14 calendar days and within 24 hours of a 0.25-inch storm event. For any portion of your site that discharges to a sensitive water, your inspection frequency for that area is fixed under CGP Part 4.3 at every 7calendar days and within 24 hours of a 0.25-inch storm event. If portions of your site are stabilized, are located in arid, semi-arid, or drought-stricken areas, or are subject to frozen conditions, consult CGP Part 4.4 for the applicable inspection frequency. Check all the inspection frequencies that apply to your project.

Was This Inspection Triggered by a 0.25 Inch Storm Event or the occurrence of runoff from snowmelt sufficient to cause a discharge?

If you were required to conduct this inspection because of a 0.25-inch (or greater) rain event, indicate whether you relied on an on-site rain gauge or a nearby weather station (and where the weather station is located). Also, specify the total amount of rainfall for this specific storm event. If you were required to conduct this inspection because of the occurrence of runoff from snowmelt, then check the appropriate box.

Unsafe Conditions for Inspection

Inspections are not required where a portion of the site or the entire site is subject to unsafe conditions. See CGP Part 4.5. These conditions should not regularly occur, and should not be consistently present on a site. Generally, unsafe conditions are those that render the site (or a portion of it) inaccessible or that would pose a significant probability of injury to applicable personnel. Examples could include severe storm or flood conditions, high winds, and downed electrical wires.

If your site, or a portion of it, is affected by unsafe conditions during the time of your inspection, provide a description of the conditions that prevented you from conducting the inspection and what parts of the site were affected. If the entire site was considered unsafe, specify the location as “Entire site”

Condition and Effectiveness of Erosion and Sediment (E&S) Controls (CGP Part 2.2)

(see reverse for instructions)

Type/Location of E&S Control [Add an additional sheet if necessary]	Maintenance Needed?*	Corrective Action Required?*	Date on Which Maintenance or Corrective Action First Identified?	Notes
1.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
2.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
7.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
8.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
9.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

* **Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. See Part 5 of the permit for more information.

Instructions for Filling Out the “Erosion and Sediment Control” Table

Type and Location of E&S Controls

Provide a list of all erosion and sediment (E&S) controls that your SWPPP indicates will be installed and implemented at your site. This list must include at a minimum all E&S controls required by CGP Part 2.2. Include also any natural buffers established under CGP Part 2.2.1. Buffer requirements apply if your project's earth-disturbing activities will occur within 50 feet of a water of the U.S. You may group your E&S controls on your form if you have several of the same type of controls (e.g., you may group “Inlet Protection Measures”, “Perimeter Controls”, and “Stockpile Controls” together on one line), but if there are any problems with a specific control, you must separately identify the location of the control, whether maintenance or corrective action is necessary, and in the notes section you must describe the specifics about the problem you observed.

Maintenance Needed?

Answer “yes” if the E&S control requires maintenance due to normal wear and tear in order for the control to continue operating effectively. At a minimum, maintenance is required in the following specific instances: (1) for perimeter controls, whenever sediment has accumulated to half or more the above-ground height of the control (CGP Part 2.2.3.a); (2) where sediment has been tracked-out onto the surface of off-site streets or other paved areas (CGP Part 2.2.4); (3) for inlet protection measures, when sediment accumulates, the filter becomes clogged, and/or performance is compromised (CGP Part 2.2.10); and (4) for sediment basins, as necessary to maintain at least half of the design capacity of the basin (CGP Part 2.2.12.f). Note: In many cases, “yes” answers are expected and indicate a project with an active operation and maintenance program. You should also answer “yes” if work to fix the problem is still ongoing from the previous inspection.

Corrective Action Needed?

Answer “yes” if during your inspection you found any of the following conditions to be present (CGP, Part 5.1): (1) a required E&S control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); (2) a required E&S control was never installed or was installed incorrectly; (3) you become aware that the inadequacy of the E&S control has led to an exceedance of an applicable water quality standard; (4) one of the prohibited discharges in Part 1.3 is occurring or has occurred; or (5) EPA requires corrective action for an E&S control as a result of a permit violation found during an inspection carried out under Part 4.8. If you answer “yes”, you must take corrective action and complete a corrective action report, found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. Note: You should answer “yes” if work to fix the problem from a previous inspection is still ongoing.

Date on Which Maintenance or Corrective Action First Identified?

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Notes

For each E&S control and the area immediately surrounding it, note whether the control is properly installed and whether it appears to be working to minimize sediment discharge. Describe any problem conditions you observed such as the following, and why you think they occurred as well as actions (e.g., maintenance or corrective action) you will take or have taken to fix the problem:

1. Failure to install or to properly install a required E&S control
2. Damage or destruction to an E&S control caused by vehicles, equipment, or personnel, a storm event, or other event
3. Mud or sediment deposits found downslope from E&S controls
4. Sediment tracked out onto paved areas by vehicles leaving construction site
5. Noticeable erosion at discharge outlets or at adjacent streambanks or channels
6. Erosion of the site's sloped areas (e.g., formation of rills or gullies)
7. E&S control is no longer working due to lack of maintenance

For buffer areas, make note of whether they are marked off as required, whether there are signs of construction disturbance within the buffer, which is prohibited under the CGP, and whether there are visible signs of erosion resulting from discharges through the area.

If maintenance or corrective action is required, briefly note the reason. If maintenance or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*

Condition and Effectiveness of Pollution Prevention (P2) Practices (CGP Part 2.3)

(see reverse for instructions)

Type/Location of P2 Practices [Add an additional sheet if necessary]	Maintenance Needed?*	Corrective Action Required?*	Date on Which Maintenance or Corrective Action First Identified?	Notes
1.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
2.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
7.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
8.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
9.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

* **Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. See Part 5 of the permit for more information.

Instructions for Filling Out the "Pollution Prevention (P2) Practice" Table

Type and Location of P2 Controls

Provide a list of all pollution prevention (P2) practices that are implemented at your site. This list must include all P2 practices required by Part 2.3, and those that are described in your SWPPP.

Maintenance Needed?

Answer "yes" if the P2 practice requires maintenance due to normal wear and tear in order for the control to continue operating effectively. Note: In many cases, "yes" answers are expected and indicate a project with an active operation and maintenance program.

Corrective Action Needed?

Answer "yes" if during your inspection you found any of the following conditions to be present (CGP, Part 5.1): (1) a required P2 practice needs repair or replacement (beyond routine maintenance required under Part 2.1.4); (2) a required P2 practice was never installed or was installed incorrectly; (3) you become aware that the inadequacy of the P2 practice has led to an exceedance of an applicable water quality standard; (4) one of the "prohibited discharges" listed in CGP Part 1.3 is occurring or has occurred, or (5) EPA requires corrective action for a P2 practice as a result of a permit violation found during an inspection carried out under Part 4.8. If you answer "yes", you must take corrective action and complete a corrective action report (see <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>). Note: You should answer "yes" if work to fix the problem from a previous inspection is still ongoing.

Date on Which Maintenance or Corrective Action First Identified?

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Notes

For each P2 control and the area immediately surrounding it, note whether the control is properly installed, whether it appears to be working to minimize or eliminate pollutant discharges, and whether maintenance or corrective action is required. Describe problem conditions you observed such as the following, and why you think they occurred, as well as actions you will take or have taken to fix the problem:

1. Failure to install or to properly install a required P2 control
2. Damage or destruction to a P2 control caused by vehicles, equipment, or personnel, or a storm event
3. Evidence of a spill, leak, or other type of pollutant discharge, or failure to have properly cleaned up a previous spill, leak, or other type of pollutant discharge
4. Spill response supplies are absent, insufficient, or not where they are supposed to be located
5. Improper storage, handling, or disposal of chemicals, building materials or products, fuels, or wastes
6. P2 practice is no longer working due to lack of maintenance

If maintenance or corrective action is required, briefly note the reason. If maintenance or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*

Stabilization of Exposed Soil (CGP Part 2.2.14)

(see reverse for instructions)

Stabilization Area [Add an additional sheet if necessary]	Stabilization Method	Have You Initiated Stabilization?	Notes
1.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
2.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
3.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
4.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
5.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	

Description of Discharges (CGP Part 4.6.6)

(see reverse for instructions)

Was a stormwater discharge or other discharge occurring from any part of your site at the time of the inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If "yes", provide the following information for each point of discharge:	
Discharge Location [Add an additional sheet if necessary]	Observations
1.	Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:
2.	Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:

Instructions for Filling Out the “Stabilization of Exposed Soil” Table

Stabilization Area

List all areas where soil stabilization is required to begin because construction work in that area has permanently stopped or temporarily stopped (i.e., work will stop for 14 or more days), and all areas where stabilization has been implemented.

Stabilization Method

For each area, specify the method of stabilization (e.g., hydroseed, sod, planted vegetation, erosion control blanket, mulch, rock).

Have You Initiated Stabilization

For each area, indicate whether stabilization has been initiated.

Notes

For each area where stabilization has been initiated, describe the progress that has been made, and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated, and the date it is to be completed.

Instructions for Filling Out the “Description of Discharges” Table

You are only required to complete this section if a discharge is occurring at the time of the inspection.

Was a Stormwater Discharge Occurring From Any Part of Your Site At The Time of the Inspection?

During your inspection, examine all points of discharge from your site, and determine whether a discharge is occurring. If there is a discharge, answer “yes” and complete the questions below regarding the specific discharge. If there is not a discharge, answer “no” and skip to the next page.

Discharge Location (repeat as necessary if there are multiple points of discharge)

Location of discharge. Specify the location on your site where the discharge is occurring. The location may be an outlet from a stormwater control or constructed stormwater channel, a discharge into a storm sewer inlet, or a specific point on the site. Be as specific as possible; it is recommended that you refer to a precise point on your site map.

Describe the discharge. Include a specific description of any noteworthy characteristics of the discharge such as color; odor; floating, settled, or suspended solids; foam; oil sheen; and other obvious pollution indicators.

Are there visible signs of erosion or sediment accumulation? At each point of discharge and the channel and streambank in the immediate vicinity, visually assess whether there are any obvious signs of erosion and/or sediment accumulation that can be attributed to your discharge. If you answer “yes”, include a description in the space provided of the erosion and sediment deposition that you have found, specify where on the site or in the water of the U.S. it is found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue.

Contractor or Subcontractor Signature and Certification

(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Contractor or Subcontractor: _____ **Date:** _____

Printed Name and Affiliation: _____

Operator Signature and Certification

(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Operator or "Duly Authorized Representative": _____ **Date:** _____

Printed Name and Affiliation: _____

Instructions for Signature/Certification

Each inspection report must be signed and certified to be considered complete.

Contractor or Subcontractor Signature and Certification

Where you rely on a contractor or subcontractor to carry out the inspection and complete the inspection report, you should require the inspector to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the inspection report as well.

Operator Signature and Certification

At a minimum, the inspection report must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation:* A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship:* A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency:* Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

ATTACHMENT 6 - TPDES REQUIREMENTS



RN:
Region:

Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

IMPORTANT INFORMATION:

Please read and use the General Information and Instructions prior to filling out each question in the form.

Effective September 1, 2018, this paper form must be submitted to TCEQ with a completed electronic reporting waiver form (TCEQ-20754).

ePermits: This form is available on our online permitting system.
Sign up for online permitting at: <https://www3.tceq.texas.gov/steers/>

What is the permit number to be terminated?

TXR15 [REDACTED] TXRCW [REDACTED]

Section 1. OPERATOR (Permittee)

a) What is the Customer Number (CN) issued to this entity?

CN [REDACTED]

b) What is the Legal Name of the current permittee?

[REDACTED]

c) Provide the contact information for the Operator (Responsible Authority).

Prefix (Mr. Ms. or Miss): [REDACTED]

First and Last Name: [REDACTED] Suffix: [REDACTED]

Title: [REDACTED] Credentials: [REDACTED]

Phone Number: [REDACTED] Fax Number: [REDACTED]

Email: [REDACTED]

Mailing Address: [REDACTED]

City, State, and Zip Code: [REDACTED]

Country Mailing Information, if outside USA: [REDACTED]

Section 2. APPLICATION CONTACT

This is the person TCEQ will contact if additional information is needed regarding this application.

Is the application contact the same as the permittee identified above?

Yes, go to Section 3.

No, complete section below

Prefix (Mr. Ms. or Miss): [redacted]
First and Last Name: [redacted] Suffix: [redacted]
Title: [redacted] Credentials: [redacted]
Phone Number: [redacted] Fax Number: [redacted]
Email: [redacted]
Mailing Address: [redacted]
City, State, and Zip Code: [redacted]
Country Mailing Information, if outside USA: [redacted]

Section 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

- a) TCEQ issued RE Reference Number (RN): RN [redacted]
- b) Name of project or site as known by the local community: [redacted]
- c) County, or counties if more than 1: [redacted]
- d) Latitude: [redacted] Longitude: [redacted]
- e) Site Address/Location:
If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete Section 3A.
If the site does not have a physical address, provide a location description in Section 3B. Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1.

Section 3A: Physical Address of Project or Site:

Street Number and Name: [redacted]
City, State, and Zip Code: [redacted]

Section 3B: Site Location Description:

Location description: [redacted]
[redacted]
City where the site is located or, if not in a city, what is the nearest city: [redacted]
Zip Code where the site is located: [redacted]

Section 4. REASON FOR TERMINATION

Check the reason for termination:

- Final stabilization has been achieved on all portions of the site that are the responsibility of the Operator and all silt fences and other temporary erosion controls have been removed, or scheduled for removal as defined in the SWP3.
- Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized, and temporary erosion controls that have been identified in the SWP3 have been transferred to the new Operator.

- The discharge is now authorized under an alternate TPDES permit.
- The activity never began at this site that is regulated under the general permit.

Section 5. CERTIFICATION

Signatory Name: _____

Signatory Title: _____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature (use blue ink): _____ Date: _____

Instructions for Notice of Termination (NOT) for Authorizations under TPDES General Permit TXR150000

GENERAL INFORMATION

Where to Send the Notice of Termination (NOT):

BY REGULAR U.S. MAIL:

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)
P.O. Box 13087
Austin, Texas 78711-3087

BY OVERNIGHT/EXPRESS MAIL:

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)
12100 Park 35 Circle
Austin, TX 78753

TCEQ Contact List:

Application status and form questions:	512-239-3700, swpermit@tceq.texas.gov
Technical questions:	512-239-4671, swgp@tceq.texas.gov
Environmental Law Division:	512-239-0600
Records Management - obtain copies of forms:	512-239-0900
Reports from databases (as available):	512-239-DATA (3282)
Cashier's office:	512-239-0357 or 512-239-0187

Notice of Termination Process:

A Notice of Termination is **effective on the date postmarked for delivery to TCEQ.**

When your NOT is received by the program, the form will be processed as follows:

- 1) Administrative Review: The form will be reviewed to confirm the following:
 - the permit number is provided;
 - the permit is active and has been approved;
 - the entity terminating the permit is the current permittee;
 - the site information matches the original permit record; and
 - the form has the required original signature with title and date.
- 2) Notice of Deficiency: If an item is incomplete or not verifiable as indicated above, a phone call will be made to the applicant to clear the deficiency. A letter will not be sent to the permittee if unable to process the form.
- 3) Confirmation of Termination: A Notice of Termination Confirmation letter will be mailed to the operator.

Change in Operator:

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted not later than 10 days prior to the change in Operator status.

INSTRUCTIONS FOR FILLING OUT THE FORM

The majority of permit information related to the current operator and regulated entity are available at the following website: http://www2.tceq.texas.gov/wq_dpa/index.cfm.

Section 1. Operator (Current Permittee):

- a) Customer Number (CN)
TCEQ's Central Registry assigns each customer a number that begins with CN, followed by nine digits. This is not a permit number, registration number, or license number. The Customer Number, for the current permittee, is available at the following website:
http://www2.tceq.texas.gov/wq_dpa/index.cfm.

- b) Legal Name of Operator
The operator must be the same entity as previously submitted on the original Notice of Intent for the permit number provided. The current operator name, as provided on the current authorization, is available at the following website:
http://www2.tceq.texas.gov/wq_dpa/index.cfm.

- c) Contact Information for the Operator (Responsible Authority)
Provide information for person signing the NOT application in the Certification section. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. Update the address if different than previously submitted for the Notice of Intent or Notice of Change. The mailing address must be recognized by the US Postal Service. You may verify the address on the following website: <https://tools.usps.com/go/ZipLookupAction!input.action>.

The phone number should provide contact to the operator.

The fax number and e-mail address are optional and should correspond to the operator.

Section 2. Application Contact:

Provide the name, title and contact information of the person that TCEQ can contact for additional information regarding this application.

Section 3. Regulated Entity (RE) Information on Project or Site:

- a) Regulated Entity Reference Number (RN)
A number issued by TCEQ's Central Registry to sites where an activity regulated by TCEQ. This is not a permit number, registration number, or license number. The Regulated Entity Reference Number is available at the following website:
http://www2.tceq.texas.gov/wq_dpa/index.cfm.
- b) Name of the Project or Site
Provide the name of the site as known by the public in the area where the site is located.
- c) County
Identify the county or counties in which the regulated entity is located.
- d) Latitude and Longitude
Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. The latitude and longitude as provided on the current authorization is available at the following website: http://www2.tceq.texas.gov/wq_dpa/index.cfm.
- e) Site/Project (RE) Physical Address/Location Information
The physical address/location information, as provided on the current authorization, is available at the following website: http://www2.tceq.texas.gov/wq_dpa/index.cfm.

Section 3A. If a site has an address that includes a street number and street name, enter the complete address for the site. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate the site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

Section 3B. If a site does not have an address that includes a street number and street name, provide a complete written location description. For example: "The site is located on the north side of FM 123, 2 miles west of the intersection of FM 123 and Highway 1."

Provide the city (or nearest city) and Zip Code of the facility location.

Section 4. Reason for Termination:

The Notice of Termination form is only for use to terminate the authorization (permit). The Permittee must indicate the specific reason for terminating by checking one of the options. If the reason is not listed then provide an attachment that explains the reason for termination.

Please read your general permit carefully to determine when to terminate your permit. Permits will not be reactivated after submitting a termination form. The termination is effective on the date postmarked for delivery to TCEQ.

Section 5. Certification:

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code §305.44.

IF YOU ARE A CORPORATION:

The regulation that controls who may sign an application form is 30 Texas Administrative Code §305.44(a), which is provided below. According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a), which is provided below. According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statutes under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a) (3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at 512-239-0600.

30 Texas Administrative Code §305.44. Signatories to Applications

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

SECTION 01600
DELIVERY, STORAGE AND HANDLING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies the general requirements for the delivery handling, storage and protection for all items required in the construction of the work. Specific requirements, if any, are specified with the related item.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 TRANSPORTATION AND DELIVERY

- A. Transport and handle items in accordance with manufacturer's instructions.
- B. Schedule delivery to reduce long term on site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer.
- C. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.
- D. Deliver products to the site in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.
- E. All items delivered to the site shall be unloaded and placed in a manner which will not hamper the Contractor's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
- F. Provide necessary equipment and personnel to unload all items delivered to the site.
- G. Promptly inspect shipment to assure that products comply with requirements, quantities are correct and items are undamaged. For items furnished by others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify Engineer verbally, and in writing, of any problems.
- H. If any item has been damaged, such damage shall be repaired at no additional cost to the Owner.

1.04 STORAGE AND PROTECTION

- A. Store and protect products in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instruction shall be studied by the Contractor and reviewed with the Engineer by him/her. Instruction shall be carefully followed and a written record of this kept by the Contractor. Arrange storage to permit access for inspection.

- B. Store loose granular materials on solid flat surfaces in a well drained area. Prevent mixing with foreign matter.
- C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, cracking and spalling to a minimum.
- D. All mechanical and electrical equipment and instruments subject to corrosive damage by the atmosphere if stored outdoors (even though covered by canvas) shall be stored in a weathertight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the Engineer. Building shall be provided with adequate ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer.
 - 1. All equipment shall be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by the manufacturer.
 - 2. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal to metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
 - 3. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
 - 4. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.
- E. All paint and other coating products shall be stored in areas protected from the weather. Follow all storage requirements set forth by the paint and coating manufacturers.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01610
BASIC PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Applicable codes, basis of design and design criteria for project components and systems designed by performance specification.
- B. Requirements for transportation, delivery, handling, and storage of materials and equipment.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 RELATED WORK

- A. Section 01750 – Anchorage and Bracing

1.04 SUBMITTALS

- A. When required by the state statutes, applicable codes or these specifications, provide calculations signed and sealed by a licensed Texas Professional Engineer for project records.
- B. Contractor/Supplier must submit written proof that the material/equipment storage and maintenance requirements are adequate for the project area climate and for the storage duration requirements. Contractor/supplier must also provide written instructions how to protect and provide maintenance of equipment once installed yet not started up.

1.05 REFERENCES

- A. Work shall comply with the requirements of these Codes, standards and specifications.
- B. City of Cibolo, TX Adopted Codes:
 - 1. 2017 NFPA 70 - National Electric Code
- C. City of Seguin, TX Adopted Codes:
 - 1. 2020 NFPA 70 - National Electric Code
- D. Basis of Design:
 - 1. The following site design criteria shall be used:
 - a. Risk Category of Buildings and Other Structures is listed on the Structural General Notes. All components and equipment shall be considered to have the same Risk Category as that of the structure they occupy.
 - b. Wind Loads:

- 1) Wind analysis and design shall be per ASCE 7-16 to meet the requirement of Texas Department of Insurance.
- 2) Basic wind speed = 120 mph
- 3) Wind exposure category= C
- c. Seismic Loads:
 - 1) Mapped spectral response accelerations $SS = 0.065g$ and $S1 = 0.035g$
 - 2) Design spectral response accelerations $SDS = 0.07g$ and $SD1 = 0.06g$
 - 3) Seismic Design Category = A

2. These Contract Documents provide additional design criteria.

E. Provide calculations signed and sealed by a licensed Texas Professional Engineer as required by applicable state statutes, codes or these specifications. Design shall be done by a Texas Professional Engineer engaged by and at the expense of the Contractor.

1.06 PRODUCTS

- A. Products: Means material, equipment, or systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components designated for reuse.
- B. Do not reuse materials and equipment, designated to be removed, except as specified by the Contract Documents.
- C. Provide equipment and components from the fewest number of manufacturers as is practical, in order to simplify spare parts inventory and to allow for maximum interchangeability of components. For multiple components of the same size, type or application, use the same make and model of component throughout the Work.

1.07 TRANSPORTATION

- A. Make arrangements for transportation, delivery, and handling of equipment and materials required for timely completion of the Work.
- B. Transport and handle products in accordance with instructions.
- C. Consign and address shipping documents to the proper party giving name of Project, street number, and Owner. Shipments shall be delivered to the Contractor.

1.08 DELIVERY

- A. Arrange deliveries of products to accommodate the Construction Schedule and in ample time to facilitate inspection prior to installation. Avoid deliveries that cause lengthy storage or overburden of limited storage space.
- B. Coordinate deliveries to avoid conflict with Work and conditions at the Project Site and to accommodate the following:
 1. Work of other Contractors or the Owner.

2. Limitations of storage space.
 3. Availability of equipment and personnel for handling products.
 4. Owner's use of premises.
- C. Have products delivered to the Project Site in Manufacturer's original, unopened, labeled containers.
- D. Immediately upon delivery, inspect shipment to assure:
1. Product complies with requirements of Contract Documents.
 2. Quantities are correct.
 3. Containers and packages are intact; labels are legible.
 4. Products are properly protected and undamaged.

1.09 PRODUCT HANDLING

- A. Coordinate the off-loading of materials and equipment delivered to the Project Site. If necessary to move stored materials and equipment during construction, Contractor shall relocate materials and equipment at no additional cost to the Owner.
- B. Provide equipment and personnel necessary to handle products, including those provided by the Owner, by methods to prevent damage to products or packaging.
- C. Provide additional protection during handling as necessary to prevent breaking scraping, marring, or otherwise damaging products or surrounding areas.
- D. Handle products by methods to prevent over bending or overstressing.
- E. Lift heavy components only at designated lifting points.
- F. Handle materials and equipment in accordance with Manufacturer's recommendations.
- G. Do not drop, roll, or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

1.10 STORAGE OF MATERIAL

- A. Store and protect materials in accordance with Manufacturer's recommendations and requirements of these Technical Specifications.
- B. Make necessary provisions for safe storage of materials and equipment. Place loose soil materials, and materials to be incorporated into the Work to prevent damage to any part of the Work or existing facilities and to maintain free access at all times to all parts of the Work and to utility service company installations in the vicinity of the Work.

- C. Keep materials and equipment neatly and compactly stored in locations that will cause a minimum of inconvenience to other contractors, public travel, adjoining owners, tenants, and occupants. Arrange storage in a manner to provide easy access for inspection.
- D. Provide adequately ventilated, watertight storage facilities with floor above ground level for materials and equipment susceptible to weather damage.
- E. Restrict storage to areas available on the construction site for storage of material and equipment as shown on Drawings or approved by the Owner's Representative.
- F. Provide off-site storage and protection when on-site storage is not adequate.
- G. Do not use lawns, grass plots, or other private property for storage purposes without written permission of the owner or other person in possession or control of such premises. Damage to lawns, sidewalks, streets or other improvements shall be repaired or replaced to the satisfaction of the Owner's Representative.
- H. Protect stored materials and equipment against loss or damage.
- I. Store materials in Manufacturers' unopened containers.
- J. Materials delivered and stored along the line of the Work shall not be closer than 3 feet to any fire hydrant nor restrict access on the service side of the hydrant. Public and private drives and street crossings shall be kept open.
- K. The total length which materials may be distributed along the route of construction at any one time is 1,000 lineal feet, unless otherwise approved in writing by the Owner's Representative.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install materials or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 INSTALLATION

- A. Equipment drawings show general locations of equipment, devices, and raceways, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Repaint painted surfaces that are damaged prior to equipment acceptance.

- D. Do no cut or notch any structural member or building surface without specific approval of Owner's Representative.
- E. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's printed instructions, and as may be specified. Retain a copy of Manufacturer's instruction at Site available for review at all times.
- F. Provide safety guards for all rotating parts on all sides. Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Design for easy installation and removal. Use 16 gage or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated ½ inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.
- G. For material and equipment specifically indicated or specified to be reused in the Work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
 - 2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.03 ADJUSTMENT AND CLEANING

- A. Perform required adjustment, tests, operation checks, and other startup activities.

3.04 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, startup, and operations prior to acceptance of equipment by Owner.

END OF SECTION

SECTION 01630
SUBSTITUTIONS AND PRODUCT OPTIONS

1.01 SECTION INCLUDES

- A. Options for making product or process selections.
- B. Procedures for proposing equivalent construction products or processes, including pre-approved, and approved products or processes.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 SUBMITTALS

- A. Make Submittals required by this and related Sections under the provisions of Section 01350 – Submittals.

1.04 DEFINITIONS

- A. Product: Means, materials, equipment, or systems incorporated into the Work. Product does not include machinery and equipment used for production, fabrication, conveying, and erection of the Work. Products may also include existing materials or components designated for re-use.
- B. Process: Any proprietary system or method for installing system components resulting in an integral, functioning part of the Work. For this Section, the word Product includes Processes.

1.05 SELECTION OPTIONS

- A. Pre-approved Products: Products of certain manufacturers or suppliers are designated in the Technical Specifications as “pre-approved”. Products of other Manufacturers or suppliers will not be acceptable under this Contract and will not be considered under the submittal process for approving alternate products.
- B. Approved Products: Products of certain Manufacturers or Suppliers designated in the Technical Specifications followed by the words "or approved equal". Approval of alternate products not listed in the Technical Specifications may be obtained through provisions of this Section and Section 01300 – Submittals. The procedure for approval of alternate products is not applicable to Pre-approved Products.
- C. Product Compatibility: To the maximum extent possible, provide products that are of the same type or function from a single manufacturer, make, or source. Where more than one choice is available as a Contractor's option, select a product which is compatible with other products already selected, specified, or in use by the Owner.

1.06 CONTRACTOR'S RESPONSIBILITY

- A. Furnish information the Engineer deems necessary to judge equivalency of the alternate product.
- B. Pay for laboratory testing as well as any other review or examination cost needed to establish the equivalency between products which enables the Engineer to make such a judgment.
- C. If the Engineer determines that an alternate product is not equivalent to that named in the Technical Specifications, the Contractor shall furnish one of the specified products.

1.07 ENGINEER'S REVIEW

- A. Alternate products may be used only if approved in writing by the Engineer. The Engineer's determination regarding acceptance of a proposed alternate product is final.
- B. Alternate products will be accepted if the product is judged by the Engineer to be equivalent to the specified product or to offer substantial benefit to the Owner.
- C. The Owner retains the right to accept any product deemed advantageous to the Owner, and similarly, to reject any product deemed not beneficial to the Owner.

1.08 SUBSTITUTION PROCEDURE

- A. Collect and assemble technical information applicable to the proposed product to aid in determining equivalency as related to the Approved Product specified.
- B. Submit a written request for a product to be considered as an alternate product along with the product information within fourteen (14) days after the Effective Date of the Agreement.
- C. After the submittal period has expired, requests for alternate products will be considered only when a specified product becomes unavailable because of conditions beyond the Contractor's control.
- D. Submit 5 copies of each request for alternate product approval. Include the following information:
 - 1. Complete data substantiating compliance of proposed substitution with Contract Documents.
 - 2. For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature with product description, performance and test data, and reference standards.
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product was used and date of installation. Include the name of the Owner, Owner's Representative, Engineer, and installing Contractor.
 - 3. For construction methods:

- a. Detailed description of proposed method.
 - b. Shop Drawings illustrating methods.
4. Itemized comparison of proposed substitution with product or method specified.
 5. Data relating to changes in Construction Schedule
 6. Relationship to separate contracts, if any.
 7. Accurate cost data on proposed substitution in comparison with product or method specified.
 8. Other information requested by the Engineer.
- E. Approved alternate products will be subject to the same review process as the specified product would have been for Shop Drawings, Product Data, and Samples.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01640
MANUFACTURERS' SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Where specified, provide manufacturer's representatives to perform installation assistance, inspections, testing, start-up services and training as specified herein.
- B. Manufacturer's services shall include:
 - 1. Assistance during installation when specified to include observation, guidance, instruction of Contractor's personnel in assembly, erection, and installation or application procedures.
 - 2. Inspection, checking, and adjustment for equipment to function as specified. Any additional services required in the technical specifications shall be conducted by manufacturer.
 - 3. Revisiting the site to correct problems until installation and operation meet the specified requirements at no additional cost to the Owner.
 - 4. Resolution of assembly or installation problems attributable to, or associated with, respective manufacturer's products and systems.
 - 5. Assistance during testing and commissioning until Substantial Completion.
 - 6. Training of the Owner's personnel in the operation and maintenance of manufacturer's product in accordance with respective equipment specifications.
 - 7. Completion of Manufacturer's Certificate of Proper Installation found at the end of this Section.
 - 8. Completion of Closeout in accordance with Section 01700 – Contract Closeout.
 - 9. Completion of installation certificate in accordance with Section 01665– Equipment Checkout, Field Testing & Functional Testing.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 RELATED WORK

- A. Submittals are included in Section 01350 Submittals.
- B. Contractor Quality Control is included in Section 01400 – Contractor Quality Control.
- C. Equipment Delivery, Storage and Handling is included in Section 01610 - Basic Product Requirements.

- D. Equipment Checkout, Field Testing, and Functional Testing is included in individual equipment specifications.
- E. Operation and Maintenance Data requirements are included in Section 01731 – Operation and Maintenance Data. Vendor Training is included in Equipment specifications.

1.04 DEFINITIONS

- A. Person-Day: One person for 8 hours on site within regular subcontractor working hours exclusive of travel time.

1.05 SUBMITTALS

- A. Qualifications of proposed manufacturer's representative(s) and manufacturer's certificate of factory training in accordance with Paragraph 1.06.
- B. All certificates and forms as specified in equipment specifications, 01610 - Basic Product Requirements, 01640 - Manufacturers' Services, , 01731 - Operations and Maintenance Data, , as specified herein and in the product Specification section.

1.06 QUALIFICATION OF MANUFACTURERS' REPRESENTATIVE

- A. Provide authorized representatives of the manufacturers, factory trained and certified in factory training in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system. Representatives shall be subject to acceptance by Owner's Representative. No substitute representatives shall be allowed without prior written approval of the Owner's Representative.
- B. Manufacturers' representatives shall have a minimum of two years of experience within the last five years in the installation, adjustment, operation, testing and start-up of the equipment and systems being installed and shall have participated in at least two similar tests during this period of experience.
- C. Manufacturer's sales and marketing personnel will not be accepted as Manufacturer's Representatives.

1.07 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Provide Manufacturer's assistance time where specified, inclusive of any requirements due to retesting, which shall be provided at no additional cost to the Owner.
- B. Schedule Manufacturer's onsite services with the Contractor so as not to conflict with other onsite testing or other Manufacturer's onsite services.
- C. Determine that all conditions necessary for testing and/or certification have been met before scheduling Manufacturer's services.
- D. The Contractor shall notify the Owner's Representative and receive approval of Manufacturer's representative prior to scheduling manufacturer's services. Only those days of services and site

visits, approved by Owner's Representative will be credited to fulfill the specified minimum services.

- E. Manufacturer's responsibilities include the following categories of work, including Specification Section where details of the work are specified.
- F. See Section 01665, Equipment Checkout, Field Testing and Functional Testing, for requirements to attend commission meetings.

Category of Manufacturer's Work	Related Specification Section
1. Complete Technical Data Forms	Individual Equipment Technical Sections
2. Prepare Submittals	01350 – Submittal Procedures,
3. Conduct Shop Testing	Technical Sections
4. Prepare Equipment Checkout, Field Testing & Functional Test	Individual Equipment Technical Sections
5. Prepare Operation and Maintenance Manual	01731 - Operations and Maintenance Data
6. Prepare Training Manual and Conduct Training	Individual Equipment Technical Sections
7. Pre-commissioning and Commissioning	Individual Equipment Technical Sections
8. Closeout Procedure	01700 – Contract Closeout
9. Complete Certificate of Proper Installation	01640 – Manufacturers' Services,
10. Instructor Certification	Individual Equipment Technical Sections

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

Contractor: _____
 Project: _____
 Contract Number: _____
 Specification Section: _____
 Equipment/System: _____
 Tag Number(s): _____
 Serial Number(s): _____

I hereby certify that the above-referenced equipment/system has been:

Yes	No	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed in accordance with Manufacturer's recommendations.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Serviced with proper initial lubricants.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Electrical and mechanical connections meet quality & safety standards.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All applicable safety equipment has been properly installed.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Operated and rotates in the proper direction.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Correct rotation verified and properly aligned/adjusted as necessary.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tested for vibration and meets requirements. Vibration requirements: _____ Vibration reading: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Equipment as installed is ready to be operated by others and will reliably perform the function for which it is intended.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Initial Volts (V) and Amps (A) recorded: Ph1 (A-B): V _____ A _____ Ph2 (B-C): V _____ A _____ Ph3 (A-C): V _____ A _____

Comments:

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate this equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the Manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Representative: _____ Manufacturer: _____
 Signature: _____ Date: _____

SECTION 01700
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies administrative, verification and procedural requirements for project closeout, including but not limited to:
 - 1. Closeout Procedure.
 - 2. Final cleaning.
 - 3. Project Record Documents.
 - 4. Spare parts and maintenance materials (spare paint, lubricants, special tools).
 - 5. Warranties, guarantees, and bonds.
 - 6. Reconciliation of final accounting, final change order, final payment application.
 - 7. Permit close-outs including Certificate of Occupancy or Certificate of Completion.

1.02 RELATED WORK

- A. Operation and Maintenance (O&M) data and manuals Section 01730 and applicable Sections in Technical Divisions.
- B. Final cleaning is included in Section 01710.
- C. Project Record Documents are included in Section 01720.
- D. Spare parts and maintenance materials (spare paint, lubricants, special tools) are included in applicable Sections in Divisions 9 through 16.
- E. Warranties, guarantees, and bonds are included in 00 72 00 – General Conditions of the Contract and applicable Sections in Technical Divisions 10 through 16.
- F. Payment Application is included in 00 61 14.

1.03 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, work has been inspected and that work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Provide all deliverables as specified, prior to submitting the final payment application.

- C. Provide submittals to Engineer that are required by governing or other authorities having applicable jurisdiction including but not limited to permit close out information, certificates of occupancy, etc.
- D. Submit Application for Final Payment identifying total adjusted Contract Sum, previous payments and sum remaining due, following submittal and approval of Record Documents and Record Drawings.
- E. Provide Project Record Documents prior to request for final closeout.
- F. Complete or correct items on punch list, with no new items added to said punch list.
- G. Any punch list items will be completed to the Owner's satisfaction prior to final payment.
- H. Submit Contractor's Final Release and Release of Liens with final payment application.

1.04 FINAL CLEANING

- A. Contractor to complete final cleaning prior to submittal of the final application for payment.
- B. Contractor to comply with requirements as specified in Section 01710.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01710
CLEANING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Execute cleaning, during progress of the work, and at completion of the work, as required by General Conditions.
- B. Maintaining premises and public properties (including storage yards) free from accumulations of waste, debris and rubbish caused by operations.
 - 1. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials:
 - 2. Clean all surfaces exposed to sight.
 - 3. Leave project clean and ready for occupancy or use

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item.

1.03 RELATED WORK

- A. Standard General Conditions of the Construction Contract are included in Division 0.
- B. Each Section: Cleaning for specific products or work.

1.04 DISPOSAL AND CLEANING

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.
- D. Wet down dry materials and rubbish to settle dust and prevent blowing dust.
- E. At daily intervals during progress of work, clean site and public properties.
- F. Legally and properly dispose of waste materials, debris, and rubbish.
- G. Provide wire fence or equivalent around debris piles to prevent blowing of debris from project site.
- H. Legally dispose of debris at public or private dumping areas off Owner's property.
- I. Handle materials in a controlled manner with as few handlings as possible.
- J. Owner may dictate cleaning equipment and methodology.
- K. Hazards Control:
 - 1. Remove containers from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- L. Conduct cleaning and disposal operations to comply with local ordinances and anti pollution laws:
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into stream or waterways.
 - 4. Cleanup after haul trucks.

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels and other foreign materials from sight exposed interior and exterior surfaces.
- C. Wash and shine glazing and mirrors.
- D. Polish glossy surfaces to a clear shine.
- E. Ventilating Systems:
 - 1. Clean permanent filters and replace disposable filters if units were operated during construction.
 - 2. Clean ducts, blowers and coils if units were operated without filters during construction.
- F. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- G. Prior to final completion, or Owner occupancy, conduct an inspection of sight exposed interior and exterior surfaces and all work areas, to verify that the entire work is clean.

END OF SECTION

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SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall keep and maintain, at the job site, a copy of contract documents, marked up to indicate all changes made during the course of a project, as specified herein.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for project record documents under this section. Include payment in the lump sum base bid.

1.03 RELATED REQUIREMENTS

- A. Contract close-out submittals are included in Section 01700.
- B. Warranties and bonds are included in 00 72 00.
- C. As-built construction schedules are included in Section 01311.
- D. As-built wiring diagrams are included in Section 01731.

1.04 REQUIREMENTS INCLUDED

- A. Contractor shall maintain a record copy of the following documents, marked up to indicate all changes made during the course of a project:
 - 1. Contract Drawings
 - 2. Specifications
- B. Contractor shall assemble copies of the following documents for turnover to the Engineer at the end of the project, as specified.
 - 1. Field Orders, Change Orders, Design Modifications, and RFIs
 - 2. Field Test records
 - 3. Permits and permit close-outs (final approvals)
 - 4. Certificate of Occupancy or Certificate of Completion, as applicable
 - 5. Laboratory test reports (e.g., bacteriological and primary & secondary water quality)
 - 6. Certificates of Compliance for materials and equipment
 - 7. Record Shop Drawings

8. Samples

C. RECORD DRAWINGS

1. The Contractor shall annotate (mark-up) the Contract Drawings to indicate all project conditions, locations, configurations, and any other changes or deviations that vary from the original Contract Drawings. This requirement includes, but is not limited to, buried or concealed construction, and utility features that are revealed during the course of construction. Special attention shall be given to recording the locations (horizontal and vertical) and material of all buried utilities that are encountered during construction – whether or not they were indicated on the Contract Drawings. The record information added to the drawings may be supplemented by detailed sketches, if necessary, clearly indicating, the WORK, as constructed.
2. These annotated Contract Drawings constitute The Contractor's Record Drawings and are actual representations of as-built conditions, including all revisions made necessary by change orders, design modifications, requests for information and field orders.
3. Record drawings shall be accessible to the Owner and Engineer at all times during the construction period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's field office apart from documents used for construction.
 1. Provide files and racks for storage of the record documents.
 2. Provide locked cabinet(s) or secure storage space for storage of samples.
- B. File documents and samples in accordance with Construction Specifications Institute (CSI) format.
- C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and sample available for inspection by the Engineer or Owner at all times.
- E. Up-to-date Record Drawings may be a pre-requisite of processing periodic monthly pay applications, if so specified under the section for progress payments.

3.02 MARKING METHOD

- A. Use the color Red (indelible ink) to record information on the Drawings and Specifications,
- B. Label each document "PROJECT RECORD" in neat large printed letters.

- C. Unless otherwise specified elsewhere, notations shall be affixed to hardcopies of documents.
- D. Record information contemporaneously with construction progress.

3.03 RECORD INFORMATION COMPILATION

- A. Do not conceal any work until the required information is acquired.
- B. Drawings – legibly mark drawings with as-built information. Items to be recorded include, but are not limited to:
 - 1. Location of internal utilities and appurtenances concealed in the construction – referenced to visible and accessible features.
 - 2. Field changes of dimensions and/or details
 - a. Interior equipment and piping relocations.
 - b. Architectural and structural changes, including relocation of doors, windows, etc.
 - c. Architectural schedule changes.
 - 3. Elevations and dimensions of structures and structural elements.
 - 4. All underground utilities (piping and electrical), structures, and appurtenances
 - a. Changes to existing structure, piping and appurtenance locations.
 - b. Record horizontal and vertical locations of underground structures, piping, utilities and appurtenances, referenced to permanent surface improvements.
 - c. Record actual installed pipe material, class, size, joint type, etc.
 - 5. Changes made by Field Order, Change Order, design modification, and RFI.
 - 6. Details not indicated on the original Contract Drawings.
- C. Specifications - 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 Field Order, Change Order, RFI, and approved shop drawing.
- D. Shop Drawings (after final review and approval):
 - 1. One set of record drawings for each piece of equipment, piping, electrical system and instrumentation system.

3.04 SUBMITTAL

- A. If specified under the section for progress payments, monthly applications for payment will be contingent upon up-to-date Record Drawings. If requested by the Engineer or Owner, Contractor shall provide a copy of the Record Drawings, or present them for review prior to processing monthly applications for payment.

- B. Upon substantial completion of the WORK and prior to final acceptance, the Contractor shall finalize and deliver a complete set of Record Drawings to the ENGINEER conforming to the construction records of the Contractor. The set of drawings shall consist of corrected and annotated drawings showing the recorded location(s) of the WORK. Unless specified otherwise elsewhere, Record Drawings shall be in the form of a set of prints with annotations carefully and neatly superimposed on the drawings in red.
- C. Upon substantial completion of the WORK and prior to final acceptance, the Contractor shall finalize and deliver a complete set of Record Documents to the ENGINEER conforming to the construction records of the Contractor. The set of documents shall consist of corrected and annotated documents showing the as-installed equipment and all other as-built conditions not indicated on the Record Drawings.
- D. The information submitted by the Contractor into the Record Drawings and Record Documents will be assumed to be correct, and the Contractor shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data.
- E. Delivery of Record Drawings and Record Documents to the ENGINEER will be a prerequisite to Final payment.
- F. The Contractor shall maintain a copy of all books, records, and documents pertinent to the performance under this Agreement for a period of five years following completion of the contract.

END OF SECTION

SECTION 01731
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes procedural requirements for compiling and submitting operation and maintenance data required to complete the project.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item.

1.03 RELATED WORK

- A. Special Provisions are included in 01170.
- B. Submittals are included in Section 01350.
- C. Contract closeout is included in Section 01700.
- D. Warranties and Bonds are included in 00 72 00.

1.04 QUALITY ASSURANCE

- A. The CONTRACTOR shall verify that each submittal under this section meets the Contract requirements.
- B. Preparation of all operations and maintenance data shall be done by personnel: Trained and experienced in maintenance and operation of described products;
 - 1. Familiar with requirements of this section;
 - 2. Skilled as technical writer to the extent required to communicate essential data;
 - 3. Skilled as draftsman competent to prepare required drawings.

1.05 OPERATING MANUALS

- A. Provide specific operation and maintenance instructions for all electrical, mechanical, and instrumentation & controls equipment furnished under various technical specifications Sections.
- B. Separate manuals shall be provided for each type of equipment, or each Section number. Each manual shall contain the following:
 - 1. Format and Materials
 - a. Binders:
 - 1) Commercial quality three ring binders with durable and cleanable plastic covers
 - 2) Maximum ring width capacity: 3 inches

- 3) When multiple binders are used, correlate the data into related consistent groupings/volumes.
- b. Identification: Identify each volume on the cover AND spine with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". Include the following:
 - 1) Title of Project.
 - 2) Identify the general subject matter covered in the manual.
 - 3) Identify structure(s) and/or location(s), of the equipment provided.
 - 4) Specification Section number.
 - 5) Name of manufacturer and/or supplier of equipment covered in the manual.
- c. 20 lb loose leaf paper, with hole reinforcement
- d. Page size: 8-1/2 inch by 11 inch
- e. Provide heavy-duty fly leaves (section separators), matching the table of contents, for each separate product, each piece of operating equipment, and organizational sections of the manual.
- f. Provide reinforced punched binder tab; bind in with text.
- g. Reduce larger drawings and fold to the size of text pages - but not larger than 11 inches x 17 inches.
- h. Operation and Maintenance Manual to be provided in electronic format on CD to accompany hard copies with the following requirements:
 - 1) File Format – All documents will be delivered in Adobe Acrobat Portable Document format (PDF).
 - a) Electronic file shall be named according to the submittal number and the title of the corresponding specification section. In the case of multiple manuals being generated for the same specification section, provide a unique descriptor in addition to the specification section (e.g. M-11363-001Centrifuge.pdf; M-11320-Grit Removal System-Grit Capture Unit.pdf)
 - 2) Page Format
 - a) Size – Two page sizes; 8 ½ x 11 inches in either landscape or portrait and 11 x 17 inches in landscape only.
 - b) Content – The content of the pages will be either scanned image or text and graphics converted to Adobe Acrobat pdf. Where page content is from a scanned image, the following minimum specifications will be followed.
 - 3) Scanned Page Content:
 - a) Resolution – 300 dpi
 - 4) Color Levels:
 - a) Text only – Monochrome black and white
 - b) Text with gray tone images – 256 levels of gray
 - c) Color images – Color images can be 256 levels of gray except where color is needed to properly utilize the image in an operations and maintenance reference situation.
 - 5) File Organization – All document files will follow the order and structure of approved printed versions of the vendor manuals. The following outline details the specific organization of how the electronic document files will be compiled.
 - a) A cross-reference listing of the file names and sections of the vendor manuals will be supplied in Microsoft Excel format. The cross-reference list will include the pdf file name, submittal number and the design specification number related to the file.
 - b) Each PDF file will include only the pages of an individual item from the submitted vendor manuals.

- c) Each PDF file will contain bookmark links in a hierarchical table format to access information pertaining to the supplied equipment.
 - d) No bookmark links will reference files external to the pdf file containing the bookmark links.
 - e) Each bookmark will access the beginning location of the related information.
 - f) All pages of the PDF file(s) of the CD-ROM will be searchable. The user shall perform a search on the PDF file by using the Search function to look for a specific word or string of words. Electronic manuals produced by scanning hard copy documents shall utilize text recognition software to ensure that even scanned pages shall be text searchable.
- 6) Delivery – All files will be delivered on standard 650 MB CD-ROM. The CDROM will be formatted in ISO – 9660 format where each file will maintain its full name. Files names should not be truncated to an 8-character DOS format. Each CD-ROM will be labeled and will be permanently marked with the job name, vendor name, submittal number, and date the CD-ROM was made. A transmittal will be submitted with each CD-ROM. The transmittal will include the CD-ROM label information.
2. Contents:
- a. A table of contents/Index, divided into section reflective of the major components provided.
 - b. Specific description of each system and components
 - c. Name, address, telephone number(s) and e-mail address(es) of vendor(s) and local service representative(s)
 - d. Specific on-site operating instructions (including starting and stopping procedures)
 - e. Safety considerations
 - f. Project specific operational procedures and recommended log sheet(s).
 - g. Project specific maintenance procedures
 - h. Manufacturer's operating and maintenance instructions – specific to the project
 - i. Copy of each wiring diagram
 - j. Copy of approved shop drawing(s) and Contractor's coordination/layout drawing(s)
 - k. List of spare parts and recommended quantities
 - l. Product Data: Mark each sheet to clearly identify specific products and component parts and data applicable to installation. Delete or clearly cross-out inapplicable information. Markings shall be photo reproducible. Highlighting will not be accepted.
 - m. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams
 - n. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.
 - o. Warranties and Bonds, as specified in the General Conditions
3. Transmittals
- a. Prepare separate transmittal sheets for each manual. Each transmittal sheet shall include at least the following: the Contractor's name and address, Owner's name, project name, project number, submittal number, description of submittal and number of copies submitted.
 - b. Submittals shall be transmitted or delivered directly to the office of the Engineer, as indicated in the Contact Documents or as otherwise directed by the Engineer.

- c. Provide copies of transmittals directly to the Resident Project Representative.
- C. Manuals for Equipment and Systems - In addition to the requirements listed above, for each System, provide the following:
1. Overview of system and description of unit or system and component parts. Identify function, normal operating characteristics and limiting conditions. Include legible performance curves, with engineering data and tests and complete nomenclature and commercial number of replaceable parts.
 2. Panelboard circuit directories including electrical service characteristics, controls and communications and color-coded wiring diagrams as installed.
 3. Operating procedures: include start-up, break-in and routine normal operating instructions and sequences; regulation, control, stopping, shut-down and emergency instructions; and summer, winter and any special operating instructions.
 4. Maintenance Requirements
 - a. Procedures and guides for trouble-shooting; disassembly, repair, and reassembly instructions
 - b. Alignment, adjusting, balancing and checking instructions
 - c. Servicing and lubrication schedule and list of recommended lubricants
 - d. Manufacturer's printed operation and maintenance instructions
 - e. Sequence of operation by instrumentation and controls manufacturer
 - f. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance
 5. Control diagrams by controls manufacturer as installed (as-built)
 6. Contractor's coordination drawings, with color coded piping diagrams, as installed (as-built)
 7. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams. Include equipment and instrument tag numbers on diagrams.
 8. List of original manufacturer's spare parts and recommended quantities to be maintained in storage
 9. Test and balancing reports, as required
 10. Additional Requirements as specified in individual product specification
 11. Design data for systems engineered by the Contractor or its Suppliers

1.06 SERVICES OF MANUFACTURERS' REPRESENTATIVE

- A. All electrical, mechanical, and instrumentation & controls equipment furnished under various technical specifications Sections shall include the cost of a competent representative of the manufacturers of all equipment to supervise the installation, adjustment and testing of the equipment; and, to instruct the Owner's operating personnel on operation and maintenance. This

supervision may be divided into two or more time periods to suit the Contractor's schedule and/or the Owner's personnel availability.

- B. See the detailed specifications for additional requirements for furnishing the services of manufacturer's representatives.
- C. The manufacturer's representative shall certify that the installation of the equipment is satisfactory; that the unit has been satisfactorily tested; that the equipment is ready for operation; and, that the operating personnel have been suitably instructed in the operation, maintenance, care, and safe operation of the equipment. The *Equipment Manufacturer's Certificate of Installation, Testing, and Instruction* attached to this Section shall be used for this certification.
- D. For other materials furnished under other specification Sections, furnish the services of approved representative(s) of the manufacturer when, in the opinion of the Engineer, some evident product failure or malfunction makes such services necessary.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SUBMITTAL SCHEDULE

- A. Operation and maintenance manuals shall be delivered directly to the office of the Engineer, as follows:
 - 1. Provide preliminary copies of each manual to the office of the Engineer, no later than 30 days following approval of the respective shop drawings.
 - 2. Provide final copies of each completed manual prior to testing.
 - 3. Provide a letter that grants the Engineer and Owner to the limited right to use and reproduce each manual (in its entirety or any portion thereof) from the respective equipment manufacturer(s). Such limited right shall allow the Engineer and Owner to use each manual or any portion thereof for:
 - a. The assembly of a comprehensive facility operation and maintenance manual for the sole benefit of the Owner; and,
 - b. Supplemental training of the Owner's personnel and operators, over and above the required vendor's training, regarding operation of the facility as a system.
- B. The ENGINEER will review Operation and Maintenance manuals submittals for operating equipment for conformance with the requirements of the applicable specification Section. The review will generally be based on the O&M Manual Review Checklist appended to this Section.
- C. If during test and start-up of equipment, any changes were made to the equipment, provide two hard copies of as-built drawings or any other amendments for insertion, by the contractor, in the previously transmitted final manuals. In addition, provide one revised electronic version including the as-built drawings and any other amendments. The manuals shall be completed, including updates, if any, within 30 days of start-up and testing of the facility.

3.02 VENDOR TRAINING/INSTRUCTIONS (TO OWNER'S PERSONNEL)

- A. Before final initiation of operation, Contractor's vendors shall train/instruct Owner's designated personnel in the operation, adjustment, and maintenance of products, equipment and systems at times convenient to the Owner.
- B. Unless specified otherwise under the respective equipment specification section, vendor training/instruction shall consist of eight hours of training for each type of equipment. Such training/instruction shall be scheduled and held at times to accommodate the work schedules of Owner's personnel, including splitting the required training/instruction time into separate sessions and/or presented at reasonable times other than the Contractor's "normal working hours" or the Owner's normal day shift.
- C. Use operation and maintenance manuals as basis for instruction. Train/instruct the Owner's personnel, in detail, based on the contents of manual explaining all aspects of operation and maintenance of the equipment. If the respective equipment is inter-related to the operation of other equipment, all interlock, constraints, and permissives shall be explained.
- D. At least two weeks prior to the schedule for vendor training, a detailed lesson plan, representative of the material to be covered during instruction, shall be submitted to the Engineer for approval. Lesson plans shall consist of in-depth outlines of the training material, including a table of contents, resume of the instructor, materials to be covered, start-up procedures, maintenance requirements, safety considerations, and shut-down procedures.
- E. Prepare and insert additional data in each Operation and Maintenance Manual when the need for such data becomes apparent during training/instruction.
- F. Vendor's training/instruction will be considered acceptable based on the completed Owner's Acknowledgement of Manufacturer's Instruction as indicated on the Equipment Manufacturer's Certification of Installation, Testing, and Instruction appended to this Section.

3.03 VIDEOGRAPHY OF VENDOR TRAINING/INSTRUCTION

- A. The Contractor shall record audio/video (A/V) (in DVD format) of the training/instructions as they are being provided to the Owner's personnel. Such recording shall include the entire training/instruction session(s) as well as all questions and answers.
- B. To avoid audio problems, training/instruction shall be held in a location sufficiently removed from construction activity, insulated from the noise of construction activity, or during a time when construction activity is not occurring in the vicinity.
- C. The audio portion of the A/V recording should be done with a microphone (wired or wireless) attached to the trainer/instructor to maximize the quality of speech.
- D. Each A/V recording should have "chapters" to segregate the distinct portions of the training/instruction, or have visual cues at the start of a change in subject.

- E. Two copies of the A/V recordings shall be submitted to the Engineer on DVD disk(s). The DVDs will become the property of the Owner.

END OF SECTION

O&M Manual Review Checklist

Submittal No.: _____ Project No.: _____ Manufacturer: _____

Equipment Submitted: _____

Specification Section: _____ Date of Submittal: _____

General Data		
1.	Are the area representative's name, address, e-mail address and telephone number included?	
2.	Is the nameplate data for each component included?	
3.	Are all associated components related to the specific equipment included?	
4.	Is non-pertinent data crossed out or deleted?	
5.	Are drawings neatly folded and/or inserted into packets?	
6.	Are all pages properly aligned and scanned legibly?	
7.	Is the .PDF document bookmarked according to the table of contents?	
Operations and Maintenance Data		
8.	Is an overview description of the equipment and/or process included?	
9.	Does the description include the practical theory of operation?	
10.	Does each equipment component include specific details (design characteristics, operating parameters, control descriptions, and selector switch positions and functions)?	
11.	Are alarm and shutdown conditions specific to the equipment provided on this project clearly identified? Does it describe possible causes and recommended remedies?	
12.	Are step procedures for starting, stopping, and troubleshooting specific to the equipment provided included?	
13.	Is a list of operational parameters to monitor and record specific to the equipment provided included?	
14.	Is a proposed operating log sheet specific to the equipment provided included?	
15.	Is a spare parts inventory list included for each component?	
16.	Is a lubrication schedule for each component specific to the equipment provided included - or does it clearly state "No Lubrication Required"?	
17.	Is a maintenance schedule for each component specific to the equipment provided included?	
18..	Is a copy of the warranty information included?	
19.	Is the Mercury Inventory Form included?	

Review Comments

Is the submittal fully approved (yes/no)? _____

If not, the following points of rejection must be addressed and require resubmittal by the Contractor:

Item No.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

Reviewed By: _____ Date: _____

Legend

1 = OK

2 = Not Adequate

3 = Not Included

Note: This submittal has been reviewed for compliance with the Contract Documents.

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SECTION 01755
STARTING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contractor and his subcontractors and suppliers shall integrate testing and commissioning activities of equipment as specified herein on the Drawings and individual equipment specifications in conducting commissioning activities including the final Acceptance Tests.
- B. The general commissioning program for the process equipment consists of the following major steps:
 - 1. Equipment and Subsystem Testing
 - 2. Systems Testing
 - 3. Acceptance Testing
 - 4. Pre-commissioning activities must be verified prior to performing commissioning activities, and therefore requirements for Pre-commissioning are also discussed herein.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item.

1.03 RELATED WORK

- A. Section 01350 – Submittals
- B. Section 01400 – Contractor’s Quality Control

1.04 DEFINITIONS

- A. Acceptance Test: Test(s) conducted by Contractor(s) to demonstrate and document performance of entire operating Facility, or portion of, both manually and automatically. Such demonstration is for purposes of (i) verifying to the Engineer and Owner that Facility performs as a whole, and (ii) documenting process performance characteristics of completed Facility for Owner’s records.
- B. Commissioning: All testing required for the Facility in order to achieve Acceptance and encompasses Equipment and Subsystem Testing, Systems Testing, and Acceptance Testing.
- C. Equipment and Subsystem Test: Test or tests conducted by Contractor, Subcontractor or Supplier in presence of Owner’s Construction Manager to demonstrate installed equipment meets Manufacturer’s installation, calibration, and adjustment requirements and other requirements as specified.
- D. Facility: Entire Project, or an agreed-upon portion, including all of its unit processes.

- E. Pre-commissioning: Initial physical inspections and documentation to confirm readiness for commissioning activities.
- F. Systems Test: Test or tests conducted by Contractor and PCSS Supplier with assistance from Subcontractors and Suppliers as necessary to demonstrate manual and automatic operation of Facility unit processes.

1.05 SUBMITTALS

- A. Make Submittals required by this Section under the provisions of Section 01350 – Submittals.
- B. The following shall be submitted to the Contractor
 - 1. Manufacturer’s Certificates of Proper Installation shall be submitted within 48-hours of receipt of the document from the Supplier
 - 2. Copies of Manufacturer’s field service technician’s reports summarizing the results of initial inspections, operations, adjustments, and testing. The reports shall include detailed descriptions and tabulations of the points inspected, tests and adjustments made, quantitative results obtained, and suggestions for precautions to be taken to ensure proper maintenance. Reports shall be submitted within seven days of completion of the applicable commissioning activities.
 - 3. Additional testing plans and/or reports when specified in the individual equipment specifications.
 - 4. Logs of time spent by Manufacturer’s representatives performing services on the job site.
- C. Submit a written report that equipment or system has been properly installed and is functioning correctly.

1.06 ROLES AND RESPONSIBILITIES

- A. Contractor will:
 - 1. Provide test water, power, and chemicals as required for commissioning, unless otherwise indicated, for commissioning activities. Properly dispose of all test water, solids, debris, chemicals and other as required by other sections of these Contract Documents.
 - 2. Operate process equipment and the Facility with support of Subcontractor.
 - 3. Provide labor and materials as required for laboratory analyses of water quality parameters.
 - 4. Furnish assistance of Manufacturer’s representative(s) as specified for Owner furnished equipment.
 - 5. Make available spare parts, special tools, and operation and maintenance information for Contractor / Subcontractor-furnished equipment.
 - 6. Coordinate with Owner for any support required by Owner’s staff.

7. Provide preventative maintenance activities on process equipment after receipt of Manufacturer's Certificate of Proper Installation.

B. Contractor shall:

1. Reimburse Owner for any test water, power, or chemicals that are required for re-testing of failed commissioning activities.
2. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for commissioning activities of Contractor-furnished equipment.
3. Furnish assistance of Manufacturer's representative(s) as specified for Contractor-furnished equipment.
4. Make available spare parts, special tools, and operation and maintenance information for Subcontractor-furnished equipment.
5. Provide preventative and/or corrective maintenance activities on Subcontractor-furnished equipment and Contractor-furnished equipment per manufacturer's instructions until receipt of Manufacturer's Certificate of Proper Installation.
6. Maintain a log of all maintenance activities performed on Subcontractor-furnished and Contractor furnished equipment.
7. Provide preventative and/or corrective maintenance activities on HVAC equipment until Substantial Completion.
8. Provide preventative and/or corrective maintenance activities on electrical equipment until Substantial Completion.
9. Provide sufficient personnel for Contractor and equipment Manufacturers to support Project schedule to not cause project delays or in the event of an emergency or failure.
10. Schedule all other ongoing work by Contractor or Supplier to not interfere with or delay commissioning activities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL

A. Contractor's Commissioning Representative:

1. Designate and furnish one or more personnel to coordinate and expedite testing and commissioning. Designated personnel are subject to approval of Engineer and Owner's Construction Manager.
2. Representative(s) shall be present during weekly Contractor commissioning meetings and shall be available at all times during testing and commissioning.

B. Witness Requirements:

1. Commissioning activities shall be performed in presence of the Owner's Construction Manager.
2. Point-to-point checks completed as part of Pre-commissioning shall be performed in the presence of the Owner's Construction Manager.
3. Contractor shall provide a minimum seven days' notice to Owner's Construction Manager of Subcontractor commissioning activities and point-to-point checks.

C. Testing Water

1. Testing water (potable water) will be obtained at a time, rate of flow and location approved by the Owner. All labor, materials, equipment, incidentals and power required to convey the water to the structure shall be provided by the Contractor.
2. Contractor shall provide any temporary piping, trucking or equipment required to fill basins or piping for purposes of performing pre-commissioning and commissioning activities.
3. Contractor shall provide a minimum of fourteen days' notice when testing water is needed. Contractor shall work with Owner's Construction Manager to balance test water needs with other Subcontractors.

3.02 PREPARATION AND PRE-COMMISSIONING

- A. Contractor shall conduct all start-up operations under this Contract in conformance with Section 01400 – Contractor's Quality Control.
- B. Owner must sign and approve the Pre-commissioning Checklist before Pre-commissioning is deemed to have been successfully completed. Contractor shall complete all construction and testing activities required to verify each item in the Pre-commissioning Checklist has been completed.
- C. Coordinate schedule for start-up of various equipment and systems.
- D. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- E. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system Manufacturer.
- F. Verify wiring and support components for equipment are complete and tested.
- G. Execute start-up under Contractor's supervision in accordance with Manufacturer's instructions.
- H. When specified in individual specification sections, require Manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system

installation prior to and during start-up, and to supervise placing equipment or system in operation.

3.03 EQUIPMENT AND SUBSYSTEM TESTING

- A. Equipment and Subsystem Testing shall be performed with Supplier assistance for the purpose of proving that the tested equipment meet the requirements of and complete any testing identified in the pertinent technical specifications.
- B. Contractor shall perform Equipment and Subsystem Testing for Subcontractor- furnished equipment.
- C. Contractor shall perform Equipment and Subsystem Testing for Owner furnished equipment. Subcontractor shall assist Contractor in conducting Equipment and Subsystem Testing for facilities or areas. Subcontractor assistance will include verifying wiring and terminations and equipment adjustments and modifications as necessary to continue progress of Equipment and Subsystem Testing, or corrective actions should significant interruptions be experienced.
- D. Equipment and Subsystem Testing will generally be conducted at the equipment Local Control Panel for demonstration of equipment or component functional requirements. Subcontractor or supplier shall also coordinate with the PCSS Supplier, through the Contractor, to test network communications and I/O as applicable for the specific equipment.
- E. PCSS Supplier shall test network communications and I/O as part of Equipment and System Testing.
- F. Equipment shall be left in proper condition for satisfactory operation under the conditions specified in order for Contractor to operate equipment.
- G. Upon completion, the Manufacturer's field service technician shall submit a signed report of the results of his/her inspection, testing, and adjustments and a completed and signed Manufacturer's Certificate of Proper Installation.

3.04 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner no later than two weeks minimum prior to date of Substantial Completion.
- B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.05 SYSTEMS TESTING

- A. After successful completion of Equipment and Subsystem Testing, PCSS Supplier and Contractor shall perform Systems Testing.
- B. Systems Testing of facilities or areas will be defined by the Engineer and will consist of distinct process areas or sub-processes within the Facility.
- C. Contractor shall assist the PCSS Supplier in conducting Systems Testing for facilities or areas. Subcontractor assistance will include verifying wiring and terminations and equipment adjustments and modifications as necessary to continue progress of Systems Testing, or corrective actions should significant interruptions be experienced.
- D. Engineer may approve Systems Testing activities to be conducted concurrently with Equipment and Subsystem Testing.

3.06 ACCEPTANCE TESTING, ADJUSTING, AND BALANCING

- A. After successful completion of Equipment and Subsystem Testing and Systems Testing of each train of the Facility, the Contractor will conduct an Acceptance Test for each train. Contractor shall start, test, adjust, balance, and provide reports on all installed equipment as provided for in this section.
- B. Acceptance Testing will require uninterrupted operation of the Facility train being tested while maintaining performance requirements of the Facility throughout the duration of the test.
 - 1. Subcontractor and Supplier will assist the Contractor in performance of the Acceptance Tests. Assistance will include equipment adjustments and modifications, as necessary, to maintain uninterrupted operation during the acceptance test or corrective actions should significant interruption be experienced requiring a restart of the Acceptance Test.
 - a. Following successful completion of each Acceptance Test, the train that has completed testing will be placed into long-term service and will be producing drinking water and supplying water to the distribution system.
 - b. Contractor shall plan their work to not interfere with Facility operations once drinking water is being produced either prior to the Acceptance Test(s), during the Acceptance Test(s), or during long-term operations.
- C. Owner may also appoint, employ, and pay for services of an independent firm to perform testing, adjusting, and balancing. Reports will be submitted by the independent firm to the Owner indicating observations and results of the tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.
- D. Owner's employment of an independent firm shall not relieve the Contractor's responsibility under this section.

END OF SECTION

SECTION 02223
EXCAVATING, TRENCHING, AND BACKFILLING FOR UTILITIES

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

- C 117, Materials Finer than 75 um (No. 200) Sieve in Mineral Aggregates by Washing
- C 136, Sieve Analysis of Fine and Coarse Aggregates
- C 150, Portland Cement
- D 1556, Density of Soil in Place by the Sand Cone Method
- D 2167, Density and Unit Weight of Soil In Place by the Rubber Balloon Method
- D 2922, Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
- D 422, Particle Size Analysis of Soils
- D 4253, Maximum Index Density of Soils Using a Vibratory Table
- D 4254, Minimum Index Density of Soils and Calculation of Relative Density
- D 4318, Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- D 698, Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 5.5 lb. (2.49 kg) Rammer and 12-inch (305 mm) Drop

B. Texas State Department of Highways and Public Transportation (SDHPT):

- Item 476, Standard Specifications for Construction of Highways, Streets and Bridges: Jacking, Boring, or Tunneling Pipe

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid.

1.03 SUBMITTALS

- A. Provide design of jacking pits and plan of operations to Engineer in advance of jacking, boring, and tunneling operations.
- B. Samples: Submit minimum 10 lb. samples of borrow bedding and backfill material to be used to materials testing laboratory.

1.04 QUALITY ASSURANCE

A. Laboratory Quality Control by Contractor:

1. Establish optimum moisture maximum density curve for bedding and backfill material, ASTM D 698; for those soils which will not exhibit a well defined moisture density relationship, determine optimum relative density, ASTM D 4253 and D 4254.

2. Establish optimum moisture maximum density curve, ASTM D 698; Atterberg Limits, ASTM D 4318; and sieve analysis, ASTM D 422 for following:
 - a. Borrow bedding and backfill material to be used.
 - b. Excavated material of questionable suitability for use as bedding and backfill material.
 3. One optimum moisture maximum density curve, ASTM D 698, shall be established for each significant change in materials.
 4. Bedding and backfill materials which do not meet specified requirements shall be replaced with suitable materials.
- B. Field Quality Control by Owner:
1. Laboratory density testing of trench backfill:
 - a. One field in place density test per 500 lin. ft. of trench.
 - b. One field in place density test per 150 lin. ft. of trench for each fill layer under existing or proposed paved areas and at least one test per fill layer at each road crossing.
 2. Laboratory density testing of general fill: One field in place density test per 100 cu. yds. of fill placed.
 3. Field in place density tests shall be in compliance with ASTM D 1556, ASTM D 2922, or ASTM D 2167.
- C. If, during progress of work, tests indicate that compacted materials do not pass specified requirements, work shall be removed, replaced, and retested at no cost to Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Suitable Bedding and Backfill Materials:
1. Sand for pipe bedding:
 - a. Plasticity index: 7 maximum, ASTM D 4318.
 - b. 100 percent passing 1/2-in. standard sieve and 15 percent maximum passing No. 200 sieve, ASTM C 136 and C 117.
 - c. Free of clay lumps, organic material, salt, or other deleterious substances.
 2. Material for trench backfill:
 - a. Select sandy soil or other granular material.
 - b. Plasticity index: 11 maximum, ASTM D 4318.
 - c. 100 percent passing 1-in. standard sieve and 30 percent maximum passing No. 200 sieve, ASTM C 136 and C 117.
 - d. Free of clay lumps, organic material, salt, or other deleterious substances.
- B. Cement Stabilized Sand:

1. Mixture of sand and portland cement: Minimum unconfined compressive strength of 150 psi in 48 hours.
 2. Use two sacks of portland cement per cu. yd. sand for sanitary sewer pipe embedment 9 ft. each side of crossing under water line when sanitary sewer pipe material is ABS truss pipe, clay or concrete pipe with gasketed joints.
 3. Sand:
 - a. Clean durable sand, free of lumps of clay, organic material, salt or other deleterious substances.
 - b. Plasticity index: 6 maximum (of materials passing No. 200 sieve), ASTM D 4318.
 - c. 100 percent passing 3/8-in. sieve, ASTM C 136.
 - d. 5 percent to 25 percent passing No. 50 sieve, ASTM C 136.
 - e. 5 percent maximum passing No. 200 sieve, ASTM C 117.
 4. Portland cement: ASTM C 150, Type I.
 5. Do not use mixture which has dried out or lost moisture content.
- C. Paved Area Patching and Restoration:
1. Match existing pavement.
 2. Restore pavement with materials approved by authorities having jurisdiction over paved areas disturbed by construction.
- D. Construct 7-inch seal slab on unsatisfactory trench bottoms.

PART 3 EXECUTION

3.01 PREPARATION

- A. Complete, as preparation incidental to construction:
1. Minor site preparation work including clearing and grubbing; removal and disposal of trash, rubbish, debris, and minor obstacles to construction and relocation of salvable items.
 2. Remove grasses and strip topsoil to depth of 4-inches in areas to be excavated; form temporary stockpiles of topsoil.

3.02 GENERAL

- A. Work includes excavating, trenching, and backfilling for pipe.
- B. Work includes as incidental to construction, clearing of trenching areas, salvaging of topsoil and stockpiling, and construction required in crossing continued utilities, such as support of lines while trenching through, and capping and sealing, and removal of discontinued utilities within excavated areas and restoration.

- C. Make open cut excavations to required lines and grades.
- D. No extra compensation will be made because of subsurface soil conditions requiring removal of rock, boulders, hard pan or other classes of excavation; materials shall be excavated as required by construction without claim for extra compensation because of subsurface soil conditions.
- E. Trees and shrubs designated to remain that sustain cutting or injury to roots, trunk, or limbs shall be pruned by a professional arborist.
- F. Install pipe in locations shown on Drawings by tunneling, boring, augering, or jacking.
- G. Excavate adequate but not excessive working space and clearances for installation of work and form removal.
- H. Allow not less than 6-inch clearance in horizontal dimensions of excavations for outside plastering of manholes and similar structures constructed of masonry units.
- I. Do not undercut excavation faces for extended footings of structures.
- J. Clear subgrade surfaces of loose material before placing concrete or bedding materials.
- K. Backfill with specified suitable materials unless otherwise shown on Drawings, specified, or authorized.
- L. Remove from site and legally dispose of excavated materials not suitable for backfill.
- M. Do not damage pipe or disturb jointing or alignment during backfilling operations.
- N. Excavate by hand within 2-ft. of existing utilities to remain.
- O. Cuts Through Concrete, Including Asphaltic Concrete, Streets, Walks, and Drives:
 - 1. Make cuts at right angle or parallel to center lines.
 - 2. Make cuts with power-driven concrete saw.
 - 3. Cut groove to 1-1/2-in minimum depth.
 - 4. Provide clean break with straight neat edge.
 - 5. When area of removal is within 3-ft. of expansion or control joint, remove concrete to joint.

3.03 CLASSIFICATION OF EXCAVATED MATERIALS

- A. Excavated materials will be unclassified.
- B. Excavate materials encountered without exception.

3.04 BLASTING

- A. Use of explosives will not be permitted.

3.05 UNAUTHORIZED EXCAVATION

- A. Refill excavation below subgrade elevations with sand or gravel tamped to maximum density, or with cement stabilized sand or concrete.

3.06 REMOVAL OF WATER

- A. Provide and maintain adequate pumping system in trenches and excavations to collect, remove, and dispose of surface and ground water entering excavations and trenches.
- B. Keep excavations dry continually during preparation of subgrade and until structure or piping is completed to extent that no damage from hydrostatic pressure, floatation, or other water related causes will result.
- C. Divert surface water away from excavated areas and prevent water from entering excavations.
- D. Where excavations for trenches or concrete structures extend down below static ground water elevations, prevent ground water boiling up through trench bottom, loosening up, and flooding trench subgrade; lower and maintain ground water surface to depth not less than 12-in. below bottom of excavation by installing series of well points, pumping and collecting system, and approved discharge and disposal system.
- E. Maintain sewers used for drainage purposes in usable conditions; leave clean and free from sediment and obstacles at completion of work.

3.07 SHEETING AND SHORING

- A. Except where banks are cut back on stable slope, sheet, brace, and shore excavations for trenches and structures as necessary, to prevent caving, sliding, or damage to work or property by undermining or disturbance.
- B. When sheeting, bracing and shoring are necessary, construct sheeting, bracing, and shoring to withstand loads caused by earth movement and construction operations.
 - 1. Maintain shape and position of sheeting, bracing, and shoring for duration necessary.
 - 2. Remove sheeting, bracing, and shoring when not needed.

3.08 SUBGRADE PREPARATION

- A. Trench bottoms and subgrade surfaces for concrete structures shall be free from mud and muck, and shall be firm, dense, and compacted and consolidated to degree of remaining firm and intact under feet of workmen.

- B. Remove peat, muck, quicksand, or other unstable material encountered at and below subgrade to depth 1-ft. below subgrade or depth equal to diameter of pipe for pipe larger than 1-ft.; backfill with sand or gravel compacted to maximum density or concrete.
- C. Reinforce trench bottoms or subgrade surfaces for concrete structures which are solid, but which become mucky on top due to construction operations with specified sand.
- D. Use only sand or gravel compacted to maximum density, or concrete to bring fills to lines and grades indicated and for replacing unsatisfactory materials.
- E. Special Trench Bottom Reinforcement: If foundation on which pipe is to be laid is excessively wet, excavate trench to minimum of 12-inches below outside bottom surface of pipe and construct 7-inch seal slab.

3.09 EXCAVATION

- A. Do not keep open more than 100-ft. of trench on any line under construction.
- B. Open cut excavation from surfaces unless tunneling or boring and jacking operations are indicated.
- C. Install underground piping and structures before paving is placed.
- D. Alignment and Grade:
 - 1. Fix and determine alignment and grade or elevation of each pipe line by using offset stakes.
 - 2. Vertical and horizontal alignment of pipes and maximum joint deflection used shall be in conformity with requirements of pipe being laid.
 - 3. Laser equipment may be used to set line and grade provided manufacturer's procedures are followed and accuracy is maintained.
 - 4. Employ surveyor to periodically check and document correct grade and alignment of pipe laid with laser equipment.
- E. Cover:
 - 1. Provide 24-inch minimum cover over top of pipe where surface grades are definitely established and 30-inches in other locations.
 - 2. Lay underground lines crossing existing and proposed roads at minimum depth of 30 in. below pavement and 12-in. minimum below ditch grade.
 - 3. Greater depth of cover may be necessary on vertical curves or to provide necessary clearance beneath pipes, conduits, drains, drainage structures or other obstructions encountered at normal pipe grades.
 - 4. Provide 4 ft. minimum cover for water mains below top of curb.

5. Measure depth of backfill cover vertically from top of pipe to finish ground or pavement surface elevations.

F. Trenching:

1. All sanitary sewers shall be on 6-in. minimum bed of cement stabilized sand with cradle of cement stabilized sand carried up to springline of pipe. Pipe shall then be bedded/backfilled with cement stabilized sand to a minimum of 12 inches over the top of pipe before placing select fill in trench, and to within 12-inches of pavement subgrade.
2. Make vertical sides in bedding zone; slope sides at stable slope above top of pipe.
3. Excavation for pipe stubs to be laid transversely across streets may be made with trench hoe.
4. Where surface or underground obstructions make excavation inaccessible to trenching machine, trench hoe may be used.
5. Where trench hoe is used, do not use excavated material composed of large chunks and clods for backfill.
6. Dispose of large chunks and clods as waste materials and provide suitable backfill material.
7. Excavate trench material to be replaced in trench as backfill, shall be well broken up and moisture content shall not exceed 3 percent above optimum moisture content as determined by ASTM D 698.
8. Water line trenching and boring:
 - a. Construct waterlines in open cut trenches with vertical sides except in locations where pipe is to be jacked or placed in bored holes.
 - b. Sheath and brace to maintain sides of trench vertical and intact during construction and to protect adjacent property including structures, substructures, and service and utility lines.
 - c. Installed solid sheathing left in place: Cut off time 18-in. below ground before backfilling trench.
 - d. Remove sheathing and bracing after backfilling is completed.
 - e. Keep open and excavate trench at least 50-ft. in advance of last joint of pipe placed during pipe laying operations.
 - f. Locate existing water mains, to which mains under construction shall be connected, in advance of connection; allow for adjustment of alignment and grade of mains under construction.
 - g. Construct water mains in dry trenches employing well pointing, additional sheathing, or using concrete seal in bottom of trench as necessary.
 - h. Install sheathing and bracing in trench and leave bracing in place a 5-ft. maximum intervals where proposed water main parallels edge of existing pavement and is 3-ft. or less from edge.
 - i. Keep existing street surface adjacent to trench free of surplus soil.
 - j. Install pipe in tight fitting augered holes where water lines cross underneath driveways of 16 ft. or less in width, or sidewalks.

- k. Place pipe in tight fitting augered hole, where centerline of proposed water line is 10 ft. or less from centerline of 8-in. diameter or larger growing tree; bored hole shall extend at least 4 ft. beyond each side of tree.

G. Trench Widths:

1. Trenches for pipe sewers smaller than 30-inches pipe shall have width below top of pipe not less than outside diameter plus 24-inches and not more than outside diameter of pipe plus 36-inches.
2. Trench widths for sewers 30-in. and larger shall have width below top of pipe not less than outside diameter plus 24-in and shall be wide enough to permit making up joints but shall not be wider than outside diameter of pipe plus 48-in.
3. Trench widths for special jointing shall meet requirements of pipe materials manufacturer.
4. Trench widths for monolithic sewers shall be equal to outside diameter of sewer plus thickness of sheathing timber extending below top of concrete.
5. Trench widths below tops of pipe bells or monolithic sewers may be increased by an amount to permit sheathing and bracing timbers and to permit installation of well points and pumps in trench where sump pumping is uneconomical.
6. Provide space between cross braces to permit handling of forms, pipe, and other materials.

H. Do not deposit excavated material on lawn, sidewalk, garden or shrubbery.

I. Do not obstruct drainage during handling of excavated material.

J. Unauthorized Trench Widths: Where trench width below top of pipe exceeds maximum permitted, provide pipe of adequate strength, arch concrete encasement, or special pipe embedment designed with safety factor of 2 and selected to satisfy loading conditions.

K. Joint Holes:

1. Provide adequate clearance for tools and jointing operations.
2. Do not allow part of joint or coupling to contact trench bottom or trench wall when pipe is jointed.

3.10 PIPE ENVELOPE

- A. Pipe shall be bedded as shown in pipe envelope details on Drawings.
- B. Use specified sand for pipe envelope where sand envelope is shown.
- C. Use specified cement stabilized sand for pipe envelope and backfill where shown.
- D. Construct 7-inch seal slab on unsatisfactory trench bottoms.

3.11 TRENCH BACKFILL (Based On Review And Approval Of Licensed Geotechnical Engineer)

- A. Do not backfill with wet, mucky, or unsuitable materials or with large rocks or clods of material.
- B. Trench backfill above pipe embedment shall conform to requirements for type and location of pipe.
- C. Sewers Under Existing or Future Roads, Streets, and Driveways:
 - 1. Place specified cement stabilized sand as trench backfill up to within 1-ft. of pavement subgrade for points enclosed within boundaries 1-ft. outside edges of pavement or curb.
 - 2. Place select backfill within top 1-ft. in road, street, or driveway existing or future area within boundaries 1 ft. outside edge of pavement or curb.
 - 3. Place select backfill in 8-in. maximum layers and compact to 95 percent maximum density, ASTM D 698.
- D. Water Pipe Under Roadways:
 - 1. Encase water lines in minimum of 6-in. of sand.
 - 2. Use sand specified for pipe bedding for trench backfill under existing or future roads, streets, driveways, walks, curbs, gutters, and other surface structures for 5 ft. outside edges of pavement or curbs.
 - 3. Place backfill in 8 in. maximum layers and compact to 95 percent maximum density as determined by ASTM D 698.
 - 4. Place granular backfill full depth of trench to base of future roadway or to within 1-ft. of natural ground where pipe is within 5-ft. of future paving.
 - 5. Place select backfill within top 1-ft. or to natural grade within points 1 ft. outside edge of future pavement or curb.
- E. Pipe Under Grassy or Native Soil Area:
 - 1. Encase water lines in minimum of 6-in. of sand.
 - 2. Backfill with material selected from excavation operations placed in 8-in. layers compacted equal to adjacent undisturbed materials.
 - 3. Water main backfill shall be specified granular material for trench backfill.
 - 4. Add backfill material as necessary where backfill settles below ground surface.
 - 5. Mound excess material along trench to provide for future settlement.
- F. Place backfill material to minimum depth 12-in. above pipe before ceasing daily backfilling operations.

- G. Provide 12-in. of base material backfill for patching of existing pavement.
- H. Remove backfill which gives evidence of instability by settlement and replace with approved material and recompact using approved compaction procedures.
- I. Underground Marking Tape: Install in trenches, centered, 6-in. below finished grade, during backfill.

3.12 BACKFILL AT MANHOLES, JUNCTION BOXES

- A. Place cement stabilized sand backfill in 8-in. maximum layers around structures and compact to density of adjacent undisturbed materials. Backfill shall extend to within two (2) feet of finished grade.
- B. Do not deposit or compact backfill by flooding.

3.13 DRAINAGE MAINTENANCE

- A. Start backfilling operations upstream for trenches crossing highways, streets, driveways adjacent to drainage ditches, and water courses; proceed downstream to prevent impounding of water.
- B. Do not allow water to accumulate in uncompleted trenches.
- C. Remove material deposited in ditch or water course crossed by trench excavation immediately after completion of backfill.
- D. Restore section, grades, and contours of ditches or water courses to original condition.

3.14 UNSUITABLE AND EXCESS MATERIALS

- A. Dispose of unsuitable excavated materials off site in legal manner.
- B. Excess excavated material shall be stockpiled outside the street right of way in the area between the front property line and the 25-foot building line. Prior to placing excess material on the area, all organic material shall be stripped.

3.15 FINISHING AND GRADING

- A. Uniformly grade disturbed areas smooth so areas match adjacent undisturbed natural ground and fit into drainage pattern of surrounding areas.
- B. For areas previously finished to proposed established grade and cross section, finish surface within 0.10 ft. above or below required grade and cross section.
- C. Finish ditches and gutters to drain.

3.16 RESTORATION

- A. Unless disturbed areas and excavation areas are scheduled for subsequent construction, restore as follows, as incidental to construction:

1. Replace 4-inch depth of topsoil from stockpiles of topsoil formed during preparation operations.
 2. Provide hauled in topsoil as necessary.
 3. For excavation and disturbed areas sodded prior to construction, resod to match pre-existing conditions.
- B. Following completion of construction, all areas disturbed by construction shall be restored to their original or better condition.
- C. Contractor shall video record and photograph all existing plant roads and Construction Work Areas (CWAs) plus the site entrance prior to mobilization to document the condition of these roads and CWAs. The contractor shall be responsible for keeping roads within and adjacent to the project, free of mud and debris from construction at all times.

END OF SECTION

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SECTION 13300
PROCESS CONTROL SYSTEMS GENERAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section covers the furnishing and installation of an instrumentation and control system designated as the Process Control System (PCS).
- B. Contractor shall procure the services of a Process Control System Integrator (PCSI). The PCSI shall be responsible for the following:
 - 1. Coordinate all process control system-related items.
 - 2. Furnish and install all materials, equipment, labor, and services required, except for those services and materials specifically excluded.
 - 3. Achieve a fully integrated and operational PCS as specified herein, in the associated Specification Sections, and as detailed in the Contract Drawings.
 - 4. Perform all testing, training, and startup activities specified to be provided.
- C. Equipment and software furnished under this section and under other related sections listed in the Scope of Work paragraph above shall be designed, coordinated, and supplied by the PCSI or supplier.
- D. The PCSI shall perform all Applications Systems Programming (ASP) work to provide all work specified in Section 13310 – Application Engineering Services including Programmable Logic Controller (PLC), and network configuration and programming for a complete and fully functional system that meets the design intent. The Human Machine Interface (HMI) is excluded from the PCSI/ASP scope of work. HMI programming, including HMI graphics development, database development and startup activities associated with the HMI system will be performed by a programming firm separately contracted with the Owner. Coordination with the separately contracted HMI programmer will be required for testing (including development of testing documents), developing the O&M manuals, and supporting startup activities. These tasks will be a joint effort between the PCSI/ASP and the programmer.
 - 1. The following firm is selected by the Owner for the HMI programming:
 - a. Hierholzer Engineering, INC
433 E Schulz St
Marion, TX 78124
Phone: (830) 372-4808
- E. Work shall include, but not be limited to, the following:
 - 1. Integration of the standby generators, automatic transfer switches (ATS), and power quality meters (PQMs) into the existing SCADA network for Wagner, Leissner, Dead Man Well and Wells Range facilities.

2. Installation of a new SCADA panel at the Dead Man Well facility.
3. Auxiliary and accessory devices necessary for system operation or performance, such as transducers, relays, signal amplifiers, intrinsic safety barriers, signal isolators, software, and drivers to interface with existing equipment or equipment provided by others under other Sections of these specifications, shall be included whether they are shown on the drawings or not.
4. Furnish all labor, materials, equipment and incidentals required to complete the testing of all devices and systems furnished and installed as shown on the Drawings.
5. Any modifications to the existing panels shall be marked up on the as-built documentation and be included in the panel drawings submittal for approval.

F. Associated Sections

1. This section encompasses the equipment and services specified in the following sections:

<u>SECTION</u>	<u>SPEC TITLE</u>
13310	Application Engineering Services
13315	Process Control System Submittals
13320	Process Control System Testing
13340	Process Control System Input/Output List
13420	Programmable Logic Controllers
13460	Control Panel Enclosures and Panel Equipment

- G. PCSI/ASP shall coordinate with the Contractor, Owner, Engineer, and the HMI programmer for all scheduling, installation, testing, startup, and training services.
- H. Instrumentation specified in other Divisions shall meet the requirements of the Process Control Systems Sections of Division 13.

1.02 GENERAL

- A. The Drawings and Specifications indicate the extent and general arrangement of the systems. If any departures from the Drawings or Specifications are deemed necessary by the PCSI, details of such departures and the reasons shall be submitted to the Engineer for review with or before the first submittal. No departures shall be made without prior written acceptance.
- B. The specifications describe the minimum requirements for hardware and software. Where the PCSI's standard configuration includes additional items of equipment or software features not specifically described herein, such equipment or features shall be furnished as a part of the system and shall be warranted as specified herein.
- C. Equipment furnished and installed under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by the Engineer.

- D. Requirements specified in this section apply to all equipment specified in the above sections, unless otherwise stated. In the event of a conflict, the most stringent requirements shall override others.
- E. The PCSI shall supply, install, and configure all instruments specified in Division 13 and as shown on the Drawings.
- F. All equipment and installations shall satisfy applicable federal, state, and local codes.
- G. Drawings
 - 1. The Drawings indicate locations and arrangements of equipment and may include installation details and block and one-line diagrams showing connections and interfaces with other equipment. 13340 – Process Control System Input/Output List contains the input/output (I/O) points.
- H. Dimensional Restrictions
 - 1. Layout dimensions will vary between manufacturers and the layout area indicated on the Drawings is based on typical values.
 - 2. The PCSI shall review the Drawings, the manufacturer's layout drawings and installation requirements, and make any modifications requisite for proper installation subject to acceptance by the Engineer.
 - 3. At least three (3) feet of clear access space shall be provided in front of all instrumentation and control system components.
- I. Workmanship and Materials
 - 1. The PCSI shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.
 - 2. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice.
 - 3. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts, furnished at any time, can be installed in the field.
 - 4. Like parts of duplicate units shall be interchangeable.
 - 5. Equipment shall not have been in service at any time prior to delivery, except for testing.
- J. Corrosive Fluids
 - 1. All parts which are exposed to corrosive conditions shall be made from corrosion resistant materials.

2. The PCSI shall submit certification that the instrument manufacturer approves the selection of materials of primary elements that are in contact with the specified process fluid to be inert to the effects of the process fluid.

K. Permits and Agency Approvals

1. The Contractor shall, as part of their work, arrange for and obtain all necessary permits, inspections, and approvals by the authorities having local jurisdiction of such work. This shall include any third-party inspections and testing of panels and equipment.

1.03 GOVERNING CODES AND STANDARDS

- A. All work performed covered by this section and all equipment, materials, and installation shall be in accordance with the National Electrical Code (NEC), with applicable federal, state, and local regulations and ordinances, and with the latest edition of the following codes and standards. (Note: Codes and standards are referred to in the text by basic designation only. Where a date is given for reference standards, that edition shall be used. Where no date is given for reference standards, the latest edition in effect at the time of bid opening shall apply.)
1. American National Standards Institute (ANSI)
 2. American Society for Testing and Materials (ASTM)
 3. Code of Federal Regulations (CFR)
 4. Canadian Standards Association (CSA)
 5. Factory Mutual (FM)
 6. Federal Communication Commission (FCC)
 - a. Part 15 – Class A
 7. Institute of Electrical and Electronics Engineers (IEEE)
 - a. IEEE 519 – Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
 - b. IEEE C37.90 – Standard for Relays and Relay Systems Associated with Electric Power Apparatus
 8. International Society of Automation (ISA)
 9. Insulated Cable Engineers Association (ICEA)
 10. National Electric Safety Code (NESC)
 11. National Electrical Manufacturers Association (NEMA)
 - a. NEMA ICS 1 – Industrial Control and Systems General Requirements
 12. National Fire Protection Agency (NFPA):
 - a. NFPA 70 – National Electrical Code (NEC)
 - b. NFPA 79 – Industrial Control Equipment

13. Occupational Safety and Health Administration (OSHA)
 14. Underwriters Laboratories, Inc. (UL):
 - a. UL 508 – The Standard for Safety for Industrial Control Equipment
 - b. UL 508A – The Standard for Safety for Industrial Control Panels
 - c. UL 61010-1 – The Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use: General Requirements
 - d. UL 61010-2-201 – The Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use: Particular Requirements for Control Equipment
 - e. UL 50 – The Standard for Safety for Enclosures for Electrical Equipment
 - f. A nationally recognized testing laboratory, as approved by the Authority having jurisdiction, may substitute for UL listing on commercial off the shelf products.
 15. United States Defense Standard (MIL-STD)
 - B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.
 - C. If the issue of priority is due to a conflict or discrepancy between the provisions of the contract documents and any referenced standard, or code of any technical society, organization or association, the provisions of the contract documents shall take precedence if they are more stringent or presumptively cause a higher level of performance.
 - D. If there is any conflict or discrepancy between standard specifications, or codes of any technical society, organization or association, or between laws and regulations, the higher performance requirement shall be binding on the Contractor, unless directed otherwise by the Owner and/or Engineer.
 - E. In accordance with the intent of the contract documents, the Contractor accepts the fact that compliance with the priority order specified shall not justify an increase in contract price or an extension in contract time nor limit in any way, the Contractor's responsibility to comply with all laws and regulations at all times.
- 1.04 RELATED WORK
- A. All equipment and work provided under any division of these project specifications, including, but not limited to, vendor supplied instrumentation and control panels, shall fully comply with the relevant requirements of Division 13 sections.
 - B. Conduit and Cable
 1. The Process Control conduit systems are specified in Electrical Division 16.
 2. Instrumentation signal cable and alarm, control, and status wiring are specified in Electrical Division 16.
 - C. The contract documents indicate both vendor and PCSI supplied instruments, devices, and control panels. The distinction between equipment suppliers shall be shown on the Drawings, Instrument Device Schedule, and Panel Schedules. The PCSI shall provide all equipment as instruments, devices, and control panels that are not listed as supplied by vendors.

D. Related Equipment, Materials, and Appurtenances

1. Related equipment and materials may include, but will not be limited to, instrumentation, motor controllers, valve actuators, chemical feeders, analytical measuring devices, conduit, cable, and piping as described in other sections or furnished under other contracts.
2. The PCSI shall provide all auxiliary and appurtenances devices necessary for system operation or performance, such as transducers, relays, signal amplifiers, signal boosters, signal converters, intrinsic safety barriers, signal isolators, special power supplies, special cable, special grounding, software, and drivers to interface with existing equipment or equipment provided by others under other sections of these specifications, whether they are shown on the Drawings or not.
3. All equipment shall be designed and installed in full conformity with the Drawings, specifications, engineering data, instructions, and recommendations of the manufacturer, and the manufacturer of the related equipment.

E. Coordination

1. Systems supplied under this section shall be designed and coordinated by the PCSI for proper operation with related equipment and materials furnished by other suppliers under other sections of these specifications, under other contracts, and, where applicable, with related existing equipment.
2. The PCSI/ASP shall coordinate with the Contractor, Owner, Engineer, the HMI Programmer, and other suppliers of Instrumentation and Controls equipment specified under other Divisions that interface with the PCS for all scheduling, installation, testing, startup, and training services.

1.05 PCSI/ASP'S QUALIFICATIONS.

A. General

1. Successfully completed work of similar or greater complexity on at least three (3) previous projects within the last five (5) years. Successful completion shall be defined as a finished project completed on time, without any outstanding claims or litigation involving the PCSI/ASP. Potential references shall be for projects where the PCSI/ASP's contract was of similar size to this project.
2. Been in the same industry performing the type of work specified in this specification section for a minimum of 15 years.
3. Maintain competent and experienced service personnel to service the hardware and software furnished for this project.
4. Hold an adequate Certificate of Insurance for the project work specified herein and in other related Sections.
5. Submit a team organization chart, resumes, and training certifications.

6. Employ personnel who have completed and hold certificates for required training.
7. Certifications and training credentials of all individuals working on the Owner's systems must be submitted and approved prior to commencing work.
8. If the PCSI/ASP has worked with the Owner, provide a list of projects previously completed. The PCSI/ASP may be rejected based on past performance on the Owner's projects, and may not use rejection to claim additional compensation or time.
9. Be capable of responding to on-site problems, at a minimum, within 12 hours of notice. Provide an on-site response within four (4) hours of notification starting at two (2) months before scheduled startup to two (2) months after startup completion.
10. Being listed in this specification does not relieve any potential PCSI/ASP from meeting the qualifications and criteria specified in this section.
11. Any proposed PCSI/ASP firm not shown on the pre-qualified list below must be identified and submitted a minimum of 10 days prior to bid opening and must be approved by the Owner. The Owner will announce via the addendum process a minimum of five (5) days prior to bid if the proposed PCSI/ASP has been accepted. The Owner reserves the right to accept or reject any firm based on the Owner's evaluation of qualifications, past performance, or experience (or lack thereof) with the Owner.
12. The PCSI shall be a "systems integrator" regularly engaged in the business of supplying and installing computer-based monitoring, control, data acquisition systems, instrumentation, and their associated subsystems as they are applied to the municipal water and wastewater industry.
13. The PCSI shall have the following minimum qualifications:
 - a. Maintain a permanent, fully staffed and equipped service facility within 200 miles of the project site with full-time employees capable of designing, fabricating, installing, calibrating, testing, and troubleshooting the systems specified herein.
 - b. Hold a valid UL-508 certification for their panel fabrication facility.
 - c. Staff proposed shall be certified in the programming of the specified PLC.
 - d. Employ personnel who have previously completed five (5) projects of this size or larger in dollar value and complexity.
14. The following PCSI/ASPs, listed in no particular order, have been pre-approved for this work by the Owner:
 - a. Prime Controls
815 Office Park Circle
Lewisville, Texas 75057
Attn: Brian Poarch
Phone: (972) 221-4849
 - b. Richardson Logic Control
8115 Hicks Hollow
McKinney, Texas 75071
Attn: Michael Cunningham
Phone: (972) 542-7315

- c. Control Panels USA
2530 Shell Road
Georgetown, Texas 78628
Attn: Martin Salyer
Phone: (512) 863-3224

1.06 SUBMITTALS

- A. Refer to Section 13315 – Process Control System Submittals for the specific submittal requirements.

1.07 SPARE PARTS

- A. Refer to the individual Specification Sections for the spare parts requirements.

1.08 HAZARDOUS AREAS

- A. Equipment, materials, and installation in areas classified as hazardous on the Drawings shall comply with NEC Articles 500, 501, 502, and 503.
- B. Equipment and materials installed in hazardous areas shall be UL listed for the appropriate hazardous area classification.

1.09 SHIPPING, STORAGE, AND HANDLING

- A. Shipping, storage, and handling shall be in accordance with Section 01600 – Delivery, Storage, And Handling.
- B. All electronic equipment and instruments shall be suitably packaged to facilitate handling and to protect against damage during transit and storage in accordance with the manufacturer's instructions. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements, shall always be kept dry, and shall not be exposed to adverse ambient conditions.
- C. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted surfaces that are damaged prior to acceptance of equipment shall be repainted to the satisfaction of the Engineer.
- D. Each shipment shall include an appropriate shipping list that indicates the contents of the package, including the specific instrument tags. The shipping list shall be accessible without exposing the instruments to the atmosphere. The shipping list shall also contain any cautionary notes regarding storage of the instruments, including requirements to protect the instrument from static discharge, desensitizing chemicals (solvents, paints, etc.), or ambient atmospheric conditions.
- E. The manufacturer's special instructions for field handling, storage, and installation required for protection shall be securely attached to the packaging for each piece of equipment prior to

shipment. The instructions shall be stored in resealable plastic bags or other means of protection.

- F. Individual instruments shall be appropriately tagged or labeled to positively identify the device. All identification shall be visible without the need to unpack the instrument from its protective packaging.
- G. Instrument shipment and storage requirements shall be coordinated with the Engineer or Owner prior to shipment. The PCSI shall provide adequate storage and be ready to accept the shipment before shipping any equipment to the site. Additional shipping and storage requirements shall be as detailed in the individual instrument specifications.
- H. Equipment shall be installed in its permanent, finished location shown on the Drawings within seven (7) calendar days of arriving onsite. If the equipment cannot be installed within seven (7) calendar days, the equipment shall not be delivered to the site, but stored offsite at the Contractor's expense, until such time that the site is ready for permanent installation of the equipment.
- I. Where space heaters are provided in equipment, provide temporary electrical power and operate space heaters during jobsite storage, and after equipment is installed in permanent location, until equipment is placed in service.
- J. Components which are shipped loose due to transportation limitations shall be assembled and disassembled by the manufacturer prior to shipment to assure that all components fit together and are adequately supported.
- K. If any apparatus has been damaged, such damage shall be repaired at no additional cost to the Owner.

1.10 WARRANTIES

- A. The manufacturer's warranties shall start from date of Substantial Completion.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 COORDINATION MEETINGS

- A. Refer to Section 13310 – Applications Engineering Services for ASP work related meeting and workshop requirements.

3.02 INSTALLATION REQUIREMENTS

- A. The installation of equipment furnished hereunder shall be by the Contractor or their assigned subcontractors.
- B. Refer to the individual Specification Sections for the specific installation requirements.

C. Field Wiring

1. Field wiring materials and installation shall be in accordance with the electrical section.
2. The shield on each process instrumentation cable shall be continuous from source to destination and be grounded at only one (1) ground point for each shield.

D. Salvage of Existing Equipment

1. Existing equipment and materials removed or replaced under this contract shall be delivered to the Owner at a location designated by the Owner or shall be properly disposed of at the Owner's discretion. Care shall be taken to avoid damage to equipment delivered to the Owner.
2. Any mounting brackets, enclosures, stilling wells, piping, conduits, wiring, or openings that remain after removal of equipment and support hardware shall be removed or repaired in a manner acceptable to the Owner and Engineer. Transmitters or switches containing mercury shall be removed and disposed of by personnel trained in the handling of hazardous materials and using approved procedures.

3.03 SYSTEMS CHECK

- A. The PCSI shall provide the services of a field manager and a trained and experienced field supervisor to assist the installation contractor during installation, and to calibrate, test, and advise others of the procedures for installation, adjustment, and operation.

1. Field Manager

- a. The PCSI shall appoint a field services manager who shall be responsible for the coordination of all system check-out and startup activities, and who shall be immediately available to the Engineer and Owner by phone or on site for the duration of this project.

B. Field Inspection at Delivery

1. The field supervisor shall inspect major equipment items within five (5) working days of delivery, to ensure that the equipment was not damaged during shipment and shall supervise or assist with unpacking, initial placement, and initial wiring of the system.

C. Field Calibration of Instruments

1. After each instrument has been installed, a technical representative of the PCSI shall calibrate each instrument and shall provide a written calibration report for each instrument, indicating the results and final settings. A typical instrument calibration report is attached to the end of the Section 13320 – Process Control System Testing.
2. The adjustments of calibrated instruments shall be sealed or marked, insofar as possible, to discourage tampering.
3. Instrument calibration shall be done before checkout of the system operation.

D. Training for Installation Personnel

1. The field supervisor shall train the installation personnel in reading and understanding submittal drawings, and in the correct installation and wiring procedures for the equipment. The PCSI/ASP shall submit a Certification of training to the Owner and Engineer. Certification shall be issued for each installation personnel and shall state that the personnel completed the training.

E. Field Inspection Prior to Start Up

1. After installation and wiring connections are complete, the field supervisor, with additional PCSI's personnel shall verify that each external connection to the system is correctly wired and field process components and devices are functioning as intended. The PCSI shall be responsible for completing the following scope of work.
 - a. Analog Signals – Analog input signals shall be simulated at the transmitting source and verified to be received at the proper register address in the control system. Analog outputs shall be generated at the control system, and verified to be received with the correct polarity, at the respective receiving device.
 - b. Discrete Signals – Discrete input and output signals shall be simulated and verified that they are received at the respective receiving device, and at the proper voltage.
 - c. Devices by Other Suppliers – If interrelated devices furnished by other suppliers, under other contracts, or by the Owner, such as valve actuators, motor controls, chemical feeders, and instruments, do not perform properly at the time of system checkout, the field supervisor shall use suitable test equipment to introduce simulated signals to and/or measure signals from these devices to locate the sources of trouble or malfunction.
 - d. System Check Out Report – The PCSI shall submit a written report on the results of such tests to the Engineer. Additional documentation shall be furnished as requested by the Engineer to establish responsibility for corrective measures. The PCSI shall verify, in writing, to the Engineer or Owner that the PCSI has successfully completed the external connection check before beginning system startup or field acceptance testing.

- F. Startup Assistance – After the field supervisor has completed the system check and submitted his report, the PCSI shall supply a factory-trained engineer and programmer to provide on-site startup assistance. During the startup period, these personnel shall thoroughly check all equipment, correct any deficiencies, and verify the proper operation of all components.

END OF SECTION

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SECTION 13310
APPLICATION ENGINEERING SERVICES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Process Control System Integrator (PCSI)/Application Services Provider (ASP) shall furnish all Process Control System (PCS) programming, configuration, and related services required to achieve a fully integrated and operational system as specified herein and in other Division 13 Specification Sections.
- B. All equipment shall be controlled in full conformity with the Contract Drawings, process control descriptions, specifications, engineering data, instructions, and recommendations of equipment manufacturer. Coordinate the control system for proper operation with related equipment and materials furnished by other suppliers under other sections of these specifications and with related existing equipment:
 - 1. Programmable Logic Controllers (PLC) programming, testing of PLC logic, and startup and training activities associated with the programmed PLC applications.
 - 2. Configure PLCs provided for all equipment shown on the Drawings, except for control equipment shown being provided as part of a vendor package system.
 - 3. HMI programming is excluded from the PCSI/ASP's scope of work. PCSI/ASP to provide field technician support to the HMI programmer for testing, and startup/commissioning of the HMI system.
 - 4. Provide startup and training activities associated with the configured PCS system, including equipment provided by vendor package systems.
 - 5. Provide for and test communications and functionality between all connected devices, such as PLCs, Remote Terminal Units (RTUs), and HMI software packages, including devices supplied by others, such as power monitoring equipment, as depicted on the system architecture drawings in order to provide a comprehensive working system of data collection, storage, and reporting.
 - 6. The PCSI/ASP shall configure and test data collection and interactivity between all software packages, PCs, UPS units, and Simple Network Management Protocol (SNMP) devices in order to provide a comprehensive working system of data collection and storage.
 - 7. Coordinate with vendors supplying PLC control systems and other Ethernet devices to establish peer-to-peer communication monitoring programs (e.g., "watch-dog" or "heartbeat") and to coordinate read/write passing of data via peer-to-peer communications.
 - 8. Auxiliary and accessory programming structures necessary for proper system operation and performance shall be included whether or not they are shown on the Drawings.

9. The PCSI/ASP shall coordinate and schedule all testing procedures with the General Contractor, Engineer, and Owner.
 10. Refer to the Owner's PLC and HMI Standards.
 11. Abide by the Owner's remote access policy when working on the Supervisory Control and Data Acquisition (SCADA) system. If remote access is not allowed, then all the personnel must be on site during startup/commissioning.
- C. All work shall be coordinated with plant operating personnel to minimize impacts on daily operation. Delays caused for any reason shall be noted and formally submitted to the Engineer and the Owner in the form of a letter.
- D. Associated Sections
1. This section encompasses the services specified in the following sections:

<u>SECTION</u>	<u>SPEC TITLE</u>
----------------	-------------------

13300	Process Control System General Provisions
13320	Process Control System Testing
13340	Process Control System Input/Output List
13350	Process Control Descriptions
13420	Programmable Logic Controllers
13460	Control Panel Enclosures and Panel Equipment

1.02 ASP'S QUALIFICATIONS.

- A. Refer to the Section 13300 – Process Control System General Provisions.

1.03 WARRANTY

- A. All application work shall be warranted from the date of Substantial Completion in accordance with Section 01760 – Warranties and be as specified in each Specification Section.
- B. Provide telephone technical support within four (4) hours of warranty claim. If issues cannot be resolved by telephone, provide onsite technical support within 48 hours of warranty claim.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. The system specified herein shall perform the following generalized functions:
1. The system shall allow the Operator to control equipment such as pumps and valves as defined in the control loop drawings and control loop descriptions. Role based permissions should be implemented with specific permissions and access level assigned to each group. Refer to the access/roles defined in the Owner's active directory.

2. Perform real-time process control, including proportional integral derivative (PID) control action, sequencing, process calculations, etc.
 - a. All process control functions including PID, calculations, sequencing, timing, etc., shall be done in the process controller.
 - b. The plant operators will not have the ability to change the PID parameters and setpoints that are tuned by the programmers and Engineer.
3. Collect, calculate, and store accurate, reliable operating information for present and future uses.
4. Assist remote site operating personnel by noting and communicating on normal operating conditions and equipment failures.
5. Accumulate and store equipment start counts for use in preventative maintenance.
6. Provide color graphic displays and reports for use by the system operating and supervisory personnel.
7. Provide trending for all analog values, discrete input/output change of states, and setpoints.
8. Provide control system diagnostics.
9. The system shall allow the Operator to manually control (by keyboard entry and mouse type pointing device) the status of pumps, valves, etc. (i.e., on off, open close, setpoint value, etc.) when viewing the appropriate graphic screen on the HMI.

3.02 CONTROLLER PROGRAMS

- A. All applications programs shall be developed in a structured manner per the ISA and International Electrotechnical Commission (IEC) programming standards and shall follow an intuitive arrangement so that an instrumentation technician with basic programming knowledge will be able to understand. Programs shall utilize standard program templates or subroutines for repetitive logic, such as equipment control, flow total calculations, and equipment runtime calculations.
- B. Make changes to the application programs and software configuration based on comments during the submittals, the factory tests, the field tests, and during the commissioning process to meet the design intent, at no additional cost to the Owner.

3.03 ALARM/EQUIPMENT STATUS REPORTING

- A. The alarm log shall display all alarms as they occur. The alarm message shall include the time of occurrence, tag name, tag number, and whether it is a low, high, or failure alarm. When the point in alarm returns to normal, the return-to-normal event will be logged with the time, its tag name, and tag number. All reports shall include the plant equipment number of the associated device.
- B. The equipment status shall be logged whenever a change in status occurs (i.e., start, stop). The equipment status log shall include the time, equipment name, tag number, and the particular change in status.

3.04 HISTORICAL DATA MANAGEMENT

- A. The following features shall be provided for processing and storage of system historical data:
1. Each system point (analog or discrete, real or pseudo) shall have the capability of being historically logged. A point shall have the capability of being deleted from the historical log at any time. It shall be easy to add or delete system points using minimal keystrokes.
 2. All process analogs and discrete points and setpoint values, and all flow totals and runtime indications of all primary process equipment motors shall be sampled and stored in the historical data management system.
 3. Data Processing – The real time instantaneous values shall be stored in a historical log file on the hard disk at defined sampling rates.
 4. Data Correction – Historical data shall be manually modifiable by personnel with appropriate security levels. Such data shall be differentiated from actual monitored values on reports, in the database, and in trends.
 5. Data Quality – Data Quality flags shall propagate to the next higher level of the history based on user selectable percentage determining tolerance levels for averages and totals. If the percentage of suspect data exceeds the tolerance level, the suspect data flag propagates to the next higher level. Maximums and minimums shall be taken from good data.

END OF SECTION

SECTION 13315
PROCESS CONTROL SYSTEMS SUBMITTALS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This section covers the submittal requirements for the Process Control System (PCS).

B. Associated Sections

1. This section encompasses the equipment and services specified in the following sections:

<u>SECTION</u>	<u>SPEC TITLE</u>
13300	Process Control System General Provisions
13310	Application Engineering Services
13320	Process Control System Testing
13340	Process Control System Input/Output List
13420	Programmable Logic Controllers
13460	Control Panel Enclosures and Panel Equipment

1.02 GENERAL

A. General Submittal Requirements:

1. Refer to Section 01300 – Submittal Procedures for general submittal requirements.
2. Submittals shall demonstrate that the equipment and services to be furnished comply with the provisions of these Specifications and shall provide a complete record of the equipment as manufactured, delivered, installed, and placed in service.
3. Submittals shall be complete and include equipment dimensional, assembly, and installation drawings, wiring and schematic diagrams, connection details, Specifications, ranges, installation requirements, and data covering the materials used and the parts, devices and accessories forming a part of the system furnished. Submittals consisting of only general sales literature shall not be acceptable.
4. Individual drawings and data sheets submitted at random intervals will not be accepted for review.
5. Equipment tag numbers or identifications used on the Drawings shall be referenced where applicable.
6. Shop drawing title blocks shall include, at a minimum, the Process Control System Integrator (PCSI)/Application Services Provider's (ASP) registered business name and address, Owner and project name, drawing name, revision level, and shall identify personnel responsible for the content of the Drawing(s).

7. Incomplete or partial submittals not complying with the submittal requirements outlined in this section will be rejected without review.
8. Submittals shall be bound in separate three-ring binders. Each binder shall include an index and sectional dividers. Each section shall have a uniquely numbered tab divider, and each component within each section shall have a separate binder tab divider. The cover and edge of each volume shall contain the information as specified in Section 01730 – Operation and Maintenance Data. All drawings shall be reduced to a maximum size of 11-inches by 17-inches and Z-folded to 8.5-inches by 11-inches for inclusion inside the binder. Maximum binder thickness shall be 3 inches.
9. All electronic submittals shall be submitted in a searchable PDF format. The PDF file shall include an index and be bookmarked by section and individual device or component. Submittals that are not bookmarked shall be rejected without review.
10. PLC Programs shall be submitted in the native format of the Programmable Logic Controller (PLC) as suggested by the manufacturer and as a PDF printout.
11. The Engineer and Owner will review shop drawings a maximum of two (2) times. The cost of review for the second resubmittal and for each subsequent review by the Engineer and Owner shall be charged to the Contractor in the form of a deductive change order.

B. Submittal Order

1. First Stage Submittals
 - a. The Qualifications and Deviation List, Project Plan, and Schedule submittals may be submitted together.
 - b. Qualifications Submittal – Within 30 calendar days after Notice to Proceed.
 - c. Deviation List, Project Plan, and Schedule (PCSI/ASP) – Within 45 calendar days after Notice to Proceed.
 - d. Submittal requirements are specified within this section.
2. Second Stage Submittals
 - a. Submit on second stage submittals only after the first stage submittals have been approved.
3. Third Stage Submittals
 - a. Submit on third stage submittals only after the second stage submittals have been approved.
4. Fourth Stage Submittals
 - a. Preliminary Operations and Maintenance Manuals (O&Ms) shall be submitted prior to any factory testing and/or field installation of equipment and instruments.
 - b. Submittal requirements are specified within this section.
 - c. Refer to Section 01730 – Operation and Maintenance Data for general O&M requirements.
 - d. Separate submittals shall be made for each submittal listed below in the order they are shown.

Submittal Group Title	Individual Submittal Title	Early Stage	First Stage	Second Stage	Third Stage	Fourth Stage
Qualifications and Deviation List, Project Plan, and Schedule submittal	13300 Process Control System General Provisions -Qualifications Submittal		√			
	13300 Process Control System General Provisions - Deviation List, Project Plan, and Schedule		√			
Process Control and Input/Output (IO) List Submittal	13340 Process Control System Input/Output List				√	
	13340A Attachment 01 - PCS Input/Output List				√	
Controller Program Submittal	13310 Application Engineering Services				√	
Control Panel Hardware Submittal	133420 Programmable Logic Controllers			√		
	133460 Control Panel Enclosures and Panel Equipment			√		
Testing Plan Submittals (PCSI/ASP)	13320 Process Control System Testing				√	
Process Control System Operations and Maintenance (O&M) Manuals	13300 Process Control System General Provisions					√
	13310 Application Engineering Services					√

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SUBMITTAL REQUIRMENTS

A. Qualifications Submittal

1. Detailed information on staff and organization to show compliance with the Quality Assurance requirements of this section.
2. Submit details of personnel assigned to the project and the organizational structure, including the PCSI/ASP's project manager, project engineer, lead project technicians, quality assurance reviewer, etc. Include project roles, contact information, and key individual resumes and specify in writing their commitment to the project.
3. The Qualifications submittal shall be submitted and approved before any other submittals from this section will be accepted. Failure to meet the minimum requirements shall be

grounds for rejection as a PCSI. The Qualifications submittal shall, at a minimum, contain the following:

- a. Copies of International Society of Automation (ISA) Certified Control Systems Technician (CCST) Level 1 certificates for all field technicians or resumes demonstrating a minimum of 10 years of verifiable plant start-up experience.
- b. Notarized statement from the firm's financial institution demonstrating ability for the firm to meet the obligations necessary for the performance of the work.
- c. Copy of UL-508 certificate for panel fabrication facilities.
- d. Project references for water or wastewater projects as defined in the Quality Assurance paragraphs.
- e. Documentation to demonstrate the ability to complete this project, including resumes of key staff, financial capacities, details on engineering, design, fabrication, field service capacity, and the location of staff responsible for responding to the site within four (4) hours to resolve startup issues.

B. Deviation List, Project Plan, and Schedule Submittal

1. Deviation List Submittal

- a. Submit a detailed list of any exceptions, functional differences, or discrepancies between the system proposed by the PCSI and this specification.
- b. The Deviation List shall consist of a paragraph-by-paragraph review of the Specifications indicating acceptance or any proposed deviations, the reason for exception, the exact nature of the exception, the proposed substitution, and details of any contract financial credits offered so that an evaluation may be made by the Engineer.
- c. If no exceptions are taken to the Specifications or Drawings, the PCSI shall make a statement as such. If there is no statement by the PCSI, then it is acknowledged that no exceptions are taken.
- d. The acceptability of any device or methodology submitted as an "equal" or "exception" to the Specifications shall be at the sole discretion of the Engineer.

2. Project Plan Submittal

- a. The Owner/Engineer will not accept subsequent submittals until the PCSI/ASP Project Plan submittal is approved.
- b. A brief and concise description of the proposed system by the PCSI/ASP showing the understanding of the project work, including major hardware and software components, proposed work schedule, startup, and coordination.
- c. A preliminary system architecture drawing showing the principal items of equipment furnished, including model numbers, and their interrelationships to each other and other systems.
- d. Approach to work including the replacement of existing equipment with new equipment, switchover (Maintenance of Plant Operations (MOPO) during the system transition), startup and commissioning, testing, training, and any other tasks as required by these specifications.
- e. Preliminary list of Human Machine Interface (HMI) software, PLC software, and PLC hardware, including version numbers, solely to determine compliance with the requirements of the contract documents prior to beginning development of system programming. Review and approval of software and hardware systems as part of this Project Plan stage shall not relieve the PCSI of meeting all the functional and performance requirements of the system as specified herein. Substitution of the

manufacturer or model of these systems after the submittal is approved is not allowed without Engineer approval.

- f. Sample formats of the shop drawings to be submitted and in conformance with the requirements of the Specifications. At a minimum, include samples of panel fabrication drawings, loop, and Input/Output (I/O) wiring diagrams.
- g. Preliminary coordination meeting agendas as specified herein.
- h. Training plan outline.

C. I/O List Submittal

1. The PCSI/ASP generates a detailed I/O list to be submitted to the Engineer for review and approval.
 - a. The ASP CANNOT progress in the PLC development process before receiving official approval of this submittal.
 - b. The Engineer shall verify naming convention conforms with PLC and HMI Procedures.
 - c. The I/O list shall follow the I/O List format and be submitted as a Microsoft Excel electronic document and 8-1/2 inch by 11-inch hard copy.
 - d. The I/O list shall include all active points and spare points for the system.
 - e. The I/O list shall be arranged such that each PLC, Remote Terminal Unit (RTU), or control panel system has a dedicated worksheet. At a minimum, I/O worksheet tables shall include the following information:
 - 1) Tag name(s): The identifier assigned to a device that performs a function in the control system. As part of this information, the loop number of the tag shall be broken out to allow for sorting by loop. PLC and HMI tag names shall be the same.
 - 2) Description: A description of the function of the device (text that includes signal source, control function, etc.). Include the text, "Spare Points," for all I/O module points that are not connected to equipment.
 - 3) Engineering Range/State: The range in engineering units corresponding to an analog 4-20 mA signal, or the state at which the value of the discrete points is "1."
 - 4) Engineering Units: The engineering units associated with the Analog I/O.
 - 5) Alarm Limits: Include alarm limits based on the control descriptions and the Drawings.
 - 6) Alarm State
 - 7) Alarm Priority: Include alarm priority based on the Owner's preference.
 - 8) HMI Update Rate
 - 9) Historical Logging
 - 10) Modbus Address: The Modbus address for peer-to-peer data points.
 - 11) PLC and HMI Address
 - 12) Wiring Information: The physical wiring termination points at the PLC designated by rack, slot, and channel.
 - 13) Signal Type: Use DO – Discrete Output, DI – Discrete Input, AO – Analog Output, AI – Analog Input, PI – Pulse Input, or PO – Pulse Output.
 - 14) Instrument Limits
 - 15) State Text: Designation of the "on" and "off" state values for discrete points.
 - 16) Output Type

D. Detailed Control Narratives Submittal:

1. This submittal shall cover all of the application programs developed to implement the control functions specified herein and in the contract documents.
2. The process control schemes shall be developed based on information from the Specifications. This submittal shall include the following, as a minimum:
 - a. A brief scope of the control function.
 - b. List of all scanned inputs to the control function.
 - c. A short narrative of the control strategy.
 - d. Any assumptions made in developing the program.
 - e. I/O database list showing all inputs and outputs (i.e., AI, DI, AO, DO), calculated points, and pseudo points associated with the control function.
 - f. PLC communication and hardware monitoring.
 - g. List of all operator inputs/outputs to and from the control function. A description of the operation of any panels shall be described as it relates to the control function.
 - h. All anticipated failure contingencies shall be described in detail.
 - i. All applications' programs shall be developed in a structured manner and shall follow an intuitive arrangement. Programs shall utilize standard program templates or subroutines for repetitive logic, such as equipment control, flow total calculations, and equipment runtime calculations. All applications' programs shall be submitted in 8.5-inch x 11-inch format. All programs shall be fully annotated throughout to facilitate diagnosis by instrumentation technicians with basic programming knowledge.
 - j. This submittal shall also include copies of the PLC I/O configuration tables and I/O reference usage table. In addition, any special switch settings or hardware configuration requirements, such as communications port configurations, shall be described in detail and submitted.

E. Controller Program Submittal:

1. Submit software logic and documentation for function block language used for the application engineering effort.
2. Program documentation shall include individual rung, network, and/or command descriptions with abundant comments to clearly identify function and intent of each code segment. Link between "coil" and "contact" shall be clearly presented, the function of each timer described, the purpose of each subroutine call labeled and defined, etc. Program documentation shall be sufficiently clear to allow determination of compliance with the process control requirements included in the Process Control Loop Descriptions.
3. The submittal shall demonstrate that all logic provided under this project follows the same structure and format and reflects a common programming approach. Any custom subroutines or function blocks shall be described in detail and include all inputs with allowable ranges, outputs, and internal logic of the block.
4. Submit details of control system communication. Submit hardware and software configuration information in sufficient detail to verify performance of the communication system as detailed herein and on the Drawings. Include descriptions of drivers and the impact of drivers on controller memory configuration. Any specific communication block memory addresses shall be defined.

5. Submit a memory usage report for the controller. This report shall indicate both used and unused memory addresses. Include constant and variable memory assignment records that tabulate area, location, number, and description of each numeric constant or variable stored in memory.
 6. Submit method and logic for special housekeeping programs and routines including redundancy, clock synchronization, value scaling, alarm handling, archiving, etc. Submit information for all digital systems including controllers and HMI equipment.
 7. Submit cross reference index of I/O allocation, controller memory address, HMI graphic systems address, and HMI graphic screen where the I/O point will appear. Every physical I/O point as well as calculated or virtual I/O required for the implementation of the process scheme shall be included.
 8. Make additional changes to the software configuration, beyond those identified in the initial draft submittal, based on comments during the factory and field tests and during the commissioning process as required.
- F. Testing Plan Submittal:
1. The Testing Plan submittal shall include all the testing requirements in Section 13320 – Process Control System Testing, for both the PCSI/ASP.
 2. This submittal will outline the approach to testing the various components of the system to validate the HMI and PLC programming meets the requirements. In addition, sample test forms and procedures shall be included to allow the Owner/Engineer an opportunity to comment on format and content prior to the ASP developing the detailed test procedures. Additional components of this submittal shall include test approval and punch list procedures.
 3. Test Procedure Submittals: Submit the procedures proposed to be followed for each test. Procedures shall include test descriptions, forms, and checklists to be used to control and document the required tests. Include sign-off forms for each testing phase or loop with sign-off areas for the ASP, PCSI, Engineer, and Owner. Submit separate procedures for each test phase.
 4. Test Documentation: Upon completion of each required test, document the test by submitting a copy of the signed-off test results. Testing shall not be considered complete until the signed-off test results have been submitted and favorably reviewed. Submittal of other test documentation, including “highlighted” wiring diagrams with field technician notes, are not acceptable substitutes for the formal test documentation.
 5. Each loop shall have a Loop Status sign-off form to organize and track its inspection, adjustment, and calibration. These forms shall include the following information and check-off items:
 - a. Project Name.
 - b. Loop Number.
 - c. Detailed test procedure indicating exactly how the loop will be tested, including all required test equipment, necessary terminal block numbers, and simulation techniques required.

- d. Tag Number for each component.
 - e. Check-offs/sign-offs for each component.
 - 1) Tag/identification.
 - 2) Installation.
 - 3) Termination – wiring.
 - 4) Termination – tubing.
 - 5) Calibration/adjustment.
 - f. Check-offs/sign-offs for the loop.
 - 1) Panel interface terminations.
 - 2) I/O interface terminations.
 - 3) I/O signal operation.
 - 4) Inputs/outputs operational: Received/sent, processed, adjusted.
 - 5) Total loop operation.
 - 6) Space for comments.
 - 7) Sign-off and date fields for the Contractor, the Owner/Engineer, and the PCSI/ASP.
6. Each active analog subsystem element shall have a Component Calibration form. These forms shall have the following information, including space for data entry:
- a. Project Name.
 - b. Loop Number.
 - c. ISA Tag Number and I/O Module Address.
 - d. Manufacturer.
 - e. Model Number/Serial Number.
 - f. Summary of Functional Requirements, for example:
 - 1) For Indicators: Scale ranges.
 - 2) For Transmitters/Converters: Scale and chart ranges.
 - 3) For Computing Elements: Function.
 - 4) For Controllers: Action (direct/reverse) control modes (PID).
 - 5) For Switching Elements: Unit range, differential (FIXED/ADJUSTABLE), reset (AUTO/MANUAL).
 - 6) For I/O Modules: Input or output.
 - g. Calibrations, for example:
 - 1) For Analog Devices: Required and actual inputs and outputs at 0, 50, and 100 percent of span.
 - 2) For Discrete Devices: Required and actual trip points and reset points.
 - 3) For Controllers: Mode settings (PID).
 - 4) For I/O Modules: Required and actual inputs or outputs for 0, 50, and 100 percent of span.
 - h. Space for comments.
 - i. Sign-off and date fields for the Contractor, the Owner/Engineer, and the PCSI.
- G. Process Control System Operations and Maintenance (O&M) Manuals:
1. Submit in accordance with Section 01730 – Operation and Maintenance Data. O&M manuals shall be provided in both hardcopy and electronic copy.
 2. O&M manuals shall include complete instruction books for each item of equipment and software furnished. Where instruction booklets cover more than one (1) specific model or

- range of device, product data sheets shall be included which indicate the device model number and other special features.
3. The O&M manuals shall, at a minimum, contain the following information:
 - a. Table of Contents shall be provided for the entire manual with the specific contents of each volume clearly listed. The complete Table of Contents shall appear in each volume.
 - b. Instrument and Equipment Lists
 - 1) The instrument and equipment lists shall be developed in Microsoft Excel format and provided as a hardcopy in the O&M and electronically as part of the final PDF.
 - 2) An instrument list for all devices supplied including tag number, description, Specification Section and paragraph number, manufacturer, model number, serial number, range, span, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.
 - 3) An equipment list for all non-instrument devices supplied listing description, Specification Section and paragraph number, manufacturer, model number, serial number, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.
 - 4) Certified calibration data for all flow metering devices.
 - 5) Submit Factory calibration result for the instruments.
 4. Equipment O&M Information:
 - a. Data sheets shall be provided for all field and non-field instrumentation devices. Provide a cover page for each device, piece of equipment, and original equipment manufacturer (OEM) software that lists date, specification number, product name, manufacturer, model number, location(s), and power required. Preferred format for the cover page is ISA-TR20.00.01-2001 (updated in 2004-2006), general data sheet; however, other formats are acceptable provided they contain all required information.
 - b. Vendor O&M documentation for each device, piece of equipment, or OEM software shall be either new documentation written specifically for this project or modified standard vendor documentation. All standard vendor documentation furnished shall have all portions that apply clearly, indicated with arrows, circles, or highlighted. All portions that do not apply shall be neatly lined out or crossed out. Groups of pages that do not apply at all to the specific model supplied shall be removed.
 - c. Any component requiring custom software configuration or dip switch settings, that information shall be included along with the corresponding data sheets and O&M information.
 - d. Provide the record documentation of the system audit as specified in Section 13320 – Process Control System Testing.
 - e. Include the calibration forms developed as specified in Section 13320 – Process Control System Testing.
 - f. Include reports detailing network device configurations. Include all connections, addresses, and port assignments for each configured network device.
 - g. Include Optical Time Domain Reflectometer (OTDR) trace plots for all fiber optic cables.
 5. Software O&M Information:

- a. All O&M procedures for the applications software and system configuration shall be furnished.
 - b. All software applications, programs, and configuration files shall be provided on electronic media disks independent of computer hard disk files. Files shall be provided on machine-loadable media capable of being used by a technician to restore the installed software using the existing hardware and software programs.
 - c. The manuals shall contain operating and maintenance data written specifically for this project.
 - d. At a minimum, the following information shall be provided in the manuals.
 - 1) A comprehensive index.
 - 2) All documentation from previous submittals updated to reflect the as-built system.
 - 3) Detailed service, maintenance, and operation instructions for each item supplied, including procedures for backing up files and archiving historical data.
 - 4) List of personnel to be contacted for warranty and emergency services, including name, address, telephone number, pager or cell phone number, fax number, and email address.
 - 5) Printouts of every graphic display with all dynamic points referenced.
 - 6) Printouts of all configuration files.
 - 7) Printouts of all documented PLC programs.
 - 8) Electronic media disks containing all HMI, PLC, and other custom-configured files used on the Project.
 - 9) Final PID Loop Tuning Parameters for all associated control loops.
6. As-Built Drawings
- a. As-built drawings shall be complete and including all drawings and diagrams specified in this section. Drawings shall include all wiring, fabrication, and interconnection drawings for all the equipment the PCS is connected to, including terminal points of equipment not supplied by the PCSI.
 - b. As built documentation shall include information from submittals, as described in this Specification and the other process control system specifications and be updated to reflect the as-built system. Errors in or modifications to the system resulting from the Factory and/or Functional Demonstration Tests shall be incorporated in this documentation.
7. Original Licensed Software
- a. Submit original software provided under this Contract. Submit original paper based and electronic documentation for all software provided.
 - b. Submit license agreement information including serial numbers, license agreements, User Registration Numbers, and related information.
 - c. Provide media in software sleeves within the O&M manual.
8. Control Panel Operations Narrative Manual:
- a. Record documentation shall have a Control Panel Operations Narrative manual for every PLC control panel. Provide a hardcopy of each manual to be placed in its respective enclosure. The information to be included in this manual:
 - 1) Describe the purpose of PLC.
 - 2) Control Descriptions.
 - 3) PLC Tag Info: A brief explanation of each tag and its function.
 - 4) PLC Input/Output List.

- 5) Control Panel layout.
 - 6) Control Panel Wiring Diagrams (including all the communications between the PLC modules and the terminal blocks).
 - 7) Printout of the PLC Function Block codes of the PLC program.
 - 8) Soft copies of the PLC code and configuration information.
9. Electronic O&M Information:
- a. Provide an electronic version of all equipment manuals and data sheets, along with any software back-up of configuration files. Electronic documents shall be supplied in PDF format.
 - b. Provide electronic files for all custom-developed manuals including training manuals. Text shall be supplied in both Microsoft Office format and PDF format.
 - c. Provide electronic files for all drawings produced. Drawings shall be in AutoCAD “.dwg” format and in PDF format. Drawings shall be provided using the AutoCAD eTransmit feature to bind external references, pen/line styles, fonts, and the drawing files into individual zip files.
 - d. Each computer system hardware device shall be backed up onto DVD after Substantial Completion and shall be turned over to the Owner.
 - e. If specified in the training section, provide digital copies of all training videos. Videos shall be in a format that is readable by standard DVD players and by standard PC DVD drives. Format shall be a minimum of 1920 by 1080 pixels and shall include sound.

END OF SECTION

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SECTION 13320
PROCESS CONTROL SYSTEMS TESTING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section covers the testing requirements for all process equipment, instruments, and devices that are monitored, controlled, or otherwise part of the Process Control System (PCS) and is detailed in the Contract Drawings and those specified in Section 13300, Process Control System General Provisions.
- B. Testing of vendor supplied equipment connecting to the PCS shall adhere to the same testing requirements herein. The Project Control System Integrator (PCSI)/Applications Services Provider (ASP) shall coordinate with the vendor(s) for integration and testing of their equipment into the PCS.
- C. The PCSI/ASP shall coordinate all testing activities with the Owner, Engineer, Contractor, the HMI programmer, all affected subcontractors, equipment suppliers, and vendors.
- D. The PCSI/ASP shall provide all labor, materials, equipment, and incidentals required to complete all testing listed herein.
- E. The PCSI/ASP shall perform all tests listed per testing requirements as specified herein.
 - 1. Field Testing
 - a. Unwitnessed Operational Readiness Test (UORT).
 - b. Witnessed Operational Readiness Test (WORT).
 - c. Functional Demonstration Test (FDT).
 - d. Site Acceptance Test (SAT).
- F. The PCSI/ASP to perform joint testing with the HMI programmer.
- G. The PCSI/ASP shall provide to the Engineer certified calibration/recalibration (for existing Instruments) reports for field instruments and devices specified or shown on the Drawings immediately upon completion of calibration.
 - 1. Receipt of any calibration/recalibration certificates shall in no way imply acceptance of any work or of instruments supplied.
 - 2. Each calibration/recalibration certificate shall be signed and dated by an authorized representative of the PCSI/ASP. Completed certificates shall be submitted to the Engineer through the submittal process.
 - 3. A typical instrument calibration certificate form is included at the end of this section.

1.02 TEST – GENERAL

- A. The PCSI/ASP shall test all PCS equipment at the factory prior to shipping to the site. To the extent possible, all PCS equipment shall be tested as a single fully integrated system at the factory.
- B. Each test shall be performed in the cause-and-effect format. The person administering the test shall initiate an input (cause) and, in which the system's or subsystem's produce the correct result (effect).
- C. Whether explicitly stated on the test procedures, the Engineer reserves the right to test or retest all specified functions to determine compliance with the functional requirements. Additional testing by the Engineer to determine compliance with the specified requirements shall be performed at no additional cost to the Owner. The Engineer's decision shall be final regarding the acceptability and completeness of all testing.
- D. Test using actual process variables, equipment, and data when possible. If it is not practical to test with actual process variables, equipment, and data, variables, equipment, and data shall be simulated.
- E. The PCSI/ASP shall prepare and submit testing procedures to be approved by the Owner and Engineer that shall demonstrate the system conforms to the Specifications.
- F. The PCSI/ASP shall notify the Engineer and Owner in writing at least 14 days before the proposed testing date.
- G. If any test is concluded unsuccessfully, the test shall be repeated.
- H. Equipment shall not be shipped to the project site until the Engineer and/or Owner has received all Factory Acceptance testing submittals and approved the system ready to ship in writing.
- I. Correction of Deficiencies
 - 1. Deficiencies in workmanship and/or items not meeting specified testing requirements shall be corrected to meet such requirements at no additional cost to the Owner.
 - 2. Testing shall be repeated after correction of deficiencies are made until the test is deemed successful. This work shall be performed at no additional cost to the Owner.

1.03 RELATED WORK

- A. Refer to Section 13300 – Process Control System General Provisions.
- B. Refer to Section 13310 – Application Engineering Services.

1.04 SUBMITTALS

- A. The PCSI/ASP shall submit all testing documents in one submittal. Testing documents shall include the following:

1. Testing Procedures
 - a. Detailed procedures proposed to be followed for each test specified herein. The test procedures shall serve as the basis for the execution of the required tests to demonstrate that the PCS meets, and functions as specified.
 - b. Sample test forms and procedures to be included to allow the Owner/Engineer an opportunity to comment on format and content prior to the PCSI/ASP developing the detailed test procedures.
 - c. Structure procedures in an orderly and easy to follow manner to facilitate an efficient and comprehensive test. Tests shall be in a cause-and-effect format.
 - d. Procedures shall include test descriptions, forms, and checklists to be used to control and document the required tests.
 - e. The PCSI/ASP shall include punch list forms with the test procedures to document issues that arise during the testing. Punchlist forms, at a minimum, shall include a specification cross reference; an issues description field; a resolution description field; and a sign-off area for the PCSI/ASP, Owner, and Engineer.
 - f. Indicate all pre-testing setup requirements, all required test equipment, and simulation techniques to be used.
 - g. Include the demonstration and validation under normal operating conditions and under various failure scenarios as specified in the contract documents.
2. Testing Status Sign Off forms
 - a. Develop project specific Input/Output (I/O) Status and Automatic Control Strategy signoff forms to be used during factory and field testing to organize and track each loop's inspection, adjustment, calibration, configuration, and testing status and sign off. Include sign-off forms for each testing phase showing all loops with sign-off areas for the PCSI/ASP and the Owner/Engineer.
 - b. Separate forms for factory and field testing can be used, or they can be combined, at the discretion of the PCSI/ASP.
 - c. Testing Status signoff forms shall provide space to note any deficiencies and whether the test passed or failed.
 - d. Example forms are shown in the Appendices.
3. Testing Documentation
 - a. After completion of each required test, the signed Testing Status signoff forms shall be submitted to the Owner/Engineer within 10 days of completion of each test.
 - b. Testing shall not be considered complete until the signed-off forms have been submitted and approved.
 - c. Submittal of other test documentation, including "highlighted" wiring diagrams with field technician notes, are not acceptable substitutes for the formal test documentation.

B. Testing may not start until all testing submittals have been approved.

1.05 COST OF TRAVEL

- A. Scheduled tests will only be attended once by the Owner and/or Engineer. If the test is not successful, all subsequent tests will be performed at the PCSI/ASP's expense.
- B. The PCSI/ASP shall reimburse the Owner and Engineer for all labor and expenses incurred in connection with attending repeated test necessitated by system failure or inadequate preparation.

- C. Reimbursement will go through the Owner with the Engineer invoicing the Owner for all expenditures associated with retesting.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. The PCSI/ASP shall conduct factory testing prior to equipment shipping to the project site.
- B. The PCSI/ASP shall conduct field testing once all equipment and devices that makeup the PCS have been installed.
- C. All tests shall be specifically addressed in the Test Procedure submittal.
- D. All tests shall be recorded on the approved Test Status Signoff forms.

3.02 FIELD TESTS

- A. Unwitnessed Operational Readiness Test (UORT)
 - 1. The purpose of the UORT is to check that process equipment, instrument installation, instrument calibration, instrument configuration, field wiring, control panels, and all other related system components are ready to monitor and control the processes. This test will determine if equipment is ready for operation.
 - 2. This test shall take place after the installation of all PCS components and prior to the Functional Demonstration Test (FDT) and startup. Prior to starting this test, relevant process equipment shall be installed and mechanically tested, instruments installed, control panels installed, and field wiring complete.
 - 3. The Unwitnessed ORT (UORT) shall be performed prior to the Witnessed ORT (WORT).
 - 4. The ORT shall be conducted by the PCSI/ASP, Contractor, subcontractors, equipment vendors, and any others that are responsible for process equipment being monitored or controlled by and through the PCS.
 - 5. All deficiencies found shall be corrected and retested by the PCSI/ASP prior to commencement of the FDT.
 - 6. Required Documents for Test:
 - a. Master copy of the PCSI/ASP developed field Testing Sign-Off forms.
 - b. Testing Procedures.
 - c. Calibration forms.
 - 7. The PCSI/ASP shall maintain sign-off forms and calibration forms at the job site and make them available to the Engineer/Owner at any time.
 - 8. The following tests shall be performed as part of the ORT:

- a. Instrument calibration, configuration, and set-up.
 - b. I/O Testing from field device to PLC and to HMI/OITs.
 - c. Testing of individual process control strategies.
9. Instrument calibration, configuration, and set-up.
- a. Calibrate, configure, and set-up all components and instruments to perform specified functions. This includes tuning all process equipment proportional integral derivative (PID) loops.
 - b. Calibration Form
 - 1) The PCSI/ASP shall maintain a calibration form in field to document any component or instrument requiring dip switch settings, calibration, or custom configuration. These forms shall provide a summary of the actual settings used in the field to allow an Instrument technician to replace the device entirely and configure it to function as it did before.
 - 2) Calibration information shall be added to the Instrument Data Sheet and added to a copy of the manufacturer's standard, "Configuration Sheet," or a separate form shall be created.
 - a) If a separate form is used, the form shall list project name, loop number, ISA tag number, I/O module address, manufacturer, model number/serial number, output range and calibrated value.
 - 3) Required information shall include, but not be limited to:
 - a) Discrete Devices: Actual trip points and reset points.
 - b) Instruments: Any configuration or calibration settings entered into the instrument
 - c) Controllers: Mode settings (PID).
 - d) I/O Modules: Dip switch settings, module configuration (if not documented in native programming documentation).
 - 4) Any device that allows configuration files to be backed up to a laptop, the PCSI/ASP shall make configuration files to be available to the Engineer and/or Owner for inspection. Submit backup files as part of the final system documentation.
10. I/O Testing
- a. The PCSI/ASP in conjunction with the Contractor shall test all signals under process conditions. Each I/O shall be tested from the field device to the PLC terminal block and from the PLC to HMI/OIT. Simulation of I/O, such as jumpering inputs, will not be accepted unless authorized by the Engineer.
 - b. The following I/O tests shall be performed:
 - 1) Discrete Input – At the device or instrument, change the signal condition from an inactive to active state. Observe the results on all indicators within the loop, such as HMI screens, OIT screens, pilot lights, horns, beacons, etc.
 - 2) Analog Input – Test the analog signal over the entire engineering range at various intervals including zero percent, 25 percent, 50 percent, 75 percent, and 100 percent as well as on the increasing and decreasing range. Observe results on all indicators within the loop, such as HMI screens, OIT screens, recorders, digital indicators, etc.
 - 3) Discrete Output – Signals shall be tested by switching equipment to manual control at the HMI and OIT nodes and turning output on or using other means to turn output on, then verifying equipment responds accordingly.

- 4) Analog Output – Test analog signal over entire engineering range at various intervals including 0, 25%, 50%, 75%, and 100% as well as on increasing and decreasing range by switching equipment to manual control at HMI and OIT nodes and manipulating the variable output, then verify equipment responds accordingly.
11. Testing of Automatic Control Strategies
 - a. All automatic control strategies shall be verified using actual process equipment and instruments, or other means, to verify logic performs as expected. Verify faults and logical failure scenarios for control strategies, such as instrument failures, equipment failures, loss of communication between the HMI server and PLC, loss of peer-to-peer communication, out of range testing for analog inputs, loss of power, and all other strategies specified in the control strategy document.
 - b. Repeat all systems' tests specified under factory testing.
 - c. The UPS shall be tested to verify UPS switches power correctly while keeping all UPS powered loads online. Test the UPS capacity by switching offline power to UPS and verify if they maintain specified runtime.
 - d. Panels modified by this Contract shall test the internal control panel temperature under full running conditions to ensure proper cooling/ventilation is being provided.
 - e. Upon successful completion of the UORT, the PCSI/ASP shall submit a record copy of test results and request scheduling of the WORT.
- B. Witnessed Operational Readiness Test (WORT)
1. The purpose of the WORT is to check that process equipment, instrument installation, instrument calibration, instrument configuration, field wiring, control panels, and all other related system components are ready to monitor and control the processes. This test will determine if equipment is ready for operation.
 2. Before scheduling the WORT, the PCSI/ASP shall determine through their own UORT and through their internal quality assurance program that the PCS is ready for the witnessed operational readiness testing by the Owner and Engineer.
 3. The WORT shall follow all requirements listed for the UORT.
 4. The PCSI/ASP shall submit to the Engineer the complete and signed Testing Status forms indicating that all tests have been completed and are ready for the Functional Demonstration Test (FDT).
- C. Functional Demonstration Test (FDT)
1. The purpose of the FDT is to certify that the entire PCS is ready for operation by demonstrating each specified function on a paragraph-by-paragraph, loop-by-loop, and site-by-site basis. The FDT is to be witnessed by the Engineer and/or Owner.
 2. The FDT shall be performed after successful completion of the UORT and individual process startup, and prior to the Site Acceptance Test (SAT). The FDT shall be completed in a single testing period. The testing period may span over several days.

3. Failure of five (5) percent of I/O tested or more than one (1) hour of troubleshooting during the FDT will deem the test as unsuccessful and the FDT shall be rescheduled once the system is ready for retesting.
 4. All testing shall be the same as specified under the ORT, except that the entire installed system shall be tested and all functions demonstrated using live field-based data to the greatest extent possible.
 5. Required Documents for Test:
 - a. Set of panel drawings and wiring diagrams from WFAT and ORT with corrections noted.
 - b. A set of Contract Drawings and Specifications including addenda and change orders.
 - c. Signed-off master copy of the PCSI/ASP developed field testing sign-off forms.
 - d. Testing procedures.
 - e. Copy of completed calibration forms.
 - f. One (1) copy of all O&M Manuals for the PCSI/ASP supplied equipment.
 6. The daily schedule during the FDT shall be as follows:
 - a. Morning meeting to review the day's test schedule.
 - b. Scheduled tests and sign-offs.
 - c. End of day meeting to review the day's test results and to review or revise next day's test schedule.
 - d. Unstructured testing period by the Engineer and/or Owner.
 7. The system shall operate for 96 continuous hours without failure before this test shall be considered successful. The start of the continuous hours will commence after all testing has been completed.
 8. Punch list items and resolutions noted during the test shall be documented on the Punch List/Resolution form. In the event of rejection of any part or function test procedure, the PCSI/ASP shall perform repairs, replacement, and/or retest within 10 days.
 9. Upon successful completion of the FDT, the PCSI/ASP shall submit a record copy of test results to the Engineer and/or Owner as specified and request the scheduling of the SAT.
- D. Site Acceptance Test (SAT)
1. The purpose of the SAT is to verify that the PCS is capable of functioning as specified and intended for an extended period and without major malfunctions.
 2. The SAT duration shall be 30 consecutive days under full plant process operations. The SAT will be deemed successful if there are no major non-field-repairable malfunctions.
 - a. Any malfunction which cannot be corrected within 24 hours of occurrence by the PCSI/ASP personnel, or more than two (2) similar failures of any duration, will be considered a non-field-repairable malfunction.
 - b. Any malfunction during the SAT shall be analyzed and corrected by the PCSI/ASP. The Engineer and/or Owner will determine whether any such malfunctions are sufficiently serious to warrant a repeat of this test.
 - c. In the event of any part or function of the SAT being rejected, the PCSI/ASP shall perform repairs or replacement within five (5) days of the event. Upon completion of

- repairs by the PCSI/ASP, the SAT will be restarted from the date which the PCSI/ASP successfully corrected the malfunction(s), and the Engineer and/or Owner have accepted and signed off on the repairs.
- d. Malfunctions shall include any logic sequencing that is not operating per the Specifications.
3. During the SAT plant operations, the PCSI/ASP shall be present and available to address any potential issues that may impact the overall system process.
 - a. The PCSI/ASP shall provide personnel who have intimate knowledge of the system, its functionality, hardware, and software.
 - b. When the PCSI/ASP personnel are not onsite, they shall be available by phone, with their phone number given to the Owner for immediate assistance. The PCSI/ASP personnel shall be able to be onsite within four (4) hours of a notification by the Owner.
 4. While this test is proceeding, the Engineer and Owner shall have full use of the system. Only plant operating personnel shall be allowed to operate equipment associated with live plant processes. Plant operations shall remain the responsibility of the Owner, and the plant operators' decisions regarding plant operations shall be final.
 5. During the SAT, no software or hardware modifications shall be made to the system without prior approval from the Owner or Engineer.
 6. Upon successful completion of the SAT and subsequent review and approval of complete system final documentation, the system shall be considered substantially complete, and the one-year warranty period shall commence.
- E. Certificate of Installation
1. Following successful completion of the SAT, the PCSI/ASP shall submit a Certification of Installation to the Owner and Engineer. Certification shall state that the PCS installation has been completed in conformance with plans and Specifications. Certification shall be on the PCSI/ASP corporate letterhead and signed by an officer of the company.

CALIBRATION CERTIFICATE					
Instrument Name & Service					
Tag Number/Loop Number					
Instrument Location					
Manufacturer					
Model Number					
Adjustable Range					
Calibrated Range					
Remarks					
Installation Per Manufacturer's Requirements?			Yes	No	
Installation Per Contract Documents?			Yes	No	
If "No", explain					
Calibration Test:					
	Input (Units)		Output (Units)		Accuracy
0%					
25%					
50%					
75%					
100%					
Switch Test	Switch Point Upscale		Switch Point Downscale		Setting Deadband
Setpoint 1					
Setpoint 2					
Setpoint 3					
<p>I hereby certify that the above information is correct and accurate, to the best of my knowledge, and that the instrument indicated above has been supplied, installed, calibrated, and tested in accordance with the manufacturer's recommendations and the Contract Documents, unless otherwise noted.</p> <p>Receipt of this Calibration Certification shall in no way imply acceptance of any work or instrument supplied as a part of this Contract.</p>					
PCSI/ASP's Signature:				Date:	

END OF SECTION

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SECTION 13340
PROCESS CONTROL SYSTEM INPUT/OUTPUT LIST

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section covers the Process Control System (PCS) Input/Output (I/O) List for the controller. The list is intended to reflect the signals that serve as the basis of the application to be programmed by the ASP (Applications Services Provider) who is furnishing the process monitoring and control functionality specified within this Division or as indicated on the Drawings.
- B. Equipment and services provided under this section shall be subject to all Associated Sections listed below.
- C. This section shall be used and referenced only in conjunction with the PCS sections.
- D. This section supplements the PCS section. I/O data is indicated on the Drawings or the I/O List.

1.02 ASSOCIATED SECTIONS

- A. This section encompasses the equipment and services specified in the following sections:

<u>SECTION</u>	<u>SPEC TITLE</u>
13300	Process Control System General Provisions
13310	Application Engineering Services
13350	Process Control Descriptions

1.03 SUBMITTALS

- A. Submittals shall be per the PCS General Provisions and Applications Engineering Services (AES) sections.

1.04 CONTROLLER INPUT/OUTPUT TAGS

- A. For consistency between the field and Programmable Logic Controller (PLC)/Human Machine Interface (HMI) tag names, the same tag naming convention used for instrument or equipment tags, including sequence loop numbers, shall be used for the PLC/HMI tag numbering. For existing systems, the existing tag naming convention should be used.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. The PCS I/O List is based on the contract documents and included within the tables attached to this section. The ASP shall follow standards to complete the I/O list submittal as described in the PCS General Provisions and AES sections.
- B. The power source originates either from within the PLC or I/O enclosure.

3.02 INPUT/OUTPUT LIST

- A. The Input/Output List is included to provide further details and requirements for the PLC/HMI programming. The PCS I/O List:
 - 1. Summarizes the minimum physical signal requirements of the control loops represented in the contract documents. Provide additional soft signals as required to fully implement the functionality described in these contract documents.
 - 2. Does not show all hardware and software necessary to perform all control functions specified herein and as shown on the Drawings. The PCSI shall provide all hardware and software necessary to provide a complete and working system.
 - 3. Is not intended to be an inclusive listing of all elements and appurtenances required to execute the loop functions. It is intended to supplement and complement the Drawings and other Specification Sections. The design I/O List shall not be considered equal to the exact field wired I/O.
- B. The I/O list includes the following information:
 - 1. Item: An arbitrary sequential number that is for reference only.
 - 2. Controller ID.: Controller identification is a sequential number for a given type within a specific controller (PLC or Remote Terminal Unit (RTU)).
 - 3. IO Type: The identifier of the type of I/O signal, including:
 - a. AI: Analog Input.
 - b. AO: Analog Output.
 - c. DI: Discrete Input.
 - d. DO: Discrete Output.
 - e. PI: Pulse Input or accumulator Type Input.
 - f. EAI: Ethernet Analog Input.
 - g. EDI: Ethernet Discrete Input.
 - 4. Field Device: Tag number of the instrument or equipment identifier associated with the I/O point.
 - 5. Loop No.: Numeric (or alphanumeric) loop designation for the instrument or equipment.

6. I/O Tagging Suffix: Multi-letter designation to uniquely identify the PLC/HMI tags. Suffixes will be per the International Society of Automation (ISA) Standards and the Owner's guidelines.
7. I/O Tag No.: The identifier assigned to the instrument or equipment that performs a function in the control system. Tag naming shall follow the ISA tag numbering and the Owner's guidelines.
8. Service Description: A description of the function of an instrument or equipment that includes signal source and control function (i.e. Filter 1 Loss-of-Head).
9. IO Range: Engineering Range or State – The range in engineering units corresponding to an analog signal or scalable variable (LO/HI), or the text description corresponding to each state of a discrete point (ON/OFF).
10. Engineering Unit (EU): The Engineering Range associated with the analog I/O or scalable variable.
11. Alarm Information: This column includes alarm limits to be verified by the programmer during startup and commissioning. This includes the following information:
 - a. Alarm/Event (designation of the data point as an Alarm or an Event).
 - b. HI HI: High-High Alarm Limit (If applicable).
 - c. HI: High Alarm Limit (If applicable).
 - d. LO LO: Low-Low Alarm Limit (If applicable).
 - e. LO: Low Alarm Limit (If applicable).
12. Historical Information: Points to be placed into Historian.
 - a. Update Rate (sec): Rate that a data point is collected by the Historian. These rates shall be finalized by the Owner during the project construction phase.
 - b. Historical Logging: This column indicates whether a data point is to be historized.
13. Analog Data:
 - a. Signal Type: This will typically be 4-20mA, but could also be 1-5Vdc, RTD, or Network Protocols (i.e. Ethernet/IP, Modbus TCP, Modbus RTU, FLD-BUS, Profibus DP or PA, serial, HART, or similar) to indicate the signal type of the associated input or output.
 - b. Power: This will typically be '2-wire' for devices that are loop powered from the PLC enclosure, '3-wire' for combination loop-powered and externally powered devices, or '4-wire' for devices that are powered from external power supplies, unless noted otherwise.
14. Discrete Data:
 - a. Signal Type: This will be 120VAC, 24VDC, or similar to indicate the signal type of the associated input or output.
 - b. Closed State: This will indicate the state of the input or output when it is considered to be closed or energized (normal, alarm, running, failed, etc.).
 - c. Interposing Relay: This will be either 'Yes' or 'No' to indicate whether the input or output requires an interposing relay. Relays are typically required to isolate external voltage sources. See Specifications for additional details.

15. Drawing/Piping and Instrumentation Diagram (P&ID) No.: This is the drawing number of the drawing or P&ID where the device is shown.
16. Remarks: This column may include a cross reference to another Specification Section where applicable, or to a note which provides additional information.

END OF SECTION

SECTION 13350
PROCESS CONTROL DESCRIPTIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Specification Section provides general control loop requirements for the programming of the Process Control System (PCS) by the Applications Services Provider (ASP).
- B. These descriptions are intended to provide an overview of the operating concept of the plant process equipment rather than describing in detail every operating feature or interlock.
- C. All Process Control System Programmable Logic Controller (PLC) programming and Operator Interface Terminal (OIT) or Operator Workstation Station (OWS) graphics and programming shall be performed as defined herein.

1.02 ASSOCIATED SECTIONS

- A. This section encompasses the equipment and services specified in the following sections:

<u>SECTION</u>	<u>SPEC TITLE</u>
13300	Process Control System General Provisions
13315	Process Control System Submittals
13310	Application Engineering Services
13340	Process Control System Input/Output List

1.03 SUBMITTALS

- A. Refer to Section 13315 – Process Control System Submittals for the specific submittal requirements.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Control descriptions are provided for each process area and are attached at the end of this section. The following is a list of attached sections that have detailed control descriptions for each process area. The list shows the specification attachment number and process area with accompanying process number.

<u>Spec No.</u>	<u>Area Name</u>	<u>Area Number</u>
13350.01	Wagner Generator	100
13350.02	Leissner Generator	200
13350.03	Dead Man Well Generator	300
13350.04	Wells Ranch Generator No. 1	400
13350.05	Wells Ranch Generator No. 2	500

B. The control descriptions are organized in the following format:

1. General
 - a. Process Area.
 - b. Process Overview.
 - c. Associated Equipment.
 - d. Associated Instruments.
 - e. Associated PLC.
 - f. Associated Control Panels.
 - g. Associated Piping and Instrumentation Diagrams (P&IDs).
2. Controller Programming
 - a. Control Modes.
 - b. Software Permissives.
 - c. Hardwired Interlocks.
 - d. Calculated Alarms and Variables.
 - e. Power Failure.
3. System Configuration
 - a. Status.
 - b. Setpoints.
 - c. Trending.
 - d. Alarms.
 - e. Human Machine Interface (HMI) Requirements.
4. Alarm Management.

3.02 GENERAL CONTROL CRITERIA

- A. General configuration and programming tasks are required for system PLCs. Each PLC may have several occurrences of each of these tasks or may not have any occurrences of some or all of these tasks.
- B. The Input/Output (I/O) lists in Section 13340.01 – Input/Output List and detailed equipment control descriptions included in the attachments of this section shall be referenced to determine the requirements for each PLC.
- C. All alarm and control setpoints shall be adjustable by the Operator at the HMI unless specifically stated otherwise, even if not shown on the Drawings.
- D. HMI computers shall function as a monitoring system, not as a controller, for the process equipment. The computer shall download setpoints and other information to the PLCs, and the PLCs shall perform all control algorithms, so a temporary failure of any HMI computer will not disrupt plant control.
- E. Rack and module definitions for each PLC, as well as the PLC communications configuration, shall be completely configured to allow proper addressing of all field connected I/O points. This shall include configuration of any Remote Input/Output (RIO) racks.

- F. The PLC database will include both field I/O points and internally generated points required for programming. All field I/O points and internal programming points shall be fully defined according to database naming conventions approved by the Owner. At a minimum, each database point shall be provided with a tag name, engineering unit, alarm parameters, and description.
- G. All PLC-generated process alarms, equipment statuses, and process variable values shall be available at any operator workstation.
- H. Failure of a PLC shall result in safe shutdown of associated process equipment. Interposing relays shall be provided where required to assure that equipment will revert to its fail-safe condition. Failure of any PLC or its communication shall be alarmed on the HMI computer.

3.03 EQUIPMENT CONTROL AND CONTROL MODE OVERVIEW

- A. The control descriptions correspond to the P&ID control hierarchical layers shown as process area, field panels, PLC, and Supervisory Control and Data Acquisition (SCADA).
- B. The control descriptions consist of four (4) control modes. There may be one (1) or more mode per loop depending on the process and associated equipment. Control modes consist of the following:
 - 1. Local Manual Control – This is the lowest layer of control and is typically located either in the process area located near the equipment or in the field panels at an equipment’s control panel or Motor Control Center (MCC).
 - 2. Local Auto Control – This layer of control is typically located in the field panels at the equipment’s control panel or MCC, either by hardwired relay logic or process specific PLCs. This control is most commonly used in batch processes or vendor supplied systems.
 - 3. Remote Manual Control – This layer of control is typically provided at the OIT/HMI. This control allows operators to manipulate process equipment remotely. Commands issued at the OIT/HMI are sent to the PLC where signals are generated to process equipment for control and monitoring.
 - 4. Remote Auto Control – The highest layer of control is done by the process control system PLC. In remote auto, operators typically enter a control setpoint at an OIT/HMI. Process instrumentation provides feedback signals to the PLC. The PLC is programmed to take the setpoints and feedback signals and to manipulate process equipment according to a specific algorithm. Any functions done in the operator workstations also take place at all the SCADA OITs.
- C. Descriptions for local control are included in the detailed equipment control descriptions. They are provided primarily for documentation purposes and for information. These controls are provided by the equipment vendors and require no programming effort with the exception of process interfacing, such as setpoint adjustments, etc.
- D. Descriptions for remote control are included in the detailed equipment control descriptions and are to be used by the Process Control System Integrator (PCSI) to program algorithms for process equipment control.

3.04 PLC PROGRAMMING FUNCTIONAL REQUIREMENTS

- A. The following covers functional requirements of the software, which are generic and may or may not be related to any specific control loop.
- B. Analog Scaling
1. Each analog input and output will be appropriately scaled for use in internal PLC programming, monitoring by the HMI computers, or transmission to other PLCs.
 2. Requirements for raw count values shall be coordinated with the Operator interface software to ensure compatibility.
- C. Flow Totalization:
1. Every reading that monitors the flow of the main water flow needs to be totalized daily.
 - a. Only values with a good value status are totalized.
 - b. All flow totals will be maintained in millions of gallons (MG) for MGD rates.
 - c. Flow rates and flow totals shall be indicated and recorded at the HMI.
 2. Running Total
 - a. The running total starts at the beginning of the day and totalizes the volume throughout the day.
 - b. At the end of the day, it resets that total and starts over.
 - c. Before the total is reset, it is stored for examination throughout the next day. Therefore, the flow total consists of two (2) values: the previous day's total and the total for the current day since midnight.
 - 1) For example: The total reading is calculated by integrating the minutely average of the MGD readings every minute. The minutely average needs to be scaled to millions of gallons per minute before it is totalized. While MGD units are used in this example, flow totalization may be for other volumetric flow units, such as gallons per minute (gpm), standard cubic feet per minute (scfm), etc.
 - d. The Applications Services Provider (ASP) shall provide flow totalization in the base units of the flow signal being totalized, unless stated otherwise in the Specifications.
 - e. Flow shall not be totalized:
 - 1) When a valve is closed or a pump is not running, the flow totalizer shall not accumulate values caused by noise or errors in calibration.
 - 2) If the analog signal is outside the 4-20 mA range.
 - 3) If the value of the flow input is less than 2 percent of the full range of the input.

$$MG_{Daily} = \sum_{1}^{1440} \frac{MGD_{MinAvg}}{60Min * 24Hours}$$

3. Each flow totalization shall come with a reset button on the HMI screen.

D. Equipment Runtimes and Starts

1. To support routine maintenance functions, all motorized equipment (pumps, motors, motorized gates, etc.) whose “run” status is monitored by a PLC, will have their runtime and number of starts accumulated by the respective PLC.
 - a. The runtime procedure will monitor the status of the equipment “run” contact and when the equipment is running, increment a software timer that maintains equipment runtime to within a one-minute resolution.
 - b. The timer shall stop incrementing, but not reset, when the “run” contact indicates that the equipment is not running.
 - c. The timer value shall increment an hour counter that maintains an integer value representing the equipment runtime in hours.
 - d. The counter value shall be available for display on the HMI computer.
2. Both the runtime and number of starts will continue to be collected until reset by an operator with permissions at the supervisor level and above. When reset, both values will be set to zero, and the date/time when it was reset will be noted. A manual reset of the runtime value shall be available at the HMI.
3. Two runtime parameters shall be provided for equipment:
 - a. Accumulated Runtime – Accumulates for the life of the equipment.
 - b. Resettable Runtime – Runtime with reset capabilities.

E. Equipment Availability

1. Remote Switch Monitoring
 - a. In general, equipment with PLC control has been provided with a local selector switch that transfers control to the PLC.
 - b. The PLC shall monitor the position of this switch to determine if the equipment is available for PLC control.
 - c. If the equipment is not available, the PLC program shall not attempt to implement remote manual or automatic status changes for the equipment.
 - d. The PLC program may, however, need to implement special routines if equipment unavailability affects a sequence (as described in the detailed equipment descriptions).
2. Equipment Out Of Service tag (OOS) Command
 - a. All controllable equipment is provided with the ability to have an operational tag applied to it.
 - b. Upon receiving an Out Of Service tag command from the Operator, the control logic will inhibit all remote controls of the equipment.

F. Power Faults and Maintained Outputs

1. The use of maintained control outputs to equipment should be evaluated to determine whether contacts need to be de-energized upon power loss, so equipment does not automatically energize upon restoration of power, and if any startup sequencing is needed. Utilize plant power monitoring systems to determine when utility power is lost and restored.

G. Maintained/Momentary Outputs

1. The need for maintained or momentary control outputs shall be determined from the I/O listing and the electrical schematics.
2. In general, equipment with only one (1) control output indicated in the I/O list shall be programmed for a maintained control output.
3. Equipment with two (2) (or more) control outputs shall be programmed for momentary outputs.
4. Provisions shall be made, in either case, to remove the active state (start, open, forward, initiate, etc.) control output when an equipment failure is sensed or when the equipment transitions from available to unavailable (local switch change).

H. Control Mode Transition:

1. Equipment Failures
 - a. Unless otherwise indicated in the equipment control descriptions, equipment in automatic mode shall be transitioned to manual mode (and stopped) if the equipment fails or becomes unavailable or if the PLC processor resets.
2. Manual/Auto Bumpless Transfer
 - a. Programming at the PLC shall be such that switching between manual and automatic control modes results in a smooth (bumpless) transition without upsetting the process or inadvertently changing equipment states.
 - b. Equipment running in local manual mode shall be tracked by the PLC code such that the PLC maintains the running status and speed setpoint when switching the equipment's Hand-Off-Auto (or Local-Remote) switch from Hand to Auto (or Local to Remote).
 - c. When switching equipment directly into an automatic proportional integral derivative (PID) or sequence type control function, the PLC shall use the tracking values (running status and speed) as initial values.
3. Equipment running or stopped in automatic mode shall remain running or stopped when manual mode is selected.
4. Peer-to-Peer Communications
5. If equipment tracking is via peer-to-peer communications (rather than hardwired interface) and the communications link goes down, the PLC shall be programmed to re-verify equipment running and speed status before allowing the switch to remote control mode.
6. This is intended to prevent PLC code from inadvertently shutting down equipment when communications are restored.

I. PID Tuning Parameters:

1. All tuning parameters for each PLC software PID controller are entered at the HMI.

2. Tuning trends are provided to tune and monitor each PID operation.
3. Tuning parameters settings are password protected.

3.05 ALARM CRITERIA

- A. Preclusion logic shall be added to all applicable alarms. This logic will prevent secondary alarms that are a direct result of a primary alarm from being annunciated. For example, station power failure should not cause a circuit breaker-tripped alarm to be annunciated.
- B. All software adjustable alarm setpoints accessible from the HMI shall have adjustable deadbands unless specifically noted otherwise.
- C. Plant personnel must acknowledge all alarms before they can be cleared. No alarm shall clear automatically until it has been acknowledged.
- D. Command Fault (Discrepancy) and Failure Alarms:
 1. For all controlled devices, such as pumps, valves, etc., if the device is commanded to Start or Stop (or Open or Close) by the PLC and the device feedback state does not match the commanded state within a pre-set time, a Command Fault Alarm is generated by the PLC for display and alarming at the HMI (valves shall remain in the last state).
 2. If a duty pump, or system, is commanded to start and does not start within the pre-set time, an alarm shall be generated by the PLC for display and alarming at the HMI and the standby pump shall start without operator intervention.
 3. If a device feedback state does not match the commanded state at any time, excluding the change of state described above, an Uncommanded Change of State Alarm is generated by the PLC for display and alarming at the HMI (valves shall remain in the last state).
 4. After a Command Fault Alarm occurs, the device cannot be started again until the Operator at the HMI has issued a Reset. All controlled devices with feedback shall generate Failure alarms at the PLC for display and alarming at the associated process graphic displays, even if not shown on the Drawings.
 5. All motors shall be programmed so that if a motor stops for any reason, it shall not be re-started automatically once the problem with the motor has been resolved.
 - a. The start command on the HMI shall not be a maintained contact but a momentary command to the PLC. The run status signals of all motors shall seal in the control output to the motor once the momentary start command drops out.
 - b. The run confirmations shall be on a five (5) second timer delay in that if the run confirmation is not present after five (5) seconds, the contact output to the motor from the PLC shall drop out. Thus, the only way a motor can be restarted after five (5) seconds by the SCADA system is if the Operator reinitiates the start command for that motor on the HMI or when that motor control at the HMI is placed in complete automatic mode and the SCADA OWS, through logic/interlocks, requests the motor to run.

E. Analog Alarms:

1. All analog alarms shall be generated at the HMI level as follows, with the exceptions of bad value processing and deviation alarms.
 - a. If the analog point's value exceeds or drops below the alarm limit value and set time delay has been passed, then an alarm shall be generated at the HMI for display and alarming.
 - b. To eliminate excessive alarm reporting, the analog point shall remain in alarm until the analog point's value returns beyond the limit set by the analog limit deadband.
2. All process analog inputs are displayed, historically collected, and trended. Low-low, low, high, and high-high alarms shall be calculated at the HMI for display and alarming.
 - a. Nuisance alarms, such as low turbidity, shall be inhibited.
 - b. When a valve is closed or a pump is not running, the analog flow signal associated with that valve or pump shall not generate a low flow alarm, and it shall be forced to a zero value.
3. When an analog signal goes outside the 4-20 mA range due to a failure at the instrument or PLC card, the following SCADA programming shall take place:
 - a. Alarm the signal at any local OITs and in the HMI system.
 - b. If the analog signal is associated with a control loop or ratio control loop, that loop shall go into manual.
 - c. If the analog signal is used in a calculation, that calculation shall use the last good analog signal. The computer shall place the control loop in manual if using the calculation.
4. Manual Override:
 - a. This capability is implemented within the PLC controller. Since scaling is processed at the controller, the manual override value (operator entered at the HMI) will be in engineering units, not raw counts. When a point is placed in manual override mode, the point's associated data quality is forced to be "Good" as well. Providing this capability in the controller allows the rest of the logic to operate in the manual override mode.
5. Data Quality
 - a. A key attribute of every analog input is its associated data quality. This is a simple Boolean value that indicates whether the analog reading can be trusted. The value is reset when the value is good, and it is set when it is bad. There are several checks done on the value before it is declared as "Good."
6. Bad Value Processing:
 - a. If the value is not in Manual Override, then the raw value needs to be processed further before it is converted into its engineering units.
 - b. Check to ensure the raw reading is within the limits of the instrument. These limits are specified on an individual point basis.
 - 1) Normally, the limits need to check over or under-range (open-loop) values, such as the raw count readings for 3-21mA on a 4-20mA instrument.
 - 2) Depending upon the process being monitored, it may require the range to be narrowed further. For example, a temperature instrument may have a range from

0 degrees F to 200 degrees F. If the process being measured is water temperature, then the readings should never get outside 40 degrees F to 100 degrees F.

- 3) By specifying this set of limits, any reading outside this range would indicate an instrument problem.
- 4) If the raw reading is outside these limits, the point's data quality would be set to "Bad."
- 5) The controller will not maintain the last good reading; values will be presented as processed by the controller.

7. Deviation Alarms:

- a. For all variable speed pumps, if the pump is commanded to run at a specific speed and the speed feedback signal deviates from the commanded speed by a pre-set deadband (initially set for 5 percent) for a pre-set time period (initially set for 30-seconds), a Speed Deviation alarm is generated by the PLC for display and alarming at the HMI.
- b. For all modulating valves, if the valve is commanded to a specific position, and the position feedback signal deviates from the requested position by a pre-set deadband (initially set for 5 percent) for a pre-set time period (initially set for 30-seconds), a Position Deviation alarm is generated by the PLC for display and alarming at the HMI.
- c. For all controlled setpoints (i.e., level, flow, etc.), if a process is requested to a specific setpoint, and the control variable feedback signal deviates from the requested setpoint by a pre-set deadband (initially set for 5 percent) for a pre-set time period (initially set for 30-seconds), a Setpoint Deviation alarm is generated by the PLC for display and alarming at the HMI.

F. Communication Alarms:

1. Provide specific communication status(es) for all Peer-to-Peer data communications. Upon a Peer-to-Peer communication failure, a communication failure alarm shall be generated at each PLC for display and alarming at the HMI. This communication failure alarm shall also be utilized for the associated control strategy.

END OF SECTION

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SECTION 13350.01
WAGNER BOOSTER PUMP STATION STANDBY GENERATOR UNIT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Specification section provides detailed control loop descriptions for the programming of the Process Control System by the Applications System Provider (ASP).

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Emergency Standby Generator Unit for Wagner Facilities.
- B. Process Overview
 - 1. A continuous electric power supply is provided by the Utility Service Company to the Pump Stations and Water treatment facilities and equipment.
 - 2. The main objective of the Standby Generator Control System is to ensure the continuous and reliable operation of critical equipment in the Wagner Booster Pump Station during power outages or electrical failures.

C. Associated Equipment

<u>Equipment Service Description</u>	<u>Equipment Tag Number</u>
Standby Generator Unit	EGU-100
ATS	ATS-100

D. Associated Instruments

<u>Instrument Service Description</u>	<u>Instrument Tag Number</u>
As per the vendor supplied control system	

E. Associated PLC

- 1. RTU-3

F. Associated Control Panels

- 1. EGU-100
- 2. SCADA Pack Panel

G. Associated P&ID(s)

- 1. I-100

3.02 CONTROLLER PROGRAMMING

A. Local Manual Control Mode

1. Only for maintenance or test purposes the generator can be started locally.

B. Local Automatic Control Mode

1. The ATS constantly monitors the incoming utility power. When a power failure is detected, it initiates the startup sequence of the standby generator.
 - a. The Generator Control Panel oversees the startup process, ensuring a smooth transition to generator power.
 - b. The standby generator is set to start automatically within 60 seconds of a power outage.
 - c. Once the generator is running, the control system monitors its performance, including voltage, frequency, and any alarms or anomalies.
 - d. When utility power is restored, the ATS switches the load back to the normal power source and initiates a cooldown and shutdown sequence for the standby generator.
2. The generator shall automatically start and run for 30 minutes once per week.

C. Remote Manual Control Mode

1. The operator can remotely start and stop the generator from the HMI.

D. Remote Automatic Control Mode

1. There is no remote automatic control mode.

E. Software Permissives

1. As per the vendor supplied control system.
2. While the ATS is in GEN PWR and the Generator is Running, only one pump will be permitted to run at a time.

F. Hardwired Interlocks

1. ATS-100 - No Utility Power.

G. Calculated Alarms and Variables

1. There are no calculated alarms and variables.

H. Power Failure

1. Power failure does not apply for this equipment.

3.03 SYSTEM CONFIGURATION

A. Status

1. The HMI shall indicate the following statuses at a minimum:
 - a. Generator Running.
- B. Setpoints
 1. The HMI shall include the following setpoints at a minimum:
 - a. There are no setpoints.
- C. Trending
 1. All PLC inputs, outputs and setpoints shall be recorded for trending at the HMI.
- D. Alarms
 1. The HMI shall indicate the following alarms at a minimum:
 - a. EGU Emergency Stop.
 - b. EGU Common Alarm.
 - c. EGU Fail.
 - d. EGU Fuel Tank Low Level.
- E. HMI Requirements
 1. Equipment and instrumentation shall be depicted on the HMI screen. Displays shall be per the Owners' current HMI Standards and Conventions.

END OF SECTION

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SECTION 13350.02
LEISSNER BOOSTER PUMP STATION STANDBY GENERATOR UNIT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Specification section provides detailed control loop descriptions for the programming of the Process Control System by the Applications System Provider (ASP).

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Emergency Standby Generator Unit for Leissner Booster pump station.
- B. Process Overview
 - 1. A continuous electric power supply is provided by the Utility Service Company to the Pump Stations and Water treatment facilities and equipment.
 - 2. The main objective of the Standby Generator Control System is to ensure the continuous and reliable operation of critical equipment in the Leissner Booster Pump Station during power outages or electrical failures.

C. Associated Equipment

<u>Equipment Service Description</u>	<u>Equipment Tag Number</u>
Standby Generator Unit	EGU-200
ATS	ATS-200

D. Associated Instruments

<u>Instrument Service Description</u>	<u>Instrument Tag Number</u>
As per the vendor supplied control system	

E. Associated PLC

- 1. SCADA Panel

F. Associated Control Panels

- 1. EGU-200
- 2. SCADA Pack Panel

G. Associated P&ID(s)

1. I-200

3.02 CONTROLLER PROGRAMMING

A. Local Manual Control Mode

1. Only for maintenance or test purposes the generator can be started locally.
2. The ATS constantly monitors the incoming utility power. When a power failure is detected, it initiates the startup sequence of the standby generator.
 - a. The Generator Control Panel oversees the startup process, ensuring a smooth transition to generator power.
 - b. The standby generator is set to start automatically within 60 seconds of a power outage.
 - c. Once the generator is running, the control system monitors its performance, including voltage, frequency, and any alarms or anomalies.
 - d. When utility power is restored, the ATS switches the load back to the normal power source and initiates a cooldown and shutdown sequence for the standby generator.
3. The generator shall automatically start and run for 30 minutes once per week.

B. Remote Manual Control Mode

1. The operator can remotely start and stop the generator from the HMI.

C. Remote Automatic Control Mode

1. There is no remote automatic control mode.

D. Software Permissives

1. As per the vendor supplied control system.
2. While the ATS is in GEN PWR and the Generator is Running, only one pump will be permitted to run at a time.

E. Hardwired Interlocks

1. ATS-200 No Utility Power.

F. Calculated Alarms and Variables

1. There are no calculated alarms and variables.

G. Power Failure

1. Power failure does not apply for this equipment.

3.03 SYSTEM CONFIGURATION

A. Status

1. The HMI shall indicate the following statuses at a minimum:
 - a. Generator Running.

B. Setpoints

1. The HMI shall include the following setpoints at a minimum:
 - a. There are no setpoints.

C. Trending

1. All PLC inputs, outputs and setpoints shall be recorded for trending at the HMI.

D. Alarms

1. The HMI shall indicate the following alarms at a minimum:
 - a. EGU Emergency Stop.
 - b. EGU Common Alarm.
 - c. EGU Fail.
 - d. EGU Fuel Tank Low Level.

E. HMI Requirements

1. Equipment and instrumentation shall be depicted on the HMI screen. Displays shall be per the Owners' current HMI Standards and Conventions.

END OF SECTION

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SECTION 13350.03
DEAD MAN WELL FACILITIES STANDBY GENERATOR UNIT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Specification section provides detailed control loop descriptions for the programming of the Process Control System by the Applications System Provider (ASP).

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Emergency Standby Generator Unit for Dead Man Well Facilities.
- B. Process Overview
 - 1. A continuous electric power supply is provided by the Utility Service Company to the Pump Stations and Water treatment facilities and equipment.
 - 2. The main objective of the Standby Generator Control System is to ensure the continuous and reliable operation of critical equipment in the Dead Man Well facilities during power outages or electrical failures.

C. Associated Equipment

<u>Equipment Service Description</u>	<u>Equipment Tag Number</u>
Standby Generator Unit	EGU-300
ATS-300	ATS

D. Associated Instruments

<u>Instrument Service Description</u>	<u>Instrument Tag Number</u>
As per the vendor supplied control system	

E. Associated PLC

- 1. SCADA Pack

F. Associated Control Panels

- 1. EGU-300
- 2. SCADA Pack Panel

G. Associated P&ID(s)

1. I-300

3.02 CONTROLLER PROGRAMMING

A. Local Manual Control Mode

1. Only for maintenance or test purposes the generator can be started locally.

B. Local Automatic Control Mode

1. The ATS constantly monitors the incoming utility power. When a power failure is detected, it initiates the startup sequence of the standby generator.
 - a. The Generator Control Panel oversees the startup process, ensuring a smooth transition to generator power.
 - b. The standby generator is set to start automatically within 60 seconds of a power outage.
 - c. Once the generator is running, the control system monitors its performance, including voltage, frequency, and any alarms or anomalies.
 - d. When utility power is restored, the ATS switches the load back to the normal power source and initiates a cooldown and shutdown sequence for the standby generator.
2. The generator shall automatically start and run for 30 minutes once per week.

C. Remote Manual Control Mode

1. The operator can remotely start and stop the generator from the HMI.

D. Remote Automatic Control Mode

1. There is no remote automatic control mode.

E. Software Permissives

1. As per the vendor supplied control system.
2. While the ATS is in GEN PWR and the Generator is Running, only one pump will be permitted to run at a time.

F. Hardwired Interlocks

1. ATS-300 No Utility Power.

G. Calculated Alarms and Variables

1. There are no calculated alarms and variables.

H. Power Failure

1. Power failure does not apply for this equipment.

3.03 SYSTEM CONFIGURATION

A. Status

1. The HMI shall indicate the following statuses at a minimum:
 - a. Generator Running.

B. Setpoints

1. The HMI shall include the following setpoints at a minimum:
 - a. There are no setpoints.

C. Trending

1. All PLC inputs, outputs and setpoints shall be recorded for trending at the HMI.

D. Alarms

1. The HMI shall indicate the following alarms at a minimum:
 - a. EGU Emergency Stop.
 - b. EGU Common Alarm.
 - c. EGU Fail.
 - d. EGU Fuel Tank Low Level.

E. HMI Requirements

1. Equipment and instrumentation shall be depicted on the HMI screen. Displays shall be per the Owners' current HMI Standards and Conventions.

END OF SECTION

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SECTION 13350.04
WELLS RANCH FACILITIES STANDBY GENERATOR UNIT NO. 1

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Specification section provides detailed control loop descriptions for the programming of the Process Control System by the Applications System Provider (ASP).

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Emergency Standby Generator Unit for Wells Ranch facilities.
- B. Process Overview
1. A continuous electric power supply is provided by the Utility Service Company to the Pump Stations and Water treatment facilities and equipment.
 2. The main objective of the Standby Generator Control System is to ensure the continuous and reliable operation of critical equipment in the Wells Ranch facilities during power outages or electrical failures.

C. Associated Equipment

<u>Equipment Service Description</u>	<u>Equipment Tag Number</u>
Standby Generator Unit	EGU-400
ATS	ATS-400

D. Associated Instruments

<u>Instrument Service Description</u>	<u>Instrument Tag Number</u>
As per the vendor supplied control system	

E. Associated PLC

1. Master PLC

F. Associated Control Panels

1. EGU-400
2. Master PLC Panel

G. Associated P&ID(s)

G. Associated P&ID(s)

1. I-400

3.02 CONTROLLER PROGRAMMING

A. Local Manual Control Mode

1. Only for maintenance or test purposes the generator can be started locally.

B. Local Automatic Control Mode

1. The ATS constantly monitors the incoming utility power. When a power failure is detected, it initiates the startup sequence of the standby generator.
 - a. The Generator Control Panel oversees the startup process, ensuring a smooth transition to generator power.
 - b. The standby generator is set to start automatically within 60 seconds of a power outage.
 - c. Once the generator is running, the control system monitors its performance, including voltage, frequency, and any alarms or anomalies.
 - d. When utility power is restored, the ATS switches the load back to the normal power source and initiates a cooldown and shutdown sequence for the standby generator.
2. The generator shall automatically start and run for 30 minutes once per week.

C. Remote Manual Control Mode

1. The operator can remotely start and stop the generator from the HMI.

D. Remote Automatic Control Mode

1. There is no remote automatic control mode.

E. Software Permissives

1. As per the vendor supplied control system.
2. While the ATS is in GEN PWR and the Generator is Running, only one pump will be permitted to run at a time.

F. Hardwired Interlocks

1. ATS-400 No Utility Power.

G. Calculated Alarms and Variables

1. There are no calculated alarms and variables.

H. Power Failure

1. Power failure does not apply for this equipment.

3.03 SYSTEM CONFIGURATION

A. Status

1. The HMI shall indicate the following statuses at a minimum:
 - a. Generator Running.

B. Setpoints

1. The HMI shall include the following setpoints at a minimum:
 - a. There are no setpoints.

C. Trending

1. All PLC inputs, outputs and setpoints shall be recorded for trending at the HMI.

D. Alarms

1. The HMI shall indicate the following alarms at a minimum:
 - a. EGU Emergency Stop.
 - b. EGU Common Alarm.
 - c. EGU Fail.
 - d. EGU Fuel Tank Low Level.

E. HMI Requirements

1. Equipment and instrumentation shall be depicted on the HMI screen. Displays shall be per the Owners' current HMI Standards and Conventions.

END OF SECTION

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SECTION 13350.05
WELLS RANCH FACILITIES STANDBY GENERATOR UNIT NO. 2

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Specification section provides detailed control loop descriptions for the programming of the Process Control System by the Applications System Provider (ASP).

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Emergency Standby Generator Unit for Wells Ranch facilities.
- B. Process Overview
 - 1. A continuous electric power supply is provided by the Utility Service Company to the Pump Stations and Water treatment facilities and equipment.
 - 2. The main objective of the Standby Generator Control System is to ensure the continuous and reliable operation of critical equipment in the Wells Ranch facilities during power outages or electrical failures.

C. Associated Equipment

<u>Equipment Service Description</u>	<u>Equipment Tag Number</u>
Standby Generator Unit	EGU-500
ATS	ATS-500

D. Associated Instruments

<u>Instrument Service Description</u>	<u>Instrument Tag Number</u>
As per the vendor supplied control system	

E. Associated PLC

- 1. Master PLC

F. Associated Control Panels

- 1. EGU-500
- 2. Master PLC Panel

G. Associated P&ID(s)

- 1. I-500

3.02 CONTROLLER PROGRAMMING

A. Local Manual Control Mode

1. Only for maintenance or test purposes the generator can be started locally.

B. Local Automatic Control Mode

1. The ATS constantly monitors the incoming utility power. When a power failure is detected, it initiates the startup sequence of the standby generator.
 - a. The Generator Control Panel oversees the startup process, ensuring a smooth transition to generator power.
 - b. The standby generator is set to start automatically within 60 seconds of a power outage.
 - c. Once the generator is running, the control system monitors its performance, including voltage, frequency, and any alarms or anomalies.
 - d. When utility power is restored, the ATS switches the load back to the normal power source and initiates a cooldown and shutdown sequence for the standby generator.
2. The generator shall automatically start and run for 30 minutes once per week.

C. Remote Manual Control Mode

1. The operator can remotely start and stop the generator from the HMI.

D. Remote Automatic Control Mode

1. There is no remote automatic control mode.

E. Software Permissives

1. As per the vendor supplied control system.
2. While the ATS is in GEN PWR and the Generator is Running, only one pump will be permitted to run at a time.

F. Hardwired Interlocks

1. ATS-500 No Utility Power.

G. Calculated Alarms and Variables

1. There are no calculated alarms and variables.

H. Power Failure

1. Power failure does not apply for this equipment.

3.03 SYSTEM CONFIGURATION

A. Status

1. The HMI shall indicate the following statuses at a minimum:
 - a. Generator Running.
- B. Setpoints
 1. The HMI shall include the following setpoints at a minimum:
 - a. There are no setpoints.
- C. Trending
 1. All PLC inputs, outputs and setpoints shall be recorded for trending at the HMI.
- D. Alarms
 1. The HMI shall indicate the following alarms at a minimum:
 - a. EGU Emergency Stop.
 - b. EGU Common Alarm.
 - c. EGU Fail.
 - d. EGU Fuel Tank Low Level.
- E. HMI Requirements
 1. Equipment and instrumentation shall be depicted on the HMI screen. Displays shall be per the Owners' current HMI Standards and Conventions.

END OF SECTION

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SECTION 13420
PROGRAMMABLE LOGIC CONTROLLERS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section includes Programmable Logic Controllers (PLCs) for control of process equipment, process-oriented machinery, and process systems.
- B. Associated Sections

This section encompasses the equipment and services specified in the following sections:

<u>SECTION</u>	<u>SPEC TITLE</u>
13300	Process Control Systems General Provisions
13310	Application Engineering Services
13315	Process Control System Submittals
13320	Process Control System Testing
13340	Process Control System Input/Output List

1.02 SUBMITTALS

- A. Submittals shall be per Section 13300 – Process Control System General Provisions and Section 13315 – Process Control System Submittals.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications
 1. A qualified manufacturer shall be capable of providing training, parts, and coordination of emergency maintenance and repairs.
 2. The manufacturer shall have a local office within 100 miles of the jobsite or have technicians available on-site within four hours of emergency notification.
 3. The manufacturer shall have a local full-time staff of employees that have developed and commissioned a minimum of three (3) new SCADAPacks based systems within the past 12 months. The manufacturer must have a minimum of five (5) years' experience designing, installing, and commissioning Supervisory Control and Data Acquisition (SCADA) systems.
 4. The manufacturer shall have a minimum of three (3) full-time employees qualified to perform the SCADA system work.
- B. The manufacturer of this equipment shall have produced similar equipment for a minimum of five (5) years. When requested by the Owner/Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

- C. The programmable controller and all the corresponding components within the family of controller products shall be manufactured by a company that regularly manufactures and services this type of equipment.
- D. The manufacturer shall comply with the ISO 9001 standards for “Quality Systems – Model for Quality Assurance in Design/Development, Production, Installation, and Servicing.”
- E. The manufacturer shall provide complete technical support for all the products. This shall include factory or on-site training, regional application centers, local or factory technical assistance, and a 24/7/365 technical support phone service.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver PLC components in packaging designed to prevent damage from static electricity and physical damage.
- B. Store PLC equipment according to manufacturer requirements. At a minimum, store indoors in clean, dry space with uniform temperature to prevent condensation. Protect PLCs from exposure to dirt, fumes, water, corrosive substances, and physical damage. Also, protect the PLC from all forms of electrical and magnetic energy that could reasonably cause damage.

1.05 NOMENCLATURE AND IDENTIFICATION DEFINITIONS

- A. AI: Analog Input.
- B. AO: Analog Output.
- C. Fixed I/O: A PLC style consisting of a fixed number of I/O, a processor, and a power supply all in one (1) enclosure. Some fixed PLCs have limited expansion ability.
- D. CPU: Central Processing Unit.
- E. DI: Discrete Input.
- F. Distributed I/O: Hardware specially designed to function as Remote I/O.
- G. DO: Discrete Output.
- H. HMI: Human-Machine Interface.
- I. I/O: Input and/or Output.
- J. Master/Slave: Communication between devices in which one (1) device, the master, controls all communications. The other devices, the slaves, respond only when queried by the master. Typically used in a Remote I/O application.
- K. Modular I/O: A PLC style consisting of cards that are assembled to comprise a complete unit. All I/O, CPU, and Power Supply are dedicated cards. Typically, these cards are inserted into a chassis.

- L. Peer-to-Peer: Communication between two (2) or more devices, typically PLCs, in which each device can control the communication exchange.
- M. PID: Control action, proportional plus integral plus derivative.
- N. PLC: Programmable Logic Controller.
- O. Remote I/O: I/O that is located remotely from the processor. Remote I/O can communicate over a variety of communication protocols and can use standard rack based I/O, or special Remote I/O hardware referred to as Distributed I/O.
- P. SCADA: Supervisory Control and Data Acquisition.

1.06 WARRANTY

- A. The manufacturer shall warrant the equipment to be free from defects in material and workmanship for two (2) years from the date of acceptance of the equipment containing the items specified in this section. Within such a period of warranty, the manufacturer shall promptly furnish all material and labor necessary to return the equipment to new operating condition. Any warranty work requiring shipping or transporting of the equipment shall be performed by the Contractor at no expense to the Owner.

1.07 SPARE PARTS

- A. Refer to Section 13300 – Process Control System General Provisions.
- B. All spare parts shall be packaged to prevent damage during long-term storage. Identify all packages with indelible markings on the exterior describing contents.
- C. Provide complete ordering information including manufacturer, part number, part name, hardware and software revision levels, and equipment for which the part is to be used.

1.08 SPARE I/O AND SLOTS

- A. Refer to Section 13340 – Input/Output List for summaries of I/O type quantities for each PLC.
- B. Each panel containing PLC I/O shall include at least 20% (minimum of four (4)) spare points of each type (AI, AO, DI, and DO) for future use, regardless of whether any of those point types are used in that panel or not. The spares shall be the same type of I/O modules supplied.
- C. For chassis-based PLC systems, provide at least two (2) spare slots for the addition of future I/O in each chassis provided. For non-chassis-based PLC systems, provide adequate space to the right of the last I/O card in each row of I/O cards for at least two (2) future I/O cards (width should be based on the widest I/O card provided in the panel).
- D. Spare output points that require the use of an external relay shall be supplied with the external relay.
- E. All installed unused points on all I/O modules shall be wired to terminal blocks in the order that they occur on the I/O modules. Unwired spares shall not be acceptable.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable.
 - 1. Programmable Logic Controller
 - a. SCADAPack 32
 - 2. Category 6 Shielded Cable
 - a. Superior Essex CAT6 04-001-62
 - b. Belden DataTuff 7953A
 - c. Approved equal

2.02 GENERAL

- A. Provide PLC equipment with the required memory and functional capacity to perform the specified sequence of operation with the scheduled input and output points.
- B. PLC systems shall include processors, memory cards, power supplies, input/output modules, communication modules, redundancy modules, and remote interface modules as required to satisfy project requirements.
 - 1. Provide memory cards for all PLC CPUs provided on this project.
- C. Furnish products listed and classified by Underwriters Laboratories (UL), Canadian Standards Association (CSA), or Factory Mutual (FM) approval as suitable for the purpose specified and indicated.
- D. All equipment and devices furnished hereunder shall be designed for continuous industrial service. The system shall contain products of a single manufacturer, insofar as possible, and shall consist of equipment models that are currently in production.
- E. The PLCs shall communicate between the HMI Server and field-mounted transducers, switches, controllers, and process actuators. The communications protocol shall be completely transparent to process operators at the HMI.
- F. All equipment furnished shall be designed and constructed so that in the event of power interruption the systems shall go through an orderly shutdown with no loss of memory and resume normal operation without manually resetting when power is restored.
- G. The PLC shall be capable of stand-alone operation in the event of failure of the communication link to the HMI subsystem.
- H. Remote Input/Output Units shall include input/output modules, interface modules, communication modules, and power supply to meet system input and output requirements.

I. Agency and Environmental Specifications

1. Electrical supply voltage to the PLC shall be 120 VAC, ± 15 percent, 48-63Hz. PLC system power supplies shall be fused for overload protection.
2. Vibration: 7 mm Peak-to-Peak, 5-9Hz: 1.0G, 9-150\Hz. The method of testing is to be based upon IEC 68-2-6 and JIS C 0911 standards for vibration. The system is to be operational during and after testing. Vibration Rating of 2.0G maximum peak acceleration for 10 to 500Hz in accordance with at least one (1) of the following:
 - a. In compliance with IEC 60068 and IEC 61131.
3. Shock: 15G, 15msec. The method of testing is to be based upon IEC 68-2-27 and JIS C 0912 standards for shock. The system is to be operational during and after testing.
4. Temperature: All PLC hardware shall operate at an ambient temperature of -40° to 55°C (-40° to 140°F) with a storage ambient temperature rating of -25° to 70°C (-40° to 185°F).
5. Relative Humidity: The Programmable Controller hardware shall function continuously in the relative humidity range of 5 to 95 percent non-condensing.
6. Degree of protection: NEMA 1 (IP20).
7. All products shall have corrosion protection.

J. All major assemblies and sub-assemblies, circuit boards, and devices shall be identified using permanent labels or markings indicating:

1. Modules product type such as analog or digital.
2. Modules catalog number.
3. Modules major revision number.
4. Modules minor revision number.
5. Modules manufacturer vendor.
6. Modules serial number.

K. All necessary cables shall be included. All cables and connectors shall be as specified by the manufacturer. Cables shall be assembled and installed per the manufacturer's recommendations.

2.03 EXPANSION MODULES

- A. The DI and DO expansion modules shall be compatible with the existing SCADAPack PLC.
- B. The DI expansion module shall have a minimum of eight (8) digital inputs.
- C. The DO expansion module shall have a minimum of eight (8) digital outputs.

- D. The expansion modules shall be supplied with the necessary cable to connect to the existing SCADAPack PLC.

2.04 PLC/RIO CHASSIS

- A. All system and signal power to the CPU and support modules shall be distributed on the backplane. No interconnecting wiring between these modules via plug-terminated jumpers shall be acceptable.
- B. All system modules, main, and expansion chassis shall be designed to provide free air flow convection cooling. No internal fans or other means of cooling, except heat sinks, shall be permitted.
- C. Modules shall be designed to plug into a chassis and to be keyed to allow installation in only one (1) direction. The design must prohibit upside down insertion of the modules as well as safeguard against the insertion of a module into the wrong slot or chassis via an electronic method for identifying a module. Electronic keying shall perform an electronic check to ensure that the physical module is consistent with what was configured.

2.05 COMMUNICATION INTERFACES

- A. The PLC shall be capable of the following communication protocols as shown on the Drawings:
 - 1. 10BASE-T/100BASE-TX Ethernet communication.
 - 2. Ethernet IP.
 - 3. Modbus (RTU and ASCII) for up to 247 slaves.
- B. Ports
 - 1. 100MB/1G Ethernet
- C. When required, provide a Communications Interface Module mounted in the chassis or the equivalent port directly on the CPU.

2.06 PLC SOFTWARE

- A. The PCSI shall provide a PLC configuration and application development software package complete with documentation and disks. The PLC software package and associated licensing and/or activation shall be installed on the computers as shown in the Drawings.
- B. The software package shall allow on-line/off-line program development, annotation, monitoring, debugging, uploading, and downloading of programs to the PLCs.
- C. All hardware required (including cables, cable adapters, etc.) for connection to the PLCs shall be furnished.
- D. All software licenses required to achieve the functionality described in the Specifications shall be provided and shall be licensed to the Owner.

- E. All software shall be of the latest available revision.
- F. The software package shall include a software license agreement allowing the Owner the right to use the software as required for any current or future modification, documentation, or development of the PLCs furnished for this project.
- G. The software provided shall be capable of the following IEC 61131-3 functions:
 - 1. Ladder logic.
 - 2. Function block.
 - 3. Sequential function chart.
 - 4. Structure text.
- H. In addition to the above editors, an add-on instruction editor shall work with any of the above-mentioned editors to create custom reusable function blocks. This software shall allow any of the derived function blocks to be modified online.
- I. The software shall be Microsoft Windows-based and run on the supplied computers.
- J. The software shall include a security feature to prevent unauthorized personnel from modifying and downloading the programs.
- K. Provide an I/O simulator that allows the PLC application load program to be tested on a PC with simulated analog and digital inputs and outputs, allowing I/O testing and debugging to be performed in a safe, isolated environment without the need for running the PLC CPU and process I/O boards.

2.07 CATEGORY 6 SHIELDED CABLE

- A. Shielded twisted pair cable shall be designed for use with a gigabit communications network.
- B. Cable shall meet the requirements of the ANSI/TIA-568 specification for Category 6 (CAT6), Shielded Twisted Pair (STP) cable, tested up to 250MHz.
- C. Constructed from 23AWG, solid, bare copper wire insulated. Two insulated conductors shall be twisted together to form a pair and four pairs shall be laid up to form the basic unit.
- D. Jacketed in flame-retardant PVC.
- E. Outer shield of aluminum tape (F/UTP, F/FTP, or SF/UTP).

PART 3 EXECUTION

3.01 GENERAL INSTALLATION

- A. Maintain area free of dirt and dust during and after installation of programmable controller products.

- B. Anchor PLCs within enclosures as recommended by the PLC manufacturer.
- C. Ventilation slots shall not be blocked or obstructed by any means.
- D. Examine areas, surface, and substrates to receive PLCs for compliance with requirements, installation tolerances, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Install in accordance with the manufacturer's instructions.
- F. Unload, unpack, and transport equipment to prevent damage or loss.
- G. Replace damaged components as directed by ENGINEER.

3.02 PANEL LAYOUT

- A. Coordinate size and configuration of enclosure to meet project requirements. Drawings indicate maximum dimensions for PLCs and minimum clearances between PLCs, adjacent surfaces, and other items.
- B. Comply with indicated maximum dimensions and clearances, or with PLC vendors' required distances if they are greater than the distances indicated.
 - 1. Provide spacing around the PLC as required by the PLC manufacturer to ensure adequate cooling. Ensure that the air surrounding the PLC has been conditioned to maintain the required temperature and humidity range.
 - 2. Wires entering and exiting PLC components shall be sized to comply with the PLC manufacturer's requirements. The doors on all components shall be fully closed when all the wires are installed.
 - 3. For chassis-mounted PLCs, no wiring, wire ducts, or other devices shall obstruct the removal of cards from the rack.
 - 4. PLC lights, keys, communication ports, and memory card slots shall be accessible at all times. Lights shall be visible at all times when the enclosure door is opened.
 - 5. The control panel designer shall provide independent line fuses or circuit breakers, per the PLC manufacturer recommendation, for each power supply, input module, output module, and other modules with separately derived power requirements.
 - 6. The control panel designer shall ensure that communication signals, 4-20 mA signals (including those with embedded HART), are properly conditioned for the PLC and protected from all sources of radiated energy or harmonics.
 - 7. Where multiple mechanical components are provided for process redundancy, arrange their field connections to I/O modules such that the failure of a single module will not disable all mechanical components associated with the process (e.g., inputs and outputs for redundancy device 1 shall reside on different modules than the inputs and outputs for redundancy device 2, etc.), irrespective of the number of used points resulting from this

configuration. This applies to all I/O types. The acceptability of the I/O arrangement shall be at the discretion of the Engineer.

8. Provide all required cables, cords, and connective devices for interface with other control system components.

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SECTION 13460
CONTROL PANEL ENCLOSURES AND PANEL EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section includes control panel enclosures and panel equipment for control of process equipment, process-oriented machinery, and process systems.
- B. Associated Sections

This section encompasses the equipment and services specified in the following sections:

<u>SECTION</u>	<u>SPEC TITLE</u>
13300	Process Control Systems General Provisions
13310	Application Engineering Services
13315	Process Control System Submittals
13320	Process Control System Testing
13340	Process Control System Input/Output List

1.02 SUBMITTALS

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.
- B. Descriptive literature, bulletins, catalog cuts, and Drawings for the equipment specified herein.
- C. Complete bill of materials for the equipment.
- D. Spare parts list.
- E. Panel Layout Drawings and Wiring Diagrams Submittal
 - 1. Where direct hardwired interfaces exist between the PCSS control panels and vendor provided control panels furnished under other Divisions, the Contractor shall provide to the PCSS the approved submittals in order for the PCSS to provide complete wiring diagrams showing all wiring connections in the I/O system. This includes but is not limited to terminal block numbering, relay contact information, instruments, equipment, and control panel names. These drawings shall be included in the Final O&M submittal. Leaving this information blank on the Final Documentation drawings is not acceptable.
 - 2. Panel Layout Drawings: Drawings shall be furnished for all panels, consoles, and equipment enclosures specified. Panel assembly and elevation drawings shall be drawn to scale and detail all equipment in or on the panel. At a minimum, the panel drawings shall include the following:
 - a. Interior and exterior panel elevation drawings to scale.
 - b. Nameplate schedule.
 - c. Conduit access locations.
 - d. Panel construction details.

- e. Cabinet assembly and layout drawings to scale. The assembly drawing shall include a bill of material on the drawing with each panel component clearly defined. The bill of material shall be cross-referenced to the assembly drawing so that a non-technical person can readily identify any component of the assembly by manufacturer and model number.
 - f. Fabrication and painting specifications including color (or color samples).
 - g. Construction details, NEMA ratings, intrinsically safe barrier information, gas sealing recommendations, purging system details, etc. for panels located in hazardous locations or interfacing to equipment located in hazardous areas.
 - h. For every control panel, heating and cooling calculations for each panel supplied indicating conformance with cooling requirements of the supplied equipment and environmental conditions. Calculations shall include the recommended type of equipment required for both heating and cooling. Calculations shall include sun shields where installed.
 - i. Submit evidence that all control panels shall be constructed in conformance with UL 508 and bear the UL seal confirming the construction. Specify if UL compliance and seal application shall be accomplished at the fabrication location or by field inspection by UL inspectors. All costs associated with obtaining the UL seal and any inspections shall be borne by the Contractor.
 - j. Panel drawings shall be 11" x17" in size.
3. Panel Wiring Diagrams: Panel wiring diagrams depicting wiring within and on the panel, as well as connections to external devices. If Loop Wiring Diagrams are not specified below, equipment external to the control panel and related external connections shall be shown on the Panel Wiring Diagrams.
- a. Panel wiring diagrams shall include power and signal connections, UPS and normal power sources, all panel ancillary equipment, protective devices, wiring and wire numbers, and terminal blocks and numbering.
 - b. Wiring labeling used on the drawings shall match that shown on the Contract Documents or as developed by the PCSS and approved by the Engineer.
 - c. I/O wiring shall be numbered with rack number, slot number, and point number.
 - d. Two-wire and four-wire equipment shall be clearly identified and power sources noted. Submit final wire numbering scheme.
 - e. Panel drawings shall be 11" x17" in size.
4. Loop Wiring Diagrams: Not required

1.03 QUALITY ASSURANCE

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

1.05 NOMENCLATURE AND IDENTIFICATION DEFINITIONS

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

1.06 WARRANTY

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

1.07 SPARE PARTS

- A. None required.

1.08 TECHNOLOGY OBSOLESCENCE AND MITIGATION

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable.
 - 1. Hoffman.
 - 2. Engineer Approved Equal.

2.02 GENERAL

- A. The dimensions within this Section and on the Contract Drawings are for general reference only. Ensure that final enclosure sizing and panel arrangements accommodate all required equipment for a fully integrated and operational system as specified herein and in the Contract Documents.
- B. Each control panel and terminal cabinet shall bear the UL label. The UL label shall apply to the enclosure, the specific equipment supplied with the enclosure, and the installation and wiring of the equipment within and on the enclosure. If required for UL labeling, provide ground fault protective devices, isolation transformers, fuses, and any other equipment necessary to achieve compliance with UL 508 requirements. The Drawings do not detail all UL 508 requirements.
- C. All panel doors shall have a lock installed in the door handle, or a hasp and staple for padlocking. Locks for all panels provided under this Contract shall be keyed alike.
- D. The devices designated for rear-of-panel mounting shall be arranged within the panel according to respective panel drawings and in a manner to allow for ease of maintenance and adjustment. Heat generating devices such as power supplies shall be located at or near the top of the panel.
- E. The panels shall be completely fabricated, and instruments and devices installed and wired at the PCSS's facility.
- F. All components shall be mounted in a manner that shall permit servicing, adjustment, testing, and removal without disconnecting, moving, or removing any other component. Components mounted on the inside of panels shall be mounted on removable plates and not directly to the enclosure. Mounting shall be rigid and stable unless shock mounting is required otherwise by

the manufacturer to protect equipment from vibration. Component mounting shall be oriented in accordance with the manufacturer's recommendations. The internal components shall be identified with suitable plastic or metal engraved nametags mounted adjacent to (not on) each component identifying the component in accordance with the drawing, specifications, and PCSS's data.

- G. All exterior panel mounted equipment shall be installed with suitable gaskets, faceplates, etc. required to maintain the NEMA rating of the panel.
- H. Nameplates
 - 1. All panels and panel devices shall be supplied with suitable nameplates, which identify the panel and individual devices as required. Unless otherwise indicated, each device nameplate shall include up to three lines with the first line containing the device tag number as shown on the drawings, the second line containing a functional description (e.g., Recirculation Pump No. 1), and the third line containing a functional control description (e.g., Start).
 - 2. Unless escutcheon plates are specified or unless otherwise noted on the Drawings, nameplates shall be 3/32-inch thick, black and white, Lamicoid with engraved inscriptions. The letters shall be Black against a White background unless otherwise noted. Edges of the nameplates shall be beveled and smooth. Nameplates with chipped or rough edges will not be acceptable.
 - 3. Nameplate fasteners and mounting shall be epoxy adhesive or stainless steel screws for cabinet mounted nameplates.
 - 4. For every panel, provide a panel nameplate with a minimum of 1" high letters. Provide legend plates or 1-in by 3-in engraved nameplates with 1/4-in lettering for identification of door mounted control devices, pilot lights, and meters.
 - 5. Single Lamicoid nameplates with multiple legends shall be used for grouping of devices such as selector switches and pilot lights that relate to one function.
- I. Mounting Elevations
 - 1. ISA Recommended Practice RP60.3 shall be used as a guide in layout and arrangement of panels and panel mounted components. Dimensions shall account for all housekeeping pads that panels will sit on once they are installed.
 - 2. Centerline of indicators and controllers shall be located no lower than 48-inches or higher than 66-inches above the floor on a panel face.
 - 3. Centerline of lights, selector switches, and pushbuttons shall be located no lower than 32-inches or higher than 70-inches above the floor on a panel face.
 - 4. Tops of annunciators shall be located no higher than 86-inches above the floor on a panel face.
 - 5. Installation of panel components shall conform to component manufacturers' guidelines.

2.03 PANEL MATERIALS AND CONSTRUCTION

A. Structure and Enclosure

1. Panels shall be of continuous welded-steel or FRP construction as shown on the Panel Schedule. Provide angle stiffeners as required on the back of the panel face to prevent panel deflection under instrument loading or operation. Internally, the panels shall be supplied with a structural framework for instrument support purposes and panel bracing. The internal framework shall permit panel lifting without racking or distortion. Provide removable lifting rings designed to facilitate simple, safe rigging, and lifting of the control panels during installation.
2. Each panel shall be provided with full height, fully gasketed access doors where shown. Doors shall be provided with a three-point stainless steel latch (except for NEMA 4X panels) and heavy-duty stainless steel locking handle. Rear access doors (if included) shall be conveniently arranged and sized such that they extend no further than 24-inches beyond the panel when opened to the 90-degree position. Front and side access doors shall be as shown. Panel access doors shall be provided with full length, continuous, piano type stainless steel hinges with stainless steel pins. Front access doors with mounted instruments or control devices shall be of sufficient width to permit door opening without interference from flush mounted instruments.
3. The panels, including component parts, shall be free from sharp edges and welding flaws. Wiring shall be free from kinks and sharp bends and shall be routed for easy access to other components for maintenance and inspection purposes.
4. The panel shall be suitable for top and bottom conduit entry as required by the Electrical Drawings. For top mounted conduit entry, the panel top shall be provided with nominal one-foot square removable access plates, which may be drilled to accommodate conduit and cable penetrations. All conduit and cable penetrations shall be provided with ground bushings, hubs, gasketed locknuts, and other accessories as required to maintain the NEMA rating of the panel and electrical rating of the conduit system.
5. All panels in indoor, dry, non-corrosive environments shall be NEMA 12 unless otherwise noted. All panels in outdoor, wet, non-chemically corrosive environments shall be NEMA 4 unless otherwise noted. Panels in chemically corrosive environments shall be NEMA 4X unless otherwise noted. All panels located in a hazardous location shall be rated for the type of hazard (e.g., NEMA 7 for Class 1, Division 1).

B. Wall and Unistrut Mounted Panels

1. All wall and Unistrut mounted panels shall meet the NEMA classification as shown on the drawings or specified herein. The panels shall be constructed of not less than USS 14 gauge steel, suitably braced internally for structural rigidity and strength. All NEMA 4X rated wall mounted panels shall be constructed of 316 stainless steel, unless FRP is specifically indicated. FRP panels shall be used in chlorine areas. All FRP panels located in direct sunlight shall be provided with a protective coating and sun shield to prevent discoloration and cracking.

C. Finish Requirements

1. All sections shall be descaled, degreased, filled, ground, and finished. The enclosure, when fabricated of steel, shall be finished with two rust resistant phosphate prime coats and two coats of enamel, polyurethane, or lacquer finish, which shall be applied by either the hot air spray or conventional cold spray methods. Brushed anodized aluminum, stainless steel, and FRP panels will not require a paint finish.
 2. The panels shall have edges ground smooth and shall be sandblasted and then cleaned with a solvent. Surface voids shall be filled and ground smooth.
 3. Immediately after cleaning, one coat of a rust-inhibiting primer shall be applied inside and outside, followed by an exterior intermediate and topcoat of a two-component type epoxy enamel. A final sanding shall be applied to the intermediate exterior coat before top coating.
 4. Apply a minimum of two coats of manufacturer's standard flat, light-colored lacquer on the panel interior after priming.
 5. Unless otherwise noted, the finish exterior colors shall be ANSI 61 gray with a textured finish.
- D. Print storage pockets shall be provided on the inside of each panel. The storage pockets shall be steel, welded onto the door, and finished to match the interior panel color. The storage pocket shall be sufficient to hold all of the prints required to service the equipment, and to accommodate 8.5 inch by 11 inch documents without folding.

2.04 ENVIRONMENTAL CONTROL

- A. All panels shall be provided with louvers, sun shields, heat sinks, forced air ventilation, or air conditioning units as required to prevent temperature buildup inside of panel. The internal temperature of all panels shall be regulated to a range of 45 degrees F to 104 degrees F (7.22 degrees C to 40 degrees C) under all conditions. Under no circumstances shall the panel cooling or heating equipment compromise the NEMA rating of the panel.
- B. Except for panels mounted with their backs directly adjacent to a wall, louvers shall be in the rear of the panels, top and bottom, and shall be stamped sheet metal construction.
- C. All outdoor enclosures and enclosures located in unheated areas indoors or in areas subject to humidity and moisture shall be provided with an integral heater, fan, and adjustable thermostat to reduce condensation and maintain the minimum internal panel temperature. Mount the unit near the bottom of the enclosure with discharge away from heat-sensitive equipment. Heater shall be Hoffman, Model DAH 115 Volt, 50/60 HZ or equal.

2.05 CORROSION CONTROL

- A. Panels shall be protected from internal corrosion by the use of corrosion-inhibiting vapor capsules as manufactured by Northern Technologies International Corporation, Model Zerust VC; Hoffman, Model AHCI; or equal.

2.06 CONTROL PANEL - INTERNAL CONSTRUCTION

A. Internal Electrical Wiring

1. All interconnecting wiring shall be stranded, type MTW, and shall have 600 volt insulation and be rated for not less than 90 degrees Celsius. Wiring for systems operating at voltages in excess of 120 VAC shall be segregated from other panel wiring either in a separate section of a multi-section panel or behind a removable Plexiglas or similar dielectric barrier. Panel layout shall be developed such that technicians shall have complete access to 120 VAC and lower voltage wiring systems without direct exposure to higher voltages.
2. Power distribution wiring on the line side of fuses or breakers shall be 12 AWG minimum. Control wiring on the secondary side of fuses shall be 16 AWG minimum. Electronic analog circuits shall utilize 18 AWG shielded, twisted pair, cable insulated for not less than 600 volts.
3. Power and low voltage DC wiring systems shall be routed in separate wireways. Crossing of different system wires shall be at right angles. Different system wires routed parallel to each other shall be separated by at least 6-inches. Different wiring systems shall terminate on separate terminal blocks. Wiring troughs shall not be filled to more than 60 percent visible fill.
4. Terminations
 - a. All wiring shall terminate onto single tier terminal blocks, where each terminal is uniquely and sequentially numbered. Direct wiring between field equipment and panel components is not acceptable.
 - b. Multi-level terminal blocks or strips are not acceptable unless they are approved by the Engineer. If approved, they shall be mounted on angled din rail elevated from the back panel.
 - c. Terminal blocks shall be arranged in vertical rows and separated into groups (power, AC control, DC signal). Each group of terminal blocks shall have a minimum of 25 percent spares.
 - d. Terminal blocks shall be the compression type, fused, unfused, or switched as shown on the Contract Drawings or specified elsewhere in Division 13.
 - e. Discrete inputs and outputs (DI and DO) shall have two terminals per point with adjacent terminal assignments. All active and spare PLC and controller points shall be wired to terminal blocks.
 - f. Analog inputs and outputs (AI and AO) shall have three terminals per shielded pair connection with adjacent terminal assignments for each point. The third terminal is for shielded ground connection for cable pairs. Ground the shielded signal cable at the PLC cabinet. All active and spare PLC and controller points shall be wired to terminal blocks.
 - g. Wire and tube markers shall be the sleeve type with heat impressed letters and numbers.
 - h. Only one side of a terminal block row shall be used for internal wiring. The field wiring side of the terminal shall not be within 6-inches of the side panel or adjacent terminal or within 8-inches of the bottom of free-standing panels, or within 3-inches of stanchion mounted panels, or 3-inches of adjacent wireway.
 - i. Circuit power from the SCADA cabinet out to field devices (switches, dry contacts etc.) that are used as discrete inputs to the PLC input cards shall be isolated with an

- isolating switch terminal block with a flip cover that is supplied with a dummy fuse. Isolation switch block shall be an Allen Bradley, Model 1492-H7, or equal. One isolating switch terminal block per loop numbered piece of equipment and one per spare I/O point is acceptable.
- j. All PLC discrete outputs to the field shall be isolated with individual isolating fuse switch terminal blocks with flip covers and neon blown fuse light indicators. The single circuit fusible terminal block shall be an Allen Bradley, Model 1492-H4 or equal.
5. All wiring to hand switches and other devices, which are live circuits independent of the panel's normal circuit breaker protection, shall be clearly identified as such.
 6. All wiring shall be clearly tagged and color coded. All tag numbers and color coding shall correspond to the panel wiring diagrams and loop drawings prepared by the PCSS. All power wiring, control wiring, grounding, and DC wiring shall utilize different color insulation for each wiring system used. The color-coding scheme shall be:
 - a. Incoming 120 VAC Hot - Black
 - b. 120 VAC Hot wiring downstream of panel circuit breaker – Red
 - c. 120 VAC Hot wiring derived from a UPS system – Red with Black stripe.
 - d. Three phase power – Brown, Orange, Yellow, and Green ground or as specified in Division 16.
 - e. 120 VAC neutral - White
 - f. Ground - Green
 - g. DC power or control wiring – Blue
 - h. DC analog signal wiring – Black (+), White (-)
 - i. Foreign voltage – Yellow
 7. Provide surge protectors on all incoming power supply lines at each panel per the requirements of Section 13300 Instrumentation and Controls - General Provisions.
 8. Provide redundant 24 VDC power supplies where specified to power field instruments and panel devices. Twenty-four VDC power supplies shall be as specified in this Section.
 9. Wiring trough for supporting internal wiring shall be plastic type with snap-on covers. The side walls shall be open top type to permit wire changing without disconnecting. Trough shall be supported to the subpanel by stainless steel screws. Trough shall not be bonded to the panel with glue or adhesives.
 10. Each panel shall be provided with an isolated copper grounding bus for all signal and shield ground connections. Shield grounding shall be in accordance with the instrumentation manufacturer's recommendations.
 11. Each panel shall be provided with a separate copper power grounding bus (safety) in accordance with the requirements of the National Electrical Code.
 12. Each panel shall have control, signal, and communication line surge suppression in accordance with Section 13300 Instrumentation and Controls – General Provisions.
 13. Each panel shall be provided with a circuit breaker to interrupt incoming power.

14. Additional electrical components including transformers, motor starters, switches, circuit breakers, etc. shall be in compliance with the requirements of Division 16.

- B. The orientation of all devices including PLC and I/O when installed, shall be per the manufacturer's recommendations. No vertical orientation of PLC racks shall be allowed unless specifically indicated by the manufacturer as an acceptable mounting alternative, and also approved by the Engineer.

2.07 ELECTRICAL COMPONENTS

- A. The main circuit breaker shall be a thermal-magnetic molded case breaker, by Square D Company, Or approved equal. Provide a flange mounted main power disconnect operating handle with mechanical interlock having a bypass that will allow the panel door to open only when the switch is in the OFF position.
- B. A mechanical disconnect mechanism, with bypass, shall be installed on each motor circuit protector, capable of being locked in the "OFF" position to provide a means of disconnecting power to the motor.
- C. Auxiliary contacts shall be provided for remote run indication and indication of each status and alarm condition. Additional controls shall be provided as specified herein and as required by the detailed mechanical equipment requirements, the P&IDs (Division 13), the Control Wiring Diagrams Division 13, and as shown on the Drawings.
- D. All operating control devices and instruments shall be securely mounted on the exterior door. All controls shall be clearly labeled to indicate function and shall be in accordance with the electrical area classification indicated on the Electrical Contract Drawings.
- E. The control panel shall be provided with a lightning and surge protection unit on the line side of the main circuit breaker. Unit shall be 600 Volt, 3 Phase, General Electric "Tranquell" Series, Or approved equal.
- F. Specific control devices, control descriptions, and other data are specified under the detailed specification for the mechanical equipment with which the control panel is supplied.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

3.02 INSTALLATION

- A. The panels shall be installed at locations as shown on the Contract Drawings.
- B. Refer to Section 13300 Instrumentation and Controls - General Provisions.

3.03 IDENTIFICATION

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

3.04 FIELD QUALITY CONTROL

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

3.05 STARTUP SERVICE

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

3.06 DEMONSTRATION

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

3.07 TESTS

- A. Refer to Section 13300 Instrumentation and Controls - General Provisions.

END OF SECTION

SECTION 16000
ELECTRICAL GENERAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This scope covers the furnishing, installation, testing, adjusting and placing in operation all electrical equipment, devices, facilities, materials, and auxiliary items necessary for the complete and successful operation of all electrical equipment as herein described, shown on the plans, or deemed necessary for the completion of the electrical portion of the project. It is the intent of Division 16 – Electrical to outline the electrical requirements of the contract in order to provide the information necessary for the construction of a fully operational system as shown on the plans and as herein described. A comprehensive electrical scope of work is as follows:
1. Power/Electrical System.
 2. Control System.
 3. Utility Work.
 4. Temporary Construction Power.
 5. All Incidentals Necessary for a Complete and Fully Operational Electrical System.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 – General Requirements Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
1. Division 01 – General Requirements.
 2. Division 16 – Electrical.
 3. Division 13 – Instrumentation.

1.03 SUBMITTALS

- A. Submit under provisions of the General Requirements.
1. The Contractor installing all Electrical work shall review and approve all electrical shop drawings prior to submittal to the Engineer for review. As part of the review, the installer shall certify the following:
 - a. I hereby certify that the (equipment (material) (article) shown and marked in this submittal is in compliance with the contract drawing and specifications, can be

installed in the allocated space, will be stored in accordance with the Manufacturer's recommendation, will be installed per NEC, and is submitted for approval.

- B. Submit detailed layouts of equipment in electrical rooms, showing location and size of submitted equipment, demonstrating equipment submitted equipment will fit within the indicated spaces.
- C. Shop drawing received without the Certification above will be returned without being reviewed. The Certification must be signed by the Master Electrician in responsible charge of the project.
- D. All electrical shop drawings shall be reviewed and approved by the Control System Integrator indicating that the proposed product will connect to control system and that the equipment being provided meets the requirements of Div. 13.
- E. All electrical equipment being submitted for approval must contain a certification from the equipment or product manufacturer indicating compliance with the contract specifications and drawings. This certification must include a copy of the project specifications that have been highlighted and initialed indicating compliance with the project specifications.
- F. Submit shop drawings and product data grouped to include complete submittal of related systems, products, and accessories in a single submittal. No electrical work may be performed until shop drawings are approved. Submit Shop Drawings on the Following Systems as Grouped Below:
 - 1. Low Voltage Power/Electrical System
 - 2. Conduit and Conduit Fittings.
 - 3. Wire.
 - 4. Pull Boxes.
 - 5. Panelboards.
 - 6. Circuit Breakers.
 - 7. Conduit Support Systems.
 - 8. Wiring Devices.
 - 9. Switchboards.
 - 10. Transformers.
 - 11. Automatic Transfer Switches
 - 12. Surge Protection Equipment.
 - 13. Equipment and Conduit/Tray Supports.

14. Power System Studies
 - a. Prior to Approval of Any Power Equipment.
 - 1) Load Flow.
 - 2) Short Circuit.
 - 3) Protective Device Evaluation.
 - b. Prior to application of Electrical Power.
 - 1) Arc Flash.
 - c. After 30 Day Facility Run Test
 - 1) Final Load Flow.
 - 2) Final Short Circuit.
 - 3) Final Protective Device Evaluation.
 - 4) Final Arc Flash.
 - 5) Final Harmonic Studies.

15. Control System.

16. Miscellaneous Utility Work.

- a. Power Company Coordination and Ducts.

17. Miscellaneous Electrical Equipment.

- a. Miscellaneous Electrical Parts.

G. Mark dimensions and values in units to match those specified.

1.04 REFERENCE STANDARDS

- A. ANSI/NFPA 70 – National Electrical Code.
- B. ANSIC2 – National Electrical Safety Code.
- C. ANSI – American National Standards Institute.
- D. IBC – International Building Code.
- E. IEEE – The Institute of Electrical and Electronics Engineers.
- F. IES – The Illuminating Engineering Society of North America.
- G. ISA – International Society of Automation.
- H. NECA – National Electrical Contractor Association.
- I. NEMA – National Electrical Manufacturer's Assoc.
- J. NETA – International Electrical Testing Association.
- K. NFPA – National Fire Protection Assoc.
- L. FBC – Florida Building Code.

- M. OSHA – The Occupational Health and Safety Administration of the United States Department of Labor.
 - N. UL – Underwriters Laboratories.
- 1.05 QUALITY ASSURANCE (NOT USED)
- 1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)
- 1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)
- 1.08 MAINTENANCE/SPARE PARTS (NOT USED)
- 1.09 WARRANTY/EXTENDED WARRANTY (NOT USED)
- 1.10 WORKING CLEARANCES
- A. Working clearances around equipment requiring electrical services shall be verified by Contractor to comply with Code requirements. Should there be apparent violations of clearances; the Contractor shall notify the Engineer before proceeding with connection or placing of equipment.
 - B. In the case of panelboards, safety switches and other equipment requiring wire and cable terminations, the Contractor shall ascertain that lug sizes and wiring gutters or space allowed for proper accommodation and termination of the wires and cables are adequate.
- 1.11 WORKMANSHIP
- A. Workmanship under this Division shall be accomplished by persons skilled in the performance of the required task. All work shall be done in keeping with conventions of the trade. Work of this Division shall be closely coordinated with work of other trades to avoid conflict and interference.
- 1.12 PROTECTION OF ELECTRICAL EQUIPMENT
- A. All electrical equipment and wiring shall be stored in a clean and dry location. The location shall be temperature and humidity controlled. All equipment shall be stored per the equipment Manufacturer’s published storage requirements and recommendation. The equipment supplier shall verify that the storage location proposed by the contractor is acceptable to the equipment Manufacturer. The contractor shall submit documentation proving that the storage location is acceptable to the Manufacturer.
 - B. All equipment stored outside of the equipment Manufacturer’s published storage guidelines shall be replaced at the contractor expense. The contractor shall provide temperature and humidity monitoring equipment in the storage area as part of the proof of acceptable storage.
 - C. One equipment is placed in an electrical room, the room must be temperature and humidity controlled. In addition, the environment must remain clean and dirt free. Doors and temporary AC units must be installed prior to electrical equipment being placed in the rooms. Recording

temperature and humidity gauges will be required in all electrical and process areas with electrical equipment once the equipment is placed.

1.13 ENCLOSURES

- A. Equipment Enclosures shall be rated for the area for which they are installed. Unless otherwise indicated, enclosures to be rated as listed below:
 - 1. Indoor Air-Conditioned Spaces:
 - a. NEMA Type 1 or NEMA 12.
 - 2. Interior Corrosive Spaces.
 - a. NEMA 4X Fiberglass.
 - 3. Exterior Locations:
 - a. NEMA 4X 316 Stainless Steel.
 - 4. Hazardous Locations.
 - a. NEMA 7

1.14 UTILITIES

- A. The Contractor shall provide a fully operational electrical service as described in the plans.
 - 1. Arrange with the utility company for the services and install the services in accordance with their requirements, regulations, and recommendations.

1.15 WARRANTY/EXTENDED WARRANTY

- A. Per Division 1 – General Provisions.

1.16 TEMPORARY POWER AND LIGHTS DURING CONSTRUCTION

- A. It shall be the responsibility of the Contractor to provide and maintain adequate temporary power and lighting at all times during construction, so that the various other trades can accomplish their work in a flawless manner. Particular attention will be given to lighting for masonry, drywall, painting, tile work and any other finish work.

1.17 MATERIAL STANDARDS

- A. Material shall be new and comply with standards of Underwriters' Laboratories, Inc., where standards have been established for the particular product and the various NEMA, ANSI, ASTM, IEEE, AEIC, IPCEA or other publications referenced.

1.18 TEST EQUIPMENT

- A. The contractor shall provide all test equipment and supplies deemed necessary by the Engineer at no extra cost to the Owner. All equipment shall have a current certification certificate. These supplies shall include but not be limited to the following: volt meters, amp meters, light meters,

watt meters, harmonic distortion test equipment, thermal image cameras, high pot test equipment, power quality analyzers, and oscilloscopes.

- B. The test equipment is in addition to any equipment necessary to conduct the testing prescribed in the project documents.

1.19 REGULATORY REQUIREMENTS

- A. Conform to applicable sections of the Building Code and all local rules, regulations and ordinances.
- B. Electrical: Conform to NFPA 70 & National Electric Safety Code.
- C. Obtain permits, and request inspections from authority having jurisdiction.
- D. References listed in Paragraph 1.04, this section.

1.20 FINAL INSPECTION AND TESTING

- A. After the electrical installation is complete, the Contractor shall deliver to the Engineer the following information with his request for final inspection.
 - 1. One set of contract drawings marked to show all significant changes in equipment ratings and locations, alterations in locations of conduit runs, or of any data differing from the contract drawings. This shall include revised or changed panelboard and switchgear schedules.
 - 2. Certificates of final inspection from local authority.
- B. The electrical work shall be thoroughly tested to demonstrate that the entire system is in proper working order and in accordance with the plans and specifications. Each motor with its control shall be run as nearly as possible under operating conditions for a sufficient length of time to demonstrate correct alignment, wiring capacity, speed and satisfactory operation. All main switches and circuit breakers shall be operated, but not necessarily at full load. Contractor may be required during final inspection, at the request of the Engineer to furnish test instruments for use during the testing.

1.21 PROCESS EQUIPMENT

- A. The electrical contractor is required to read all other equipment specifications contained in these documents and provide all required power and control conductors required by said equipment to allow them to function as described.
- B. All equipment for which power is not specifically indicated on the plans shall be provided with power per the NEC to the nearest panelboard, MCC, or switchboard with adequate capacity to serve said equipment as calculated by the NEC.

1.22 AS-BUILT DRAWINGS

- A. The contractor shall provide detailed as-built drawings for the project indicating all power wiring.
- B. The As-Built drawings shall include detailed drawings of all duct banks, underground conduit, above ground conduit, motor control centers, PLC control panels, control drawings. These drawings shall indicate exact location of all underground electrical wiring and fiber optic cable.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 16055
POWER SYSTEM STUDIES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Short Circuit Studies, Protective Device Evaluation Studies, Arc Flash Studies and Protective Device Coordination Studies, shall be performed by:
 - 1. Coordinated Power Systems
 - 2. Eaton Engineering Services
 - 3. SKE – S. Kanetzky Engineering, LLC
- B. The studies shall be submitted to the Owner’s Representative prior to receiving final approval of the distribution equipment shop drawings, and/or prior to release of equipment for manufacture. If formal completion of the studies cause delay in equipment manufacture, approval from the Owner’s Representative may be obtained for a preliminary submittal of sufficient study data to ensure that the selection of device ratings and characteristics will be satisfactory.
- C. The studies shall include all portions of the electrical distribution system from the normal power source or sources down to, and including, the 120/208-Volt distribution system, including 208V main 3 phase circuit breaker and all 208V, 3 phase loads. Study shall also include all manufacturer supplied equipment. Normal system connections and those, which result in maximum fault conditions, shall be adequately covered in the study. System showing the largest load or partial list of the equipment on the bus will be rejected. One line diagram shall show all loads on the system. Combined circuits or partial one lines are not allowed. Utility owned transformer protection device shall be included in each power system study.
- D. For each site within the scope of the project, the entirety of electrical distribution systems are not shown. The Contractor shall verify the extent of the electrical distribution system and provide information to the Engineer performing the studies.
- E. Protective relay devices with microprocessor-based settings shall be determined with the study.
- F. The work associated with this section is to be performed by or under the direction of a professional engineer licensed by the State of Texas.
- G. A separate power system study shall be provided for each facility:
 - 1. Wagner Booster Pump Station
 - 2. Leissner Booster Pump Station
 - 3. Dead Man Well
 - 4. Wells Ranch WTP Service No. 1
 - 5. Wells Ranch WTP Service No. 2

1.02 RELATED WORK

- A. Division 16000 – Electrical General Provisions
- B. Section 01300 - Submittals

1.03 SUBMITTALS

- A. The results of the power system study shall be summarized in a final report. Six (6) bound copies of the final report shall be submitted. Report to be sealed by a professional engineer licensed in the State of Texas. Submit a preliminary report for approval prior to release equipment for manufacture.
- B. The report shall include the following sections:
 - 1. Description, purpose, basis, and scope of the study and a full size (22"x34") single-line diagram of that portion of the power system which are included within the scope of the study.
 - 2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short circuit duties and commentary regarding same.
 - 3. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
 - 4. Fault current calculations, including a definition of terms and guide for interpretation of computer printout.
 - 5. A letter from utility provider showing available short circuit current at the service entrance, X/R ratios, impedances and characteristics of upstreams protective devices.
 - 6. A complete list of all recommended settings for all protective relays, including all solid-state protective relay packages.
 - 7. A complete detail of the Arc Flash Study analysis as specified in 1.06D.
 - 8. An arc flash label showing the information requested in section 1.06D.
 - 9. An electronic version of the analysis using SKM software, to be submitted for the final report.
 - 10. The electronic version shall include the backup folder with all the libraries files.

1.04 REFERENCE STANDARDS

- A. The power system studies provided shall be performed in accordance with the following standards:
 - 1. IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book).
 - 2. IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book).
 - 3. IEEE 141 - IEEE Recommended Practice for Electric Power Distribution for Industrial Plants.
 - 4. NFPA 70E – National Electrical Safety Code.

5. OSHA 29-CFR, Part 1910 Sub part S.
6. IEEE 1584 - IEEE Guide for Performing Arc Flash Hazard Calculations.

1.05 QUALITY ASSURANCE

- A. The company and individual(s) performing the study shall have a minimum 5 years documented experience in power system analysis and completed projects of similar size and scope.
- B. The individual(s) performing the study shall be a registered Professional Engineer in the state of Texas.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Data Collection for the Studies

1. The Contractor shall provide the required data including field settings on existing equipment for preparation of the studies. The manufacturer of new equipment, such as ATS, Switchboard, etc., shall furnish the Contractor with a listing of the required data immediately after equipment submittals are approved by the Engineer.
2. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings, and/or prior to release of the equipment for manufacturer.
3. The Contractor is responsible for gathering all manufacturer panel equipment data.

B. Short Circuit Study and Protective Device Evaluation Study

1. The short circuit study shall be performed with the aid of a digital computer program, SKM.
2. The study input data shall include the power company's short circuit contribution, resistance and reactance components of the branch impedances, the X/R ratios, base quantities selected, and other source impedances.
3. Calculate phase and phase-to-ground current and impedance.
4. Short circuit close and latch momentary duty values and interrupting duty values shall be calculated on the basis of assumed three-phase bolted short circuits at each switchgear bus, medium voltage controller, switchboard, low voltage motor control center, distribution panelboard, pertinent branch circuit panel, and other significant locations through the system. The short circuit tabulations shall include symmetrical fault currents and X/R ratios. For each fault location, the total duty on the bus, as well as the individual contribution from each connected branch, shall be listed with its respective X/R ratio and impedance.

5. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, molded case switches, automatic transfer switches, and fuses by tabulating and comparing the short circuit ratings of these devices with the calculated fault currents. Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Owner's Representative's attention, and corrective measures implemented at no extra cost to the Owner.

C. Protective Device Coordination Study

1. A protective device coordination study shall be performed to provide the necessary calculations and logic decisions required to select or to check the selection of power fuse ratings, protective relay characteristics and settings, ratios, and characteristics of associated current transformers, and low voltage breaker trip characteristics, and settings.
2. The coordination study shall include all medium and low voltage classes of equipment from the building or plant service protective devices down to and including the largest rated device in the MCC low voltage motor control center and panelboard. The phase and ground overcurrent protection shall be included, as well as settings of all other adjustable protective devices.
3. The undervoltage relay setting shall be carefully selected in order to override momentary voltage drop conditions. In addition, a time delay relay shall be used to help override undervoltage conditions. Switchgear manufacturer shall coordinate with utility company to determine a suitable relay setting and time delay setting to override the distribution system normal/abnormal voltage drop conditions.
4. The time-current characteristics of the specified protective devices shall be drawn on log-log paper. The plots shall include complete titles, representative one-line diagram and legends, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breaker trip curves, and fuses. The coordination plots shall include the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and ANSI transformer withstand limits, and significant symmetrical and asymmetrical fault currents. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves shall be maintained. The coordination plots for phase and ground protective devices shall be provided on a system basis and on separate log sheets. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.
5. The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios and connection, manufacturer and type, range of adjustment, and recommended settings. A tabulation of the recommended power fuse selection shall be provided for the medium voltage fuses where applied in the system. Any discrepancies, problem areas, or inadequacies shall be promptly brought to the Owner's Representative's attention.
6. The coordination study shall be calculated by means of computer software package, SKM.

D. Arc Flash Hazard Study

1. Perform an arc flash hazard study after the short circuit and protective device

coordination study has been completed based upon IEEE Std 1584, "IEEE Guide for Performing Arc Flash Hazard Calculations."

2. The study shall be calculated by means of computer software package SKM. Pertinent data, rationale employed, and assumptions in developing the calculations shall be incorporated in the introductory remarks of the study.
3. Determine the following:
 - a. Flash Hazard Protection Boundary.
 - b. Incident Energy.
 - c. Working Distance.
 - d. Required PPE Level.
 - e. Shock Hazard Voltage.
 - f. Limited Approach.
 - g. Restricted Approach
 - h. Prohibited Approach.
4. Produce an Arc Flash Warning label listing items a-h above. Arc flash label size shall be 3"x3" minimum. Also include the bus name, system operating voltage, and date of issue. Labels shall be printed in color and be printed on adhesive backed labels. See example below.



5. Produce Bus Detail sheets that list the items D 3 a-h from above and the following additional items.
 - a. Bus Name.
 - b. Upstream Protective Device Name, Type, and Settings.
 - c. Bus Line to Line Voltage.
6. Produce Arc Flash Evaluation Summary Sheet listing the following additional items:

- a. Bus Name.
- b. Upstream Protective Device Name, Type, and Settings
- c. Bus Line to Line Voltage.
- d. Bus Bolted Fault.
- e. Protective Device Bolted Fault Current.
- f. Arcing Fault Current.
- g. Protective Device Trip / Delay Time.
- h. Breaker Opening Time.
- i. Solidly Grounded Column.
- j. Equipment Type.
- k. Gap.
- l. Arc Flash Boundary.
- m. Working Distance.
- n. Incident Energy.
- o. Required Protective Fire Rated Clothing Type and Class.

E. Computer Software Developers

1. SKM System Analysis Inc.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION (NOT USED)

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Protective Device, Calibration, and Adjustment

1. The equipment manufacturer shall provide the services of a qualified field Owner's Representative and necessary tools and equipment to test, calibrate, and adjust the protection relays and circuit breaker trip devices as recommended in the power system study.

2. As a part of this Contract, the manufacturer's system Owner's Representative shall make one formal presentation in the Owner's office to the Owner's personnel. The presentation shall include all training materials and visual aids.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

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SECTION 16060
COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section provides the guidelines for testing of electrical equipment, cable, protective relays, circuit breakers, motor control centers, motors, and related apparatus to be used for the site interior and exterior electrical distribution system. This specification does not release the Contractor or vendor from any further testing required for safe commissioning of the equipment. All tests shall be completely recorded on forms provided at the end of this section. Tests shall be submitted to Engineer/Owner for approval.
- B. Contractor will provide and pay the cost of electrical testing by an independent testing firm.
- C. The Contractor to update the protective device settings with the final power system study acceptance.

1.02 RELATED WORK

- A. Related equipment specification in all section of Division 16 Electrical.

1.03 SUBMITTALS

- A. The testing result shall be summarized in a final report certified by the testing technician. Report shall be submitted per division 1 requirement.
- B. The report shall include the following section:
 - 1. Description, purpose, basis and scope of the work.
 - 2. Field data sheet showing all visual, mechanical and electrical inspection done on the equipment. The data sheet shall show check mark and values of all the testing done, and a description of the instrument used for testing.
 - 3. A summary of the deficiency, concern, repairs and recommendation.
 - 4. A table showing the final settings of all the adjustable equipment tested.
 - 5. All the testing values shall be in accordance with the latest NETA standard.
- C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.
- D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

- A. InterNational Electric Testing Association Standards (NETA) for acceptance testing of Electrical Distribution Apparatus, Publication 2.001, and IEEE Publication No. 141, are hereby made a part of this section, unless otherwise modified herein.
- B. NETA Maintenance Testing Specifications for electrical power distribution equipment and system (latest edition).

1.05 QUALITY ASSURANCE

- A. Testing firm shall have a minimum of five years of experience in providing acceptance testing for pumping stations. Testing shall be performed per the latest InterNational Electric Testing Association Standards (NETA) standard. This cost will be included in the Contract Bid.
- B. The Contractor shall immediately correct all deficiencies discovered during testing by the independent firm. The independent testing firm has the final say on the acceptance of the equipment, if testing determine the equipment is deficient, contractor shall be responsible to fix the deficiency even if the manufacturer said the equipment is satisfactory.

PART 2 EXECUTION

2.01 DEMOLITION/PREPARATION

- A. Preparatory work:
 - 1. Prior to the testing of any specific piece of equipment, the Contractor shall remove all shipping hardware and inspect for broken or missing parts and proper connections in accordance with the manufacturer's instructions.

2.02 INSPECTION

- A. Visual and Mechanical Inspection
 - 1. Prior to any electrical testing Contractor shall perform a visual and Mechanical inspection as specified in the latest NETA standard.
- B. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan on each major part piece of equipment. Remove front panels so joints and connections are accessible to portable scanner. Infrared testing shall be performed on loaded equipment.
 - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
 - 2. Instruments, Equipment, and Reports:
 - a. Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

- C. Prepare a certified report that identifies equipment included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

2.03 FIELD TESTING

- A. The Contractor shall test all new electrical equipment provided and installed under this contract. If there are partial replacements of existing equipment line-ups, the whole line-up shall be retested (for example: Switchboards & MCCs). Other equipment under this project that shall be tested are: ATS and panelboards. If an existing piece of electrical distribution equipment is being terminated/connected to, the Contractor shall test that piece of equipment after installation is complete.
- B. All tests, other than Low Voltage Systems and Equipment, shall be supervised by the Engineer/Owner and the contractor. Contractor shall give a 30 days notice of all scheduled tests to the Engineer/Owner in writing.
- C. Contractor shall notify the Engineer/Owner of scheduled dates of electrical equipment installation completion. Equipment testing shall be coordinated at this time by Contractor with Engineer/Owner and appropriate Manufacturer's Representatives.
- D. Under this specification the Contractor shall perform the electrical tests on specified equipment as specified herein. The Contractor shall supply all equipment required to perform all testing responsibilities.
 - 1. Cables – low-voltage, 600V maximum
 - a. Electrical Tests
 - 1) Perform resistance measurements through bolted connections with low resistance ohmmeter, if applicable, in accordance with latest NETA standard.
 - 2) Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.
 - 3) Perform continuity tests to insure correct cable connection.
 - 2. Surge Arresters, Surge Protection Devices (Low and Medium Voltage):
 - a. Electrical Tests
 - 1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.
 - 2) Perform an insulation-resistance test at voltage levels in accordance with NETA Standard.
 - 3) Test grounding connection in accordance with NETA Standard.
 - 3. Circuit Breakers – Air, Insulated Case/Molded Case
 - a. Electrical Tests
 - 1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.
 - 2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole for one minute.

- Test voltage shall be in accordance with manufacturer's published data or latest NETA standard.
- 3) Perform a contact/pole-resistance test.
 - 4) Perform adjustments for final setting in accordance with coordination study.
 - 5) Determine long-time pickup and delay by primary current injection.
 - 6) Determine short-time pickup and delay by primary current injection.
 - 7) Determine ground-fault pickup and time delay by primary current injection.
 - 8) Determine instantaneous pickup by primary current injection.
 - 9) Perform minimum pickup voltage test on shunt trip and close coils in accordance with latest NETA standard.
 - 10) Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, and antipump function.
 - 11) Verify operation of charging mechanism.
4. Circuit breakers – Air, low voltage, power
- a. Electrical Tests
 - 1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.
 - 2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or latest NETA standard.
 - 3) Perform a contact/pole-resistance test.
 - 4) Make adjustments to the trip settings in accordance with the coordination study.
 - 5) Determine minimum pickup current by primary current injection.
 - 6) Determine long-time pickup and delay by primary current injection.
 - 7) Determine short-time pickup and delay by primary current injection.
 - 8) Determine ground-fault pickup and time delay by primary current injection.
 - 9) Determine instantaneous pickup by primary current injection.
 - 10) Perform minimum pickup voltage test on shunt trip and close coils in accordance with latest NETA standard.
 - 11) Verify correct operation of any auxiliary features such as trip, and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, antipump function, trip unit battery condition, and reset all trip logs and indicators.
 - 12) Verify operation of charging mechanism.
5. Protective Relays
- a. Electrical Tests
 - 1) Perform insulation-resistance test on each circuit-to-frame. Do not perform this test on solid-state devices.
 - 2) Perform the following tests on the nominal settings specified by the Owner/user's electrical Engineer:
 - a) Pickup parameters on each operating element.
 - b) Timing tests at two (2) or more points on time-current curve.
 - c) Pickup target and seal-in units.
 - d) Special tests as required to check operation of restraint, directional and other elements per manufacturer's instruction manual.
 - e) Conduct tests to verify satisfactory performance of each control feature.

- f) Electrically confirm that CT and VT secondary circuits are intact.
6. Instrument Transformers
- a. Electrical Tests – Current Transformers
 - 1) Electrically confirm that CT secondary circuits are intact.
 - 2) Perform a ratio verification test of each current transformer. This shall be performed using the voltage method or current method in accordance with ANSI C57.13.1 (IEEE Guide for Field Testing of Relaying Current Transformers).
 - 3) Perform insulation-resistance tests on current transformer secondary winding. Value of test voltage on secondary wiring shall be 1000 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.
 - b. Electrical Tests – Voltage Transformers
 - 1) Perform insulation-resistance tests on voltage transformers, winding-to-winding and windings-to-ground. Value of test voltage on secondary wiring shall be 500 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.
 - 2) Electrically confirm proper secondary voltage.
 - 3) Perform a dielectric withstand test on the primary windings with the secondary windings connected to ground. The dc dielectric voltage shall be in accordance with NETA Standard.
7. Metering
- a. Electrical Tests
 - 1) Check calibration of meters at all cardinal points.
 - 2) Calibrate watt-hour meters to within manufacturer's published accuracy.
 - 3) Verify all instrument multipliers.
 - 4) Electrically confirm that CT and VT secondary circuits are intact.
8. Grounding Systems
- a. Electrical Tests
 - 1) Perform fall-of-potential test or alternative per IEEE Standard No. 81-2012 on the main grounding electrode or system.
 - 2) Perform point-to-point test to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.
9. Ground-fault protection systems
- a. Electrical Tests
 - 1) Measure the system neutral to ground insulation resistance with the neutral disconnect link temporarily removed. Replace neutral disconnect link after testing. Notify equipment Owner or operator of any improper neutral to ground connections detected.
 - 2) Measure insulation resistance of the control wiring at 1000 volts dc for 1 minute. If necessary, disconnect the solid-state components.
 - 3) Perform pickup tests as follows using primary injection.
 - a) Verify the relay does not operate at 90% of the set pickup current.
 - b) Determine the pickup current of the relay and verify that this current is no greater than 125% of the setting. Pickup must not be greater than 1200 amperes.

- 4) For summation type systems utilizing phase and neutral CT's, verify proper polarities by applying current to each phase-neutral CT pair. This test also applies to molded case breakers utilizing an external neutral CT.
 - a) Relay should operate when current direction is the same relative to polarity marks in the two CT's.
 - b) Relay should not operate when current direction is opposite relative to polarity marks in the two CT's.
 - 5) Measure time delay of the relay at 150% of pickup or greater.
 - 6) Verify the system is able to trip with control voltage at 55% of rated for systems utilizing ac control power and 80% of rated for systems utilizing dc control power.
 - 7) Verify operation of zone interlock systems by simultaneously injecting current at the interlocked relays and monitoring the control signals.
10. Motor control centers/Motor starters, Low Voltage
- a. Electrical Tests
 - 1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.
 - 2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with starter closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data and NETA Standard whichever is more stringent.
 - 3) Measure insulation resistance of each control circuit-to-ground.
 - 4) Perform insulation-resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute. For units with solid-state components, follow manufacturer's recommendation.
 - 5) Test motor protection devices in accordance with manufacturer's published data and NETA Standard whichever is more stringent.
 - 6) Test circuit breakers in accordance with NETA Standard.
 - 7) (Perform operational tests by initiating control devices.
11. Electrical System Transfer Switches
- a. Electrical Tests
 - b. Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.
 - c. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute. For units with solid-state components or for control devices that cannot tolerate the applied voltage, follow manufacturer's recommendation.
 - d. Perform a contact/pole-resistance test.
 - e. Verify settings and operation of control devices.
 - f. Calibrate and set all relays and timers in accordance with latest NETA Standard.
 - g. Verify phase rotation, phasing, and synchronized operation as required by the application.
 - h. Perform automatic transfer tests:
 - 1) Simulate loss of normal power.
 - 2) Return to normal power.
 - 3) Simulate loss of emergency power.

- 4) Simulate all forms of single-phase conditions.
 - a) Verify correct operation and timing of the following functions:
- 5) Normal source voltage-sensing relays.
- 6) Engine start sequence.
- 7) Time delay upon transfer.
 - i. Alternate source voltage-sensing relays.
 - j. Automatic transfer operation.
 - k. Interlocks and limit switch function.
 - l. Time delay and retransfer upon normal power restoration. (h) Engine cool down and shutdown feature.

END OF SECTION

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SECTION 16073
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Conduit supports.
2. Formed steel channel.
3. Spring steel clips.
4. Sleeves.
5. Mechanical sleeve seals.
6. Firestopping relating to electrical work.
7. Firestopping accessories.
8. Equipment bases and supports.

1.02 RELATED WORK

- A. Division 16 – Electrical.

1.03 SUBMITTALS

- A. Division 01 – Requirements for submittals.
- B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.
- C. Product Data:
1. Anchor Systems
 - a. Acceptable base material conditions (i.e. cracked, un-cracked concrete)
 - b. Acceptable drilling methods
 - c. Acceptable bore hole conditions (dry, water saturated, water filled, under water)
 - d. Manufacturer's installation instructions including bore hole cleaning procedures and adhesive injection.
 - e. Cure and gel timetables
 - f. Temperature ranges (storage, installation and in-service).
 2. Hangers and Supports: Submit Manufacturers catalog data including load capacity.
 3. Firestopping: Submit data on product characteristics, performance and limitation criteria.

- D. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- E. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.
- F. Manufacturer's Installation Instructions:
 - 1. Hangers and Supports: Submit special procedures and assembly of components.
 - 2. Firestopping: Submit preparation and installation instructions.
- G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- H. Firestopping Engineering Judgments: For conditions not covered by UL or WH listed designs, submit judgments by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

1.04 REFERENCE STANDARDS

- A. ASTM International:
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
 - 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
 - 5. ASTM E 488-96 (2003); Standard Test Method for Strength of Anchors in Concrete and Masonry Elements, ASTM International.
 - 6. ASTM E 1512-93, Standard Test Methods for Testing Bond Performance of Adhesive-Bonded Anchors, ASTM International.
- B. American Concrete Institute
 - 1. AC308; Acceptance Criteria for Post-Installed Anchors in Concrete Elements, Latest revision.
- C. FM Global:
 - 1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.
- D. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.

- E. Underwriters Laboratories Inc.:
 - 1. UL 263 - Fire Tests of Building Construction and Materials.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
 - 3. UL 1479 - Fire Tests of Through-Penetration Firestops.
 - 4. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
 - 5. UL - Fire Resistance Directory.
- F. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.

1.05 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage (24.9 Pa) minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- B. Through Penetration Firestopping of Non-Fire Rated Floor and Roof Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- D. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage (24.9 Pa) minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- F. Perform Work in accordance with local codes and standards.
- G. Maintain one copy of each installation detail on site on site.

- H. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- I. Installer: Company specializing in performing work of this section with minimum 3 years' experience and approved by Manufacturer.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

- A. Firestopping Materials: UL Listed to achieve fire ratings as noted on Drawings for adjacent construction, but not less than 1 hour fire rating.
- B. Ratings may be 3-hours for firestopping in through-penetrations of 4-hour fire rated assemblies unless otherwise required by applicable codes.
- C. Firestop interruptions to fire rated assemblies, materials, and components.
- D. Firestopping: Conform to UL Standards for fire resistance ratings and surface burning characteristics.
- E. Firestopping: Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 – Material and Equipment: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory packaging, labeled with Manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 WARRANTY/EXTENDED WARRANTY (NOT USED)

1.10 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 – Material and Equipment: Environmental conditions affecting products on site.
- B. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F (15 degrees C).

- C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of firestopping materials.

PART 2 PRODUCTS

2.01 CONDUIT SUPPORTS

- A. Stainless Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-Line, Inc.; a division of Cooper Industries.
 - b. Thomas & Betts Corporation.
 - c. Unistrut; Tyco International, Ltd.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: 316SS Stainless Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Manufacturers:
 - 1. Unistrut
 - 2. Substitutions: Division 1 - Substitution Requirements.
- F. Hanger Rods: Threaded high tensile strength stainless steel with free running threads.
- G. Beam Clamps: 316SS stainless steel, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: 316SS stainless steel.
- H. Conduit clamps for trapeze hangers: Stainless steel, notched to fit trapeze with single bolt to tighten.
- I. Conduit clamps - general purpose: One-hole malleable iron for surface mounted conduits.
- J. Cable Ties: High strength nylon temperature rated to 185 degrees F (85 degrees C). Self-locking.

2.02 MOUNTING, ANCHORING, AND ATTCAHMENT

- A. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-stainless steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
2. Mechanical-Expansion Anchors: Insert-wedge-type, 316SS stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
3. Adhesive Anchoring Systems
 - a. Acceptable Manufacturers
 - 1) Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:
 - a) HILTI HIT-RTZ with HIT-HY 150 MAX.
 - 2) The listing of specific Manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.
 - b. Product Description
 - 1) Anchor body with helical cone shaped thread on the embedded end and standard threads on the exposed end, with washer and nut, inserted into Injection adhesive.
 - 2) No cleaning of dust or water removal shall be required prior to installation of the adhesive and anchor body.
 - 3) All parts shall be manufactured of 316 stainless steel conforming to SAE 316SS.
4. Clamps for Attachment to Steel Structural Elements: 316SS Stainless Steel, type suitable for attached structural element.
5. Through Bolts: 316SS Stainless Steel Structural type, hex head, and high strength.
6. Hanger Rods: Threaded 316SS stainless steel.

2.03 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-stainless steel shapes, shop or field fabricated to fit dimensions of supported equipment.

2.04 SLEEVES

- A. Furnish materials in accordance with local codes and standards.
- B. Sleeves for Electrical Through Non-fire Rated Floors: 18 gage (1.2 mm) thick galvanized steel.

- C. Sleeves for Electrical Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage (1.2 mm) thick galvanized steel.
- D. Sleeves for Electrical Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- E. Fire-stopping Insulation: Glass fiber type, non-combustible.

2.05 FIRESTOPPING

- A. Manufacturers:
 - 1. 3M.
 - 2. Hilti.
 - 3. Substitutions: Division 1 - Substitution Requirements.
- B. Product Description: Different types of products by multiple Manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Silicone Firestopping Elastomeric Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
 - 2. Foam Firestopping Compounds: Single component foam compound.
 - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 - 4. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
 - 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet 316SS stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 - 6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 - 7. Firestop Pillows: Formed mineral fiber pillows.
- C. Color: RED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Division 1 - Verification of existing conditions before starting work.
- B. Verify openings are ready to receive sleeves.

- C. Verify openings are ready to receive firestopping.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Install backing materials to arrest liquid material leakage.
- D. Obtain permission from Architect/Engineer before using powder-actuated anchors.
- E. Obtain permission from Architect/Engineer before drilling or cutting structural members.

3.03 INSTALLATION - HANGERS AND SUPPORTS

- A. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Provide expansion anchors, powder actuated anchors, or adhesive anchors.
 - 2. Steel Structural Elements: Provide beam clamps, and welded fasteners.
 - 3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
 - 5. Solid Masonry Walls: Provide expansion anchors.
 - 6. Sheet Metal: Provide sheet metal screws.
 - 7. Wood Elements: Provide wood screws.
- B. Install conduit and raceway support and spacing in accordance with NEC.
- C. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
- D. Install multiple conduit runs on common hangers.
- E. Supports:
 - 1. Provide 316SS Stainless Steel supports for all areas that are not corrosive to Stainless Steel.
 - 2. Provide Non-Metallic supports in all areas that are corrosive to Stainless Steel.

3.04 INSTALLATION – FIRESTOPPING

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by Manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- D. Compress fibered material to maximum 40 percent of its uncompressed size.
- E. Remove dam material if allowed by Firestop Manufacturer and UL Listed assembly
- F. Fire Rated Surface:
 - 1. Seal opening at floor, wall, partition, ceiling, and roof as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch (25 mm) on both sides of building element.
 - b. Size sleeve allowing minimum of 1-inch (25 mm) void between sleeve and building element.
 - c. Pack void with backing material.
 - d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.
 - 2. Where cable tray, bus, cable bus, conduit, wireway, and trough penetrates fire rated surface, install firestopping product in accordance with Manufacturer's instructions.
- G. Non-Rated Surfaces:
 - 1. Seal opening through non-fire rated wall, partition, floor, ceiling, and roof opening as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch (25 mm) on both sides of building element.
 - b. Size sleeve allowing minimum of 1-inch (25 mm) void between sleeve and building element.
 - c. Install type of firestopping material recommended by Manufacturer.
 - 2. Install escutcheons or ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
 - 3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with Manufacturer's instructions.
 - 4. Interior partitions: Seal pipe penetrations at clean rooms, laboratories, hospital spaces, computer rooms, telecommunication rooms, and electrical rooms. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit.

3.05 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

- A. Provide housekeeping pads of concrete, minimum 3-1/2 inches (87 mm) thick and extending 6 inches (150 mm) beyond supported equipment. Refer to Division 3.
- B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of formed hot dipped galvanized steel channel. Brace and fasten with flanges bolted to structure.

3.06 INSTALLATION – SLEEVES

- A. Exterior watertight entries: Seal with adjustable interlocking rubber links.
- B. Conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.
- C. Set sleeves in position in forms. Provide reinforcing around sleeves.
- D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- E. Extend sleeves through floors 1 inch (25 mm) above finished floor level. Caulk sleeves.
- F. Where conduit or raceway penetrates floor, ceiling, or wall, close off space between conduit or raceway and adjacent work with fire stopping insulation and caulk. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- G. Install 316SS stainless steel escutcheons at finished surfaces.

3.07 FIELD QUALITY CONTROL

- A. Division 1 – Field inspecting, testing, adjusting, and balancing.
- B. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.08 CLEANING

- A. Division 1 - Requirements for cleaning.
- B. Clean adjacent surfaces of firestopping materials.

3.09 PROTECTION OF FINISHED WORK

- A. Division 1 - Requirements for protecting finished Work.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 16110
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes.

1.02 RELATED WORK

- A. Division 16 – Electrical.

1.03 SUBMITTALS

- A. Submit per Division 01 – General Provisions, and Section 16000 – Basic Electrical Requirement.
- B. Product Data: Submit catalog data showing specified features of standard products.
- C. Product Data: Submit for the following:
 - 1. Rigid Aluminum Conduit.
 - 2. EMT Conduit.
 - 3. Galvanized Rigid Steel.
 - 4. Stainless Steel.
 - 5. PVC Coated Galvanized Rigid Steel.
 - 6. PVC Sch 40.
 - 7. PVC Sch 80.
 - 8. Liquid Tight Flexible Nonmetallic Conduit.
 - 9. Raceway / Conduit fittings and bodies.
 - 10. Wireways.
 - 11. Above grade pull and junction boxes.
- D. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

- E. For the following raceway components include plans, elevations, sections, details, and attachments to other work.
 - 1. For handholes and boxes for underground wiring, including the following:
 - 2. Duct entry provisions, including locations and duct sizes.
 - 3. Frame and cover design.
 - 4. Grounding details.
 - 5. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
 - 6. Joint details.
- F. Division 1 – General Provisions.

1.04 REFERENCE STANDARDS

- A. American National Standards Institute:
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
 - 3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).
- B. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 - 6. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - 7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

- A. Minimum Raceway Size: 1” unless otherwise specified.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Division 1 – General Provisions - Product storage and handling requirements.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 WARRANTY/EXTENDED WARRANTY (NOT USED)

1.10 COORDINATION

- A. Division 1 – General Provisions - Coordination and project conditions.
- B. Coordinate installation of in slab outlet boxes.
- C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 PRODUCTS

2.01 CONDUIT

A. PVC Coated Rigid Steel Conduit

- 1. PVC coated rigid steel conduit shall have a minimum 0.040-in thick, polyvinyl chloride coating permanently bonded to rigid steel conduit and an internal chemically cured urethane or enamel coating. Rigid steel conduit shall be as manufactured by the Allied Tube and Conduit Corp.; Wheatland Tube Co.; Triangle PWC Inc. The ends of all couplings, fittings, etc. shall have a minimum of one pipe diameter in length of PVC overlap. PVC coated conduit and fittings shall be as manufactured by Perma-Cote, Robroy Industries, Triangle PWC Inc. or Ocal.
- 2. Elbows and couplings shall be PVC coated by the same Manufacturer supplying the conduit PVC coating system. Elbows and couplings used with PVC coated conduit shall be furnished with a PVC coating bonded to the steel, the same thickness as used on the coated aluminum conduit.

B. Liquidtight Aluminum Flexible Metal Conduit

- 1. Liquidtight aluminum flexible metal conduit shall have an interlocked aluminum core, PVC jacket rated for 80 degrees C., meets NEC Article 351, UL 360 as manufactured by Ultratite AEF by Southwire, the Anaconda Metal Hose Div.; Anaconda American Brass Co.; American Flexible Conduit Co., Inc.; Universal Metal Hose Co.; ALFLEX.

2. Fittings used with liquidtight flexible aluminum conduit shall be extruded from 6063 alloy in temper designation T-1 with maximum 0.1% copper content and shall conform to FEDSPEC WW-C-540C ANSI C80.5, and UL-6.

C. Aluminum Flexible Metal Conduit

1. Aluminum flexible metal conduit shall have an interlocked aluminum core, meeting NEC Article 348, UL 1 and Federal Specification WW-C-566C, as manufactured by Southwire Alfex, the Anaconda Metal Hose Div.; Anaconda American Brass Co.; American Flexible Conduit Co., Inc.; Universal Metal Hose Co.
2. Fittings used with aluminum flexible metal conduit shall be extruded from AA 6063 alloy in temper designation T-1 and shall conform to FEDSPEC WW-C-540C ANSI C80.5, and UL-6.

D. Rigid Aluminum Conduit

1. Rigid Aluminum conduit shall be extruded from AA 6063 alloy in temper designation T-1 and shall conform to FED Spec WW-C-540C, ANSI C80-5 and UL-6. Rigid aluminum conduit shall be as manufactured by Wheatland Tube Company, or Allied.

E. PVC Schedule 40 Conduit

1. Schedule 40 PVC Rigid Nonmetallic Conduit (RNC) shall be designed for use above ground and underground as described in the NEC, resistant to sunlight. The conduits and fittings shall be manufactured to NEMA TC-2, Federal Specification WC1094A and UL 651 specifications. Fittings shall be manufactured to NEMA TC-3, Federal Specification WC1094A and UL 514B. Conduit shall have a UL Label. Conduit shall be Carlon, or Kraloy.

F. PVC Schedule 80 Conduit

1. Schedule 80 PVC Rigid Nonmetallic Conduit (RNC) shall be designed for use above ground and underground as described in the NEC, resistant to sunlight. The conduits and fittings shall be manufactured to NEMA TC-2, Federal Specification WC1094A and UL 651 specifications. Fittings shall be manufactured to NEMA TC-3, Federal Specification WC1094A and UL 514B. Conduit shall have a UL Label. Conduit shall be Cantex, Prime Conduit, or Allied Tube.

2.02 BOXES

- A. Boxes specified herein are for use with raceway systems only. Boxes used for housing electrical and instrumentation equipment shall be as described elsewhere in these Specifications.
- B. NEMA 1 Areas: NEMA 1 terminal boxes, junction boxes, pull boxes, etc, shall be of sheet or cast aluminum for wall mounting, or have mounting feet where self-standing. Boxes shall have continuously welded seams. Welds shall be ground smooth. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. All boxes shall have hinged, gasketed doors with quarter-turn latches or a 3-point latch (single operator) system on enclosures larger than 36 inches wide

or 32 inches tall. Terminal boxes shall be furnished with terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20A. 600V. Boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Boxes shall be Concept Series as manufactured by Hoff-man Engineering Co.

- C. NEMA 4X Areas: NEMA 4X terminal boxes, junction boxes, pull boxes etc, shall be Type 316 stainless steel for wall mounting, or have mounting feet where self-standing. Boxes shall have continuously welded seams. Welds shall be ground smooth. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. All boxes shall have hinged, gasketed doors with quarter-turn latches or a 3-point latch (single operator) system on enclosures larger than 36 inches wide or 32 inches tall. Terminal boxes shall be furnished with terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20A., 600V. Boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Boxes shall be Concept Series as manufactured by Hoff-man Engineering Co.
- D. NEMA 7 Areas: Explosion-proof boxes shall be designed for Class 1, Group D, Division 1 hazardous locations, and shall also have O-ring seals to meet NEMA 4 requirements. Boxes shall be aluminum, with stainless steel hinged covers and stainless steel bolts; Type EJB-N4 as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; Adalet-PLM.
- E. Boxes for use in Chlorine and Caustic areas shall be of rigid PVC. Construction shall be the same as specified for NEMA 4X terminal boxes, junction boxes, pull boxes etc. as specified above.
- F. Malleable iron boxes shall not be used.

2.03 CONDUIT HUBS

- A. Conduit hubs for use on raceway system pull and junction boxes shall be watertight aluminum, insulated throat, gasketed, with grounding screw, as manufactured by O- Z/Gedney, or Red-Dot.
- B. Conduit hubs for use on outlet boxes or boxes containing electrical or instrumentation equipment shall be watertight, threaded aluminum, grounding screw type, insulated throat, hub of female-female type, with locking nipple of male construction. Hubs shall be T&B HTGZ. Hubs with female locking nipples, where the hub projects into the box, will not be acceptable.

2.04 CONDUIT SEALS

- A. Conduit wall seals for new concrete walls below grade shall be O.Z./Gedney Co. type WSK.
- B. Conduit wall seals for cored holes shall be type CSML-XXXXA as manufactured by the O.Z./Gedney Co.
- C. Conduit wall and floor seals for sleeved openings shall be type CSMI-XXXXA as manufactured by the O.Z./Gedney Co.
- D. Conduit sealing bushings shall be aluminum O.Z./Gedney Type CSBA Series.

2.05 EXPANSION-DEFLECTION FITTINGS

- A. Combination expansion-deflection fittings embedded in concrete, or exposed, with internal grounding, 4" movement, shall be stainless steel/cast iron, Type XJGD as manufactured by the Crouse-Hinds Co.

2.06 EXPANSION FITTINGS

- A. Expansion fittings shall be aluminum, 8" movement, Type XJGSA as manufactured by Crouse-Hinds Co., with internal grounding.

2.07 EXPLOSION-PROOF FITTINGS

- A. Explosion proof fittings shall be as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; O.Z./Gedney Co.

2.08 KELLEMS GRIPS

- A. Kellems grips to support cables shall be of 316 stainless steel.

2.09 CONDUIT MOUNTING EQUIPMENT

- A. All pull and junction box supports, spacers, conduit support rods, clamps, hangers, channel, nut, bolts, washers, etc. and shall be of 316 stainless steel.

2.10 WIREWAYS

- A. All wireways shall be constructed of NEMA 4X 316 stainless steel, with gasketed hinged covers and stainless-steel screws. Wireway shall be as manufactured by Hoffman.

PART 3 EXECUTION

3.01 RACEWAY APPLICATIONS

- A. Unless exact locations are shown on the Drawings, the Contractor shall coordinate the placement of conduit and related components with other trades and existing installations.
- B. Unless shown on the drawings or specified otherwise, the conduit type installed with respect to the location shall be as follows:

Conduit Type	Location
1. Rigid Galvanized Conduit	Air-Conditioned Spaces.
2. Liquidtight Flexible Aluminum Conduit	Raceway connection to vibrating equipment only in all areas. Maximum of 6' length.
3. Rigid Non-metallic, Schedule 40 PVC Conduit	Underground encased in red dyed reinforced concrete.
4. Rigid Non-metallic, Schedule 80 PVC Conduit	For use only in Underground and Chemical Areas.

Conduit Type	Location
5. Flexible Aluminum Conduit	Fixture whip connection to lighting fixtures in NEMA 1 areas (maximum 3-ft). BX or AC type prefabricated cables are not permitted.
6. Aluminum Rigid Metal Conduit	All above areas, except for concrete embedded and those areas described in Locations 2 through 6 above.
7. EMT	Admin Building only.

- C. All conduit of a given type shall be the product of one Manufacturer.

3.02 BOX APPLICATIONS

- A. Boxes installed in dry areas may be of NEMA 1 aluminum construction. All other boxes shall be of Type 316 stainless steel.
- B. Exposed switch, receptacle and lighting outlet boxes and conduit fittings shall be cast aluminum.
- C. Junction boxes and pull boxes shall have NEMA ratings suitable for the location in which they are installed, as specified in Section 16000 – Basic Electrical Requirements.
- D. Where the raceway system connects to junction and pull boxes in a NEMA 1 area, double locknut (one outer and one inner) plus insulated bushing.
- E. All boxes shall be provided with factory mounting lugs. Drilling through the back of any box or enclosure is prohibited, and if so installed shall be removed and replaced, with no increase in the Contract Price or Construction Schedule.
- F. The Contractor shall be responsible for sizing all junction boxes and pull boxes in accordance with the National Electrical Code, Article 314 and relevant sections of the NEC.
- G. Penetrations into the top of NEMA 4X and NEMA 7 boxes shall not be allowed.
- H. Exposed pull boxes or junction boxes installed outdoors, per NEMA 250 shall be NEMA 4X weatherproof and shall be provided with watertight gasketed covers fastened with stainless steel screws and be 316 stainless steel. All hardware shall be 316 stainless steel. Boxes shall be provided with integral mounting lugs.
- I. NEMA 1 boxes shall be provided for Air-Conditioned spaces only, NEMA 7 for Class 1, Group D, Division 1 hazardous locations and NEMA 4X 316 stainless steel for all other locations.

3.03 FITTINGS APPLICATIONS

- A. Combination expansion-deflection fittings shall be installed where conduits cross structure expansion joints, on conduit transitions from underground to above ground, and where installed in exposed conduit runs such that the distance between expansion-deflection fittings does not exceed one hundred fifty (150) feet of conduit run.

- B. On exposed conduit transitions from underground to above ground, where the earth has been disturbed to a depth of more than ten (10) feet, an expansion fitting, with a minimum of 6" available movement, shall be installed on the exposed side of the transition, in lieu of a combination expansion-deflection fitting.

3.04 CONDUIT SEALS APPLICATIONS

- A. Conduit wall seals shall be used where underground conduits penetrate walls or at other locations shown on the Drawings.
- B. Conduit sealing bushings shall be used to seal conduit ends exposed to the weather and at other locations shown on the Drawings.

3.05 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed. Provide long sweep 90-degree bends conduits layout for seamless directional changes.
- F. No conduit smaller than 1-in electrical trade size, shall be used, nor shall any have more than the equivalent of three 90 degree bends in any one run. Pull boxes shall be provided as required or as directed.
- G. No wire shall be pulled until the conduit system is complete in all details; in the case of concealed work, until all rough plastering or masonry has been completed; in the case of exposed work, until the conduit system has been completed in every detail.
- H. The ends of all conduits shall be tightly plugged to exclude dust and moisture during construction. Duxseal, or 3M seal spray shall be used in all applications. Plugging with tape is prohibited, even for a temporary time.
- I. Where raceways enter or leave the raceway system where the raceway origin or termination, could be subjected to the entry of moisture, rain or liquid of any type, particularly where the termination of such raceways terminate in any equipment, new or existing at a lower elevation, such raceways shall be tightly sealed at the higher elevation, both before and after the installation of cables, such that there shall be no entry of water or moisture to the Raceway System at any time. Any damage to new or existing equipment shall be corrected by complete replacement of such equipment, at no cost to the Owner. Cleaning or drying of such equipment will not be acceptable.

- J. Conduit supports, other than for underground raceways, shall be spaced at intervals of 8-ft or less, as required to obtain rigid construction.
- K. Single conduits shall be supported by means of one-hole pipe clamps in combination with one-screw back plates, to raise conduits from the surface. Multiple runs of conduits shall be supported on trapeze type hangers with horizontal members and threaded hanger rods. The rods shall be not less than 3/8-in diameter. Surface mounted panel boxes, junction boxes, conduit, etc shall be supported by spacers to provide a minimum of 1/2-in clearance between wall and equipment.
- L. Conduit hangers shall be attached to structural steel by means of beam or channel clamps. Where attached to concrete surfaces, concrete inserts of the spot type shall be provided.
- M. All conduits on exposed work shall be run at right angles to and parallel with the surrounding wall and shall conform to the form of the ceiling. No diagonal runs will be allowed. Bends in parallel conduit runs shall be concentric. All conduit shall be run perfectly straight and true.
- N. Conduit terminating in boxes and enclosures, other than NEMA 1 type, shall be terminated with conduit hubs.
- O. Conduits terminated into enclosures shall be perpendicular to the walls where flexible liquidtight or rigid conduits are required. The use of short sealtight elbow fittings for such terminations will not be permitted.
- P. Conduits containing equipment grounding conductors and terminating in boxes shall have insulated throat grounding bushings. The wire shall be grounded to the box.
- Q. Conduits shall be installed using threaded fittings. Running threads will not be permitted.
- R. All conduit fittings on PVC conduit shall be of the glued type.
- S. Liquidtight flexible aluminum conduit shall be used for the primary and secondary of transformers, generator terminations and other equipment where vibration is present. Use in other locations is not permitted. Liquidtight flexible aluminum conduit shall have a maximum length not greater than that of a factory manufactured long radius elbow of the conduit size being used. The maximum bending radius shall not be less than that shown in the NEC Chapter 9, Table 2, "Other Bends". BX or AC type prefabricated cables will not be permitted.
- T. Where conduits pass through openings in walls or floor slabs, the remaining openings shall be sealed against the passage of flame and smoke.
- U. Conduit ends exposed to the weather or corrosive gases shall be sealed with conduit sealing bushings.
- V. Raceways terminating in Control Panels, or boxes containing electrical equipment, shall not enter from the top of the panel or box, and the raceway shall be sealed with a removable silicone sealant.
- W. All conduits from external sources entering or leaving a multiple compartment enclosure shall be stubbed up into the bottom horizontal wireway or other Manufacturer designated area,

directly below the vertical section in which the conductors are to be terminated. Conduits entering from cable tray shall be stubbed into the upper section.

- X. Conduit sealing and drain fittings shall be installed in areas designated as NEMA 4X or 7.
- Y. A conduit identification plate shall be installed on all power, instrumentation, alarm and control conduits at each end of the run and at intermediate junction boxes, manholes, etc. Conduit plates shall be installed before conductors are pulled into conduits. Exact identification plate location shall be coordinated with the Owner/Engineer at the time of installation to provide uniformity of placement and ease of reading. Conduit numbers shall be exactly as shown on the Drawings.
- Z. Conduits noted as spare shall be capped or plugged at both ends with easily removable fittings.
- AA. Mandrels shall be pulled through all existing conduits that will be reused and through all new conduits 2-in in diameter and larger prior to installing conductors.
- BB. 3/16-in polypropylene pull lines shall be installed in all new conduits noted as spares or designated for future equipment.
- CC. All conduits that may under any circumstance contain liquids such as water, condensation, liquid chemicals, etc, shall be arranged to drain away from the equipment served. If conduit drainage is not possible, conduit seals shall be used to plug the conduits at the point of attachment to the equipment.
- DD. Where no type or size is indicated for junction boxes, pull boxes or terminal cabinets, they shall be sized in accordance with the requirements of the NEC.
- EE. Conduits shall not cross pipe shafts, access hatches or vent duct openings. They shall be routed to avoid such present or future openings in floor or ceiling construction.
- FF. The use of running threads is prohibited. Where such threads are necessary, a 3-piece union shall be used.
- GG. Conduits passing from heated to unheated spaces, exterior spaces, refrigerated spaces, cold air plenums, etc, shall be sealed with "Duxseal," as manufactured by Mansville or 3M, or seal fitting to prevent the accumulation of condensation.
- HH. Conduits shall be located a minimum of 3-in from steam or hot water piping. Where crossings are unavoidable, the conduit shall be kept at least 1-in from the covering of the pipe crossed.
- II. Conduits terminating at a cable tray shall be supported independently from the cable tray.
- JJ. Provide a conduit support within 1-ft of the cable tray. The weight of the conduit shall not bear on the cable tray.
- KK. Penetrations by conduit, raceways, cables, sleeves, etc., through rated walls, shafts, floors, ceilings, etc., shall be sealed by a closure foam, Dow Corning 3-6548 Silicone RTV, GE RTV 35D Silicone Foam.

END OF SECTION

SECTION 16112
CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install cable trays systems, including all hardware and accessories.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
 - 1. 01350 – Submittals
 - 2. 16000 – Electrical General Provisions

1.03 SUBMITTALS

- A. Submit to the Owner's Representative, in accordance with Division 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.
- B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment options not provided.
- C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.
- D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.
- E. Submit detailed cable tray layout showing all support locations, cable tray sizes, and routing prior to installation.

1.04 REFERENCE STANDARDS

- A. Cable trays shall be designed, manufactured, and tested in accordance with the following:
 - 1. NEMA VE 2-2002 – Cable Tray Installation Guidelines
 - 2. NEMA FG 1-2002 – Non-metallic Cable Tray Systems
 - 3. ANSI/NFPA 70 - National Electrical Code Article 392

1.05 QUALITY ASSURANCE

A. Approved manufacturers

1. Approved manufacturers are B-Line, Thomas & Betts, and Husky. All components shall be of the same manufacturer.

B. Manufacturers: Firms regularly engaged in manufacture of cable trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

C. NEMA Compliance: Comply with NEMA Standards Publication Number FG-1, "Non-Metallic Cable Tray Systems".

D. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 318, NEC).

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

A. Cable trays shall be furnished and installed by the Contractor, complete with all fittings, accessories, and supports to form a complete system as herein specified and indicated on the Plans.

1.07 DELIVERY, HANDLING, AND STORAGE

A. Deliver cable tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.

B. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic. Wet materials should be unpacked and dried before storage.

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: Two (2) years from date of shipment from the factory. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Provide non-metallic fiberglass cable trays, of types, classes, and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional

- construction features. Cable tray shall be installed according to the latest revision of NEMA VE 2.
- B. Material and Finish: Straight section structural elements; side rails, rungs and splice plates shall be pultruded from glass fiber reinforced polyester resin or vinyl ester resin.
 - C. Pultruded shapes shall be constructed with a surface veil to insure a resin-rich surface and ultraviolet resistance.
 - D. Pultruded shapes shall meet ASTM E-84, Class 1 flame rating and self-extinguishing requirements of ASTM D-635.
 - E. Ladder Cable Trays shall consist of two longitudinal members (side rails) with transverse members (rungs) mechanically fastened and adhesively bonded to the side rails. Rungs shall be spaced 9 inches apart. Rung spacing in radiused fittings shall be industry standard 9" and measured at the center of the tray's width. Each rung must be capable of supporting a 200 lb. concentrated load at the center of the cable tray with a safety factor of 1.5.
 - F. Ventilated Bottom Cable Trays shall consist of two longitudinal members (side rails) with rungs spaced 4" apart.
 - G. Cable tray loading depth shall be 5 inches per NEMA FG 1.
 - H. Straight sections shall be supplied in standard 20 foot (6m) lengths.
 - I. Cable tray inside widths shall be 24, 30, and 36 inches or as shown on drawings. Outside width shall not exceed inside by more than a total of 2".
 - J. Straight and expansion splice plates will be of "L" shaped lay-in design with an eight-bolt pattern in 5" fill systems and four-bolt pattern in 3" and 2" fill systems. Splice plates shall be furnished with straight sections and fittings.
 - K. All fittings must have a minimum radius of 12.
 - L. Fittings shall be of mitered construction.
 - M. Dimension tolerances will be per NEMA FG 1.
 - N. Cable Firestop Material shall be fiberglass blanket with noncombustible binder, manufactured by Owens Corning or approved equivalent. Conduit sealant material shall be Johns-Manville Duxseal.
 - O. Tray systems shall be complete with all splice plates, expansion joints, hardware, covers, and cover clips, where specified for a complete system. Covers, where required, shall be flanged type in standard lengths and in configurations to fit all width of bends, tees, etc. Cover clips shall be thumb type. Connectors for joining trays shall develop the full strength and rigidity of the run and shall not introduce any sharp edges or corners. Bolt ends and nuts shall not be located inside cable tray. Lock washers shall be used with bolts and nuts. Cable trays shall be bolted at each penetration provided for by the cable tray manufacturer. All nuts, bolts, washers, and all thread shall be 316 stainless steel.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

- A. Install cable trays as indicated: Installation shall be in accordance with equipment manufacturer's instructions, and with recognized industry practices to ensure that cable tray equipment comply with requirements of NEC and applicable portions of NFPA 70B. Reference NEMA VE 2 for general cable tray installation guidelines.
- B. Coordinate cable tray with other electrical work as necessary to properly integrate installation of cable tray work with other work.
- C. Provide sufficient space encompassing cable trays to permit access for installing and maintaining cables.
- D. Cable tray fitting supports shall be located such that they meet the strength requirements of straight sections. Install fitting supports per NEMA VE 2 guidelines, or in accordance with manufacturer's instructions.
- E. Cable trays
 - 1. Cable trays shall not be walked upon by any personnel, and care shall be exercised during erection to prevent deformation. Additional supports shall be provided if necessary.
- F. Field cutting
 - 1. Field cutting shall be accomplished as necessary, all sharp edges shall be ground smooth where rungs or side channels must be cut or removed.
- G. Tray expansion joints
 - 1. Trays shall have expansion joint splice plates installed at intervals not exceeding 50 feet of straight runs. Expansion joint splice plates shall also be installed at tees and crosses. Trays shall be supported within one foot maximum of each side of the gap. The gap between the tray ends shall be based on a temperature at the time of installation and the temperature extreme, a maximum of 115°F. and minimum of 32°F. Keamalex gritless inhibitor #30584-22, or equal, shall be used on all sliding surfaces of expansion joints.

H. Building expansion joints

1. Expansion joint splice plates shall also be installed whenever the cable tray crosses a building expansion joint.

I. Installation of tray expansion joints

1. When tray expansion joints are installed, the tray shall be firmly affixed close to the midpoint between expansion joints or to the nearest 90-degree bend. This shall be done to prevent the tray from possibly creeping to one end or the other.

J. Tray expansion joint grounding

1. Expansion joint grounding and tray grounding shall be according to 16450 – Grounding and Bonding for Electrical Systems and as shown on the tray drawings. Trays shall be grounded at both ends and at least every 50 feet.

K. Cable tray identification

1. Cable tray identification shall be as specified in 16195 – Identifications for Electrical Systems.

L. Cable trays and supports.

1. Cable trays and supports shall be installed as indicated on the Plans. Cable trays shall be supported to comply with the NEMA VE-2 Standard.

M. Cable lengths

1. Long low voltage cable lengths shall be installed using cable rollers and basket grips and tools designed specifically for this purpose, with care being taken not to exceed pulling tensions and bending radii recommended by the manufacturer of the cable. Short lengths of low voltage cable may be laid in place without special tools.

N. Cable ties

1. Cables shall be fastened in place with plastic Ty-Raps as manufactured by Thomas and Betts, approximately every 5 feet for straight horizontal runs and every 12 inches on radii and vertical bends.

O. Cable tray firestops

1. Cable tray firestops, consisting of fiberglass blankets on both sides of the tray, retained with solid hot-dip galvanized steel covers, shall be installed where required. In general, firestops shall be installed where trays pass through walls, ceilings, and floors. Conduit dropouts shall be sealed with Duxseal; vertical firestops shall be sealed with fiberglass. Fiberglass shall also be used to seal any openings around the tray where it passes through floors, walls, or ceilings.

P. Changes in tray size

1. Changes in tray size or direction, crosses, dropouts, etc., shall employ use of standard fittings and standard connectors approved for this purpose.

Q. Vertical runs

1. All vertical runs of cable trays shall be provided with ventilated cable tray- covers from the floor line to a point six feet above floor.

3.03 INSPECTION (NOT USED)

3.04 TESTING

- A. Upon request manufacturer shall provide test reports witnessed by an independent testing laboratory of the "worst case" loading conditions outlined in this specification and performed in accordance with the latest revision of NEMA FG 1.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 16120
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish labor, materials, equipment and incidentals necessary to install 600-volt wires and cables. Electrical work shall be in accordance with Division 16 – Electrical.
- B. Work shall include building wire, cable, wiring connections and terminations, and modular wiring systems.

1.02 RELATED WORK

- A. Division 16 – Electrical.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Division 01 – General Requirements and Division 16 - Electrical and shall include:
 - B. Product Data: Submit for wire and each cable assembly type.
 - C. Project Record Documents: Record actual locations of components and circuits.

1.04 REFERENCE STANDARDS

- A. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
 - 2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
- C. National Electrical Manufacturers Association:
 - 1. NEMA WC-3Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
 - 2. NEMA WC-5Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

D. Underwriters Laboratories, Inc.:

1. UL 1277 - Standard for Safety for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with State and Local codes and standards; NEC, and project specifications.
- B. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

A. Product Requirements: Provide products as follows:

1. Supply Stranded conductor for all feeders and branch circuits.
2. Increase wire size in branch circuits to limit voltage drop to a maximum of 3 percent.

B. Wiring Methods: Provide the following wiring methods:

1. For all Raceway Locations: Use only Type XHHW-2 insulation in raceways.
2. Office Locations: THHN/THWN insulation in raceways.
3. Cable Tray Locations: Use only Tray cable Type TC or XHHW-2 for individual conductors as permitted by the NEC.
4. All VFDs shall be supplied with VFD rated cable.
5. All Control Cables shall have an overall shield and be grounded.
6. All 4-20mA cable shall be minimum #16AWG Twisted Shielded Pair.
7. Ground Wire used as a counterpoise shall be bare tinned copper.

C. Ground Conductors

1. Conduits and other raceway shall contain an equipment grounding conductor whether the raceway is metallic or not. Conduits, motors, cabinets, outlets, and other equipment shall be properly grounded in accordance with National Electric Code requirements. Where ground wire is exposed to mechanical damage, install wire in rigid aluminum conduit. Make connections to equipment with solderless connections. Wire connections to the ground rods of the ground mat shall be of the fused type equal to the Cadweld process.

D. Conductor sizes are based on copper.

E. Aluminum conductors are not permitted

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 WARRANTY/EXTENDED WARRANTY (NOT USED)

1.10 COORDINATION

- A. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.
- B. Wire and cable routing indicated is approximate unless dimensioned.

PART 2 PRODUCTS

2.01 CONDUCTORS:

- A. Soft-drawn, annealed copper with a conductivity of not less than that of 98% pure copper bearing the U.L. label. The minimal size shall be #12. Conductors #8 or larger shall be stranded. Utilize single conductors.

2.02 SINGLE CONDUCTORS:

- A. Conductor with thermoplastic insulation rated at 600 volts and insulated with type XHHW-2 insulation. Wire shall be water tank tested and approved as machine tool wire, in accordance with National Machine Tool Builders Association. Wire in light fixture channels and other special locations shall be as specifically noted for temperature in NEC Article 300. Wire shall be manufactured by Okonite, Southwire, Encore Wire, or General Cable.

2.03 GROUND WIRE:

- A. Bare or Tinned, Class B stranded conductor without insulation. Ground wire installed above ground shall be tinned, below ground shall be bare.

2.04 VFD CABLES:

- A. Conductors provided on the load side of variable frequency drives shall be specifically rated for VFD application, shielded with 3 symmetrical grounds with a minimum voltage rating of 1000V.

2.05 PAIRED SHIELDED CABLE:

- A. 16 gauge, 7/28 stranded, tinned copper conductors with .015" extruded PVC; .004" nylon insulation twisted into pairs, stranded into a core and enclosed by a non-hygroscopic core tape, 100% coverage, helically wound, aluminum foil shield, drain wire, and .045" minimum extruded PVC jacket. Pairs shall be black/red or black/white numbered. Cables shall be 600 volts in accordance with NEC-725 and IEEE 383. Cables shall be manufactured by Belden, Okonite, Alpha or General Cable.

2.06 TRIAD SHIELDED CABLE (RTD CABLE):

- A. RTD cable shall have the following characteristics:
1. Eight (8) triads each with three (3) 18 AWG conductors.
 2. Triads shall each have individual shield and overall shield.
 3. Each conductor insulated for 600V and entire cable rated for 90 deg C.
 - a. Primary Insulation: 15 mils nominal; PVC; 4 mils nylon.
 - b. Number of Conductors: 3.
 - c. Color Code: Black and white and red.
 - d. Group Identification: Each triad numbered.
 - e. Pair Shield: 100% coverage; .35 mil aluminum x .5 mil Mylar tape and 20 gauge 7 strand tinned copper drain wire; shield tape to be applied to give a total shield isolation from all other triad shields.
 - f. Cable Shield: 100% coverage; 2.35 mil aluminum Mylar tape shield and an 18gauge 7 strand tinned copper drain wire.
 - g. Jacket: Black 90 deg C FR PVC.
 - h. RTD cable shall be manufactured by Okonite, Belden, or General Cable.

2.07 TRAY CABLE:

- A. Type TC; multi-conductor cable specifically approved for the installation of cable trays, in accordance with NEC Article 340. Cable shall be Okonite, Southwire, Encore Wire, or General Cable. Each cable conductor shall be insulated with XHHW-2 type insulation rated at 600 volts. The individual conductors shall be twisted together and jacketed with a PVC outer covering containing a U.L. label and necessary identification, including the Manufacturer, the number of conductors, size, XHHW-2 conductors, sun-resistance, and other pertinent information.

2.08 TERMINATIONS

- A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.
- B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify interior of building has been protected from weather.
- B. Verify mechanical work likely to damage wire and cable has been completed.
- C. Verify raceway installation is complete and supported.

3.02 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.03 INSTALLATION

- A. Unless necessary for pulling purposes, conductors shall be continuous from terminal block to terminal block without splice. Condulet type fittings shall not contain splices. No splicing of conductors shall be performed in any below ground structure.
- B. Splice only in junction or outlet boxes. Neatly train wiring inside boxes, equipment and panelboards. Pull conductors into a raceway at the same time and use U.L. listed, wire pulling lubricant for pulling No. 4AWG and larger wire. Install raceway first as a complete system without conductors. Do not install pull wires and conductors until the raceway system is in place.
- C. Circuits shall be tagged at terminations (both ends), in pull boxes, cabinets, and enclosures as follows:
 - 1. Tags relying on adhesives or taped-on markers are not acceptable.
 - 2. Provide conductor tags for conductors No. 10 AWG and below with legible permanent sleeve of yellow or white PVC with machine printed black marking, Raychem TMS sleeves.
 - 3. Provide tags for cables and for conductors No. 8 AWG and larger consisting of permanent nylon marker plates with legible designations hot stamped on the plate. Attach these marker plates to conductors and cables with plastic wire wraps. Tags shall be Raychem TMS-CM cable markers.
 - 4. Tags shall be imprinted with panelboard and panelboard position number (e.g. LA3-23) for conductors fed from panelboards. Other conductors shall have tags imprinted with the MCC which feeds the conductors (e.g. MCC 1).
 - 5. Switchlegs shall have the designation described above on their tags, plus an "S" suffix. Travelers shall have the designation described above on their tags, plus a "T" suffix.
 - 6. Where more than one neutral is present with a group of conductors, a tag shall be applied to each neutral indicating which phase conductors are served by each neutral (e.g. HA-2, 4, 6).
- D. Wire other than telephone station wire shall be stranded. The minimum size conductor permitted is #12 AWG, except as specifically indicated on the plans. Wire shall bear the approval of Underwriter's Laboratories, Inc. Conductors terminated on a screw termination shall have a crimp on type spade connector applied on the wire end, Panduit Pan-Term.
- E. Grouping conductors together into one conduit shall not be allowed where the plans indicate the conductors to be placed in separate conduits. Each home run shown on the plans shall be in its own conduit.
- F. Route wire and cable to meet Project conditions.
- G. Neatly train and lace wiring inside boxes, equipment, and panelboards.

- H. Identify and color code wire and cable under provisions of Division 16 – Electrical. Identify each conductor with its circuit number or other designation indicated.
- I. Special Techniques--Wire in Raceway:
 - 1. Pull conductors into raceway at same time.
 - 2. Install building wire 4 AWG and larger with pulling equipment.
- J. Special Techniques - Cable:
 - 1. Protect exposed cable from damage.
 - 2. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure. Do not rest cable on ceiling panels.
 - 3. Use suitable cable fittings and connectors.
- K. Special Techniques - Wiring Connections:
 - 1. Lean conductor surfaces before installing lugs and connectors.
 - 2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - 3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
 - 4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
 - 5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
 - 6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
 - 7. Install suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.
 - 8. Paired shielded and triad cable: Ground paired shielded and triad shielded cables at the instrument panel end only and insulate from ground elsewhere. The shield shall be continuous for the entire run. The paired shielded and triad shielded cable shall not be laced with or placed in the same conduit with power cables. Each termination of paired shielded or triad shielded cable shall be coated with silicone jelly after termination. The shield of pair shielded cable and triad shielded cable shall only be broken when the conductors are terminated on terminal strips.
- L. Install stranded conductors for branch circuits 10 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

- M. Install terminal lugs on ends of 600 volt wires unless lugs are furnished on connected device, such as circuit breakers.
- N. Size lugs in accordance with Manufacturer's recommendations terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.
- O. For terminal lugs fastened together such as on motors, transformers, and other apparatus, or when space between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength of 2-1/2 times normal potential of circuit.

3.04 WIRE COLOR

- A. Color coding of cables shall comply with the local city codes. In the absence of a local color coding requirement, the following shall be used:
 - 1. For 480Y/277V, 3-phase wiring:
 - a. Phase A – Brown.
 - b. Phase B – Orange.
 - c. Phase C – Yellow.
 - d. Neutral – Gray.
 - e. Equipment Grounding Conductor – Green.
 - 2. For 208Y/120V or 240/120V, 3-phase wiring:
 - a. Phase A – Black.
 - b. Phase B – Red.
 - c. Phase C – Blue.
 - d. Neutral – White.
 - e. Equipment Grounding Conductor – Green
 - 3. For 120/240V, 1-phase wiring:
 - a. Leg A – Black.
 - b. Leg B – Red.
 - c. Neutral – White.
 - d. Equipment Grounding Conductor – Green.
- B. Colored, vinyl marking tape shall be allowed only on conductors greater than 8 AWG. Under no condition shall conductors of a different color be spliced together.
- C. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.
- D. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.
- E. Feeder Circuit Conductors: Uniquely color code each phase.
- F. Ground Conductors:
 - 1. For 6 AWG and smaller: Green.

2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.05 GROUND CONDUCTORS

- A. Conduits and other raceway shall contain an equipment grounding conductor whether the raceway is metallic or not. Conduits, motors, cabinets, outlets, and other equipment shall be properly grounded in accordance with National Electric Code requirements. Where ground wire is exposed to mechanical damage, install wire in rigid aluminum conduit. Make connections to equipment with solderless connections. Wire connections to the ground rods of the ground mat shall be of the fused type equal to the Cadweld process.
- B. Ground metallic material, including but not limited to metallic raceway, metallic boxes and metallic enclosures. Where metallic material is not connected by raceway to a solid ground, connect the metallic material to the largest equipment grounding conductor which it houses. Clean the metal surface under the grounding lug to bright metal. Connections to motors shall be to the grounding stud which shall be threaded into the stationary frame; Burndy KC Servit, and not an end bell. The ground wire shall not be lugged to a mounting bolt.
- C. Ground wire shall be uninsulated tinned copper sized as shown on the plans in all cases.
- D. where a single ground wire is indicated to be installed in a conduit with no other conductors in the conduit, or where the ground wire is directly buried in earth or concrete. In all other cases, insulate ground wire with insulation as specified for low voltage wire.

3.06 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS.

END OF SECTION

SECTION 16161
PANELBOARDS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install distribution and branch circuit panelboards.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
 - 1. Section 01350 – Submittals
 - 2. Section 16000 – Electrical General Provisions
 - 3. Section 16195 – Electrical Identification

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. The following information shall be submitted to the Owner's Representative:
 - 1. Breaker layout drawing with dimensions indicated and nameplate designation.
 - 2. Component list.
 - 3. Conduit entry/exit locations.
 - 4. Assembly ratings including:
 - a. Short-circuit rating.
 - b. Voltage.
 - c. Continuous current.
 - 5. Cable terminal sizes.
- C. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.
- D. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.
- E. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified

requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. UL 50 - Cabinets and Boxes.
2. UL 67 - Electric Panelboards.
3. NEMA AB 1 - Molded Case Circuit Breakers.
4. NEMA AB 2 - Procedures for Verifying the Performance of Molded Case Circuit Breakers.
5. NEMA KS 1 - Enclosed Switches.
6. NEMA PB 1 - Panelboards.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. The general construction of the panelboard and the materials used shall be similar to that used for panelboards of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.
2. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the panelboard. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

B. Acceptable Manufacturers

1. ABB.
2. Siemens.
3. Square D.
4. Eaton / Cutler Hammer.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

- A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.
- B. Warranty Period: Two (2) years from date of Substantial Completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 PART 2 – PRODUCTS

2.01 MATERIALS

A. Bus

1. Material:

- a. Provide tin plated, copper bus bars, 98 percent IACS conductivity, full-sized throughout their length.
- b. Use buses with tin-plated contact surfaces.
- c. Include a tin-plated copper bus bar ground bus in panelboard rated.
- d. Full size (100% rated) insulated neutral bus shall be included in the panel board, shown with neutral. 200% rated neutral bus shall be supplied for panels designated on the drawings.
- e. The ground and neutral bus shall be at least one terminal screw for each circuit.
- f. Provide through feed or sub feed lugs where indicated.
- g. Provide lugs and connection points on phase, neutral and ground bus suitable for copper conductors.
- h. Spaces for future circuit breakers shall be bussed for the maximum devices that can be fitted.

2. Size bars as indicated and brace them to withstand the available symmetrical short circuit current.

3. Installation:

- a. Install buses in allotted spaces so that devices can be added without additional machining, drilling, or tapping.
- b. Mount neutral bars, as required, on the opposite end of the main lugs.

B. Protective Devices

1. Circuit Breakers: Provide circuit breakers for the specified service with the number of poles and ampere ratings indicated.
 - a. Provide breakers which are quick-make and quick-break on both manual and automatic operation.
 - b. Use a trip-free trip indicating breaker.
 - c. Incorporate inverse time characteristic by bimetallic overload elements and instantaneous characteristic by magnetic trip. Where indicated, provide ground fault circuit breakers (GFCB).
 - d. For 2-pole and 3-pole breakers, use the common-trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable.
 - e. Unless otherwise indicated, provide circuit breakers with the following interrupting ratings:
 - 1) Each circuit breaker used in 120/240 Volt panelboards shall have an interrupting capacity of not less than 10,000 Amps, RMS symmetrical.
 - 2) Each circuit breaker used in 277/480 Volt and 480 Volt panelboards shall have an interrupting capacity of not less than 42,000 Amps, RMS symmetrical.
 - 3) GFCI (ground fault circuit interrupter) shall be provided for circuits where shown on the drawings. GFCI units shall be 1 Pole, 120 Volt, molded case, bolt-on breakers, incorporating a solid state ground fault interrupter circuit insulated and isolated from the breaker mechanism. The unit shall be UL listed Class A Group I device (5 milliamp sensitivity, 25 millisecond trip time) and an interrupting capacity of 10,000 Amps, RMS.
 - 4) Circuit breakers shall be as manufactured by the panelboard manufacturer.
 - f. Connect breakers to the main bus by means of a solidly bolted connection.
 - g. Use breakers which are interchangeable, capable of being operated in any position within the panel.
 - h. Each panelboard shall be equipped with a minimum of 20 percent spare breakers, with spaces, bus work, and terminators to complete the next standard size panelboards above the 20% requirement.
 - i. Independently mount breakers so that a single unit can be removed from the front of the panel without disturbing or removing the main bus, other units or other branch circuit connections.
 - j. Provide individual breaker handle lock for all circuits that supply exit signs, emergency lights, and fire alarm panels.
 - k. Provide GFI circuit breakers for heat trace circuit. The rating shall be as per NEC.
2. Surge Suppressor
 - a. All 3-phase and single-phase panelboards shall be provided with a surge protective device in accordance with Section 16443.
3. Service Entrance
 - a. The panelboard shall have a connection for housing and grounding neutral conductor.
 - b. Provide a UL label for the panelboard.

2.02 FABRICATION

A. Enclosure

1. Cabinet:

- a. Construct cabinets in accordance with UL 50. Use painted galvanized sheet steel 16-gauge or more.
- b. Provide a minimum 4-inch gutter wiring space on each side.
- c. Reinforce cabinets and securely support bus bars and over-current devices to prevent vibration and breakage in handling.
- d. Provide standard conduit knockouts in cabinet ends.
- e. Finish cabinets of surface-mounted panelboards to match doors and trim as specified below.
- f. Panelboards mounted outdoors shall be weatherproof and shall have a door behind door type construction.
- g. Panelboards mounted outdoor in wet or corrosive areas shall have NEMA 4X stainless steel 316 enclosures.
- h. Panelboards mounted indoor shall be NEMA 12 enclosures for areas classified as NEMA 12.

2. Doors and Trim:

- a. Fabricate doors and trim from cold-rolled sheet steel.
- b. Equip doors with flush-type combination catch and key lock.
- c. Key all locks alike. Fasten trim for flush-mounted panelboards to cabinets by an approved means which permits both horizontal and vertical adjustment.
- d. Trim for surface-mounted panelboards must fit the cabinet with no overhang.
- e. Apply a finish to trim and doors consisting of two coats of enamel over a rust-inhibiting prime coat.

B. Circuit Identification

1. Directory:

- a. For each panelboard, provide a directory frame mounted inside the door with a heat-resistant transparent face and a directory card for identifying the load served.
- b. Type directory as specified in Section 16195.

2. Nameplate:

- a. Provide a black on white phenolic nameplate on the face of the panelboard using the following as an example:

Panel HA
277/480V, 3PH, 4W
Feeder from MCC-B/Section

- b. The nameplate shall have a minimum thickness of 1/8" and be mounted above the panel door.

C. Listing

1. UL 67 - Electric Panelboards.

D. Special Requirements

1. All copper items, including wiring, terminal blocks, lugs, connectors, bus, etc., shall be tin plated copper.
2. All steel shall be primed and painted as specified. Galvanized items shall also be painted.
3. All hardware, including nuts, bolts, washers, screws, anchor bolts, door hinges, etc., shall be made of 316 stainless steel.
4. The panelboard steel parts shall be cleaned and sprayed in control cleaning solutions by a multi-stage spray washer. The operation shall produce a coating of a minimum of 150 milligrams per square foot to meet MIL Specification TT-C490. The primed metal parts shall be electrostatically coated with power paint to a thickness of 2.5mils. The paint finish shall withstand a minimum of 1000 hours salt spray test.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 PART 3 –EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

- A. Install panelboards in the locations as shown and as recommended in NEMA PB1.1.
- B. In wet and corrosive areas, including outdoor locations, install stainless steel 316 panelboard enclosures on Type 316 stainless steel unistrut support to provide clearance behind the mounting surface.
- C. In wet and corrosive areas, including outdoor locations, connect conduits to the bottom of the enclosure and to the lower 30 percent of the sides.
- D. All conduit connections shall be by use of Myers hub.
- E. Install the panelboards such that the center of the switch or circuit breaker in the highest position will not be more than 6-1/2 feet above the floor or working platform.

3.03 INSPECTION

- A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.
- B. Check all installed panels for proper grounding, fastening and alignment.

3.04 FIELD TESTING

- A. Refer to Section 16060.

3.05 FIELD PAINTNG

- A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

- A. Remove debris from installation site and wipe dust and dirt from all components.

END OF SECTION

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SECTION 16195
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install tags/nameplate on all equipment, devices, instruments, conduit and conductor marking as indicated on the drawings and specified herein. Major equipment shall be furnished with nameplates in accordance with their individual specifications.

1.02 RELATED WORK

- A. Section 01350 – Submittals
- B. Division 16000 – Electrical General Provisions

1.03 SUBMITTALS

- A. Submit to the Owner’s Representative, in accordance with Division 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.
- B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.
- C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.
- D. Submit a letter showing all the exceptions to the specification. If no exceptions are taken the letter shall indicate no exception. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS (NOT USED)

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 PRODUCTS

2.01 MATERIALS

A. Wire Markers

1. Provide heat shrinkable sleeves and machine printed legends at every conductor. Sleeves and legends shall be high resistant to abrasion, solvents and chemicals. Provide Tyco TMS, Brady Perma Sleeve XPS, or approved equal. Markers shall be white with black lettering.
2. Markers shall have conductor origin, termination and circuit number, terminal number whichever applies.
3. Large conductors, multi-conductor cable and tray cables to be identified with placards held on with wire ties and of the same quality as markers for smaller single conductors.
4. Cables in cable tray to be identified with place cards at the equipment and at 20 feet spans in between.
5. All control wiring in electrical equipment or manufactured supplied panel shall have wire markers.

B. Conduit Markers

1. Exposed Conduit
 - a. Conduit markers to be stainless steel type permitting embossing on the job and attached to conduit with banding made of same material. Markers to be installed lengthwise and wrapped with clear adhesive tape.
 - b. Conduits to be marked at the point of origin, the point of termination, upon crossing wall, each side of junction boxes and at 20-foot internals for all exposed and accessible conduits. Identify all exposed conduits by their panel, MCC, circuit numbers or loop numbers.
 - c. Provide labels for high voltage conduit. Labels shall be vinyl for indoor exposed conduit or polyester for outdoor exposed conduit. Label shall be black letters on red/orange background. Labels shall be as manufactured by Thomas and Betts or Brady.

C. Nameplates

1. Nameplates:
 - a. Externally mark electrical equipment by means of suitable nameplates identifying each and the equipment served.
 - b. Provide each piece of equipment with a white phenolic nameplate with 3/16- inch-high black lettering secured to front of equipment.
 - c. Supply blank nameplates for spare units and used spaces.
 - d. Actual nameplate legend, which may consist of up to three lines, will be provided to the Owner's Representative on submittals.

2. Nameplate Fasteners: Fasten nameplates to equipment only by means of appropriate 316 SS screws and gasket. Stick-ons or adhesives will not be allowed. Seal opening in order to maintain the NEMA rating of the enclosure.
 - a. Nameplate Information: In general, the following information is to be provided for the types of electrical equipment as listed.
 - b. Switchgear, Motor Control Centers and Distribution Panelboards: On the mains, identify the piece of equipment, the source, and voltage characteristics, i.e., 480V, 3PH, 3W, etc. For each branch circuit protective device, identify the load served and the primary side circuit number.
 - c. Transformers: Identify the service source and load served.
 - d. Panelboards: Identify the service source, panelboard designation and voltage characteristics.
 3. Panelboards:
 - a. Prepare a neatly typed circuit directory behind clear heat-resistant plastic for each panelboard. Directory shall include circuit identification, protective device type, trip rating, number of poles and rating of main lugs or main circuit breaker.
 - b. Identify circuits by equipment served and by room numbers, where room numbers exist.
 - c. Use equipment names and room numbers selected by the Owner's Representative; names and numbers may be different from those shown on plans.
 - d. Indicate spares and spaces with light, erasable pencil markings.
 - e. Provide a final set of the panel schedule in the O&M manuals.
 - f. Provide a CD with the file for each Panel to the Owner with the O&M manual.
 4. Boxes, Small Equipment:
 - a. Pull boxes and similar items shall be marked with Nameplates.
 - b. Provide identification labels for high voltage equipment and raceways with the legend "DANGER HIGH VOLTAGE". Mark all exposed high voltage raceways every 25 feet. Safety labels shall be self-sticking polyester and as manufactured by Thomas and Betts (Panduit) or Brady.
 5. Power Receptacles: Use nameplate or engraved plate to identify power receptacles where the nominal voltage between a pair of contacts is greater than 150 volts with circuit number, voltage, and phases.
 6. Wall Switches: Engrave the switch plate of the switch with the function of the switch.
- D. Power Outlets, Switches, and Pilot Devices
- E. Mark power outlets with voltage, phase, panel name, and circuit number.
- F. Identify all wall switches, disconnect switches, etc. with nametags, circuits served, and panel origin, list to be approved by Owner's Representative/Owner.
- G. Identify all push-button stations with their functions and equipment served.

H. Detectable Warning Tape

1. Shall be red metal detectable polyester with a subsurface graphics to seal the legend from acid, alkalis, and other soil substances.
2. Minimum width shall be 2".
3. Warning tape shall meet OSHA regulation for covering location of underground utility lines.
4. The legend shall show CAUTION: BURIED ELECTRIC LINE BELOW
5. The warning tape shall be Red with black lettering.
6. Acceptable manufacturer shall be Brady 91601 or approved equal.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

- A. Furnish and install nameplates for all panelboards, motor starters, motor control center cubicles, disconnect switches, instrument panels, dry type transformers and control stations.
- B. Engrave the equipment designation, (e.g., "Starter Pump P1"), on nameplates in 3/16- inch black letters on white background of laminated phenolic. Securely fasten nameplates using stainless steel 316 sheet metal screws or rivets; or contact cement if enclosure is sealed. All switches, indicating lights, pushbuttons, meters and parameter indicators on panels shall be clearly identified with its function or tag, as required. Identification list to be approved by owner representative through the Owner's Representative.
- C. Stainless Steel tags shall be used on instrument, motors and other devices, as applicable. The tags shall be affixed to the instrument with drive pins or stainless-steel chain in such a manner that it does not need to be removed to install the instrument. Motors shall carry the tag assigned to its driven equipment, (e.g., P-101).

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 CLEANING (NOT USED)

3.06 FIELD PAINTING (NOT USED)

3.07 CLEANING (NOT USED)

END OF SECTION

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SECTION 16301
AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and appurtenances, install and test electrically operated, automatic transfer switch (ATS) equipment as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

- A. Shall conform to the requirements of Specification Section 01350 – Submittals.
- B. Shop drawings: Shop drawings shall indicate electrical characteristics and connection requirements, single-line diagrams, assembly wiring diagrams, equipment drawings, product description, and installation instructions. Shop drawings shall also clearly indicate enclosure size, gutter space, short circuit rating and continuous ampere rating of switch.
- C. Operation and Maintenance (O & M) Manuals: O&M manuals shall be submitted in accordance with the Contract Documents, and shall include detailed parts lists, lists of recommended spare parts, circuit diagrams, maintenance procedures and operating instructions. Contractor shall submit O&M manuals for each size of ATS.
- D. Product Data:
 - 1. Catalog sheets, specifications and installation instructions.
 - 2. Bill of materials.
 - 3. Detailed sequence of operations.
 - 4. Performance data: Performance data shall include equipment life, test, system functional flows, safety features and mechanical automated details.
 - 5. Company's data indicating maintenance schedule.
 - 6. Name, address and telephone number of nearest fully equipped service organization.

1.03 REFERENCE STANDARDS

- A. Products for, and the execution of, the work of this Section shall satisfy the applicable requirements of the latest NEC Codes and Federal, State, and Local regulations.

1.04 QUALITY ASSURANCE

- A. ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, and installation and servicing in accordance with ISO 9001.

- B. ATS shall be furnished through an authorized distributor of the specified ATS manufacturer with minimum three years documented experience.
- C. List of Completed Installations: Contractor shall furnish the name, address and telephone number of a least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.
- D. Contractor shall be a fully equipped service organization capable of responding within 8 hours to service calls, and shall be available 24 hours a day, 7 days a week to service the completed work.

1.05 FACTORY TESTS

- A. ATS shall be thoroughly tested at the factory to ensure proper operation of the individual components and correct overall sequence of operation, and to ensure that the operating transfer time, voltage, frequency, and time delay settings are in compliance with the project requirements. Factory tests shall be conducted per UL standards, and a certified test report shall be submitted to the engineer for review.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ASCO
 - 2. Eaton
 - 3. Engineer Approved Equal.
- B. Furnish material and equipment bearing evidence of UL listing where UL standards exist and manufacturer identification and customary size or rating data.
- C. Provide products that are free from defects impairing performance, durability, or appearance, and of the commercial quality best suited for the purpose shown on the Drawings or specified herein.
- D. ATS shall be rated for application with upstream power circuit breaker overcurrent/short-circuit protection.
- E. The voltage rating of the transfer switch shall be no less than the system voltage rating. The continuous current rating of the transfer switch shall be no less than the maximum continuous current requirements of the system.
- F. ATS shall be capable of being operated manually under full load conditions. The manual operator shall provide true quick-make, quick break operation to prevent possible flashovers from switching the contacts slowly. The control panel shall direct the operation of the transfer switch. The controller's sensing and logic shall be controlled by a built-in microprocessor for

maximum reliability and minimum maintenance. Where in-phase monitoring type switches are indicated, provide the assembly complete with all appurtenances and accessories needed to ensure in phase monitoring of the transfer control to minimize transient disturbance and ensure that the voltage of the source being transferred is at least 85% nominal prior to transfer. The control panel shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the control panel to be disconnected from the transfer switch for routine maintenance.

- G. Wiring/Terminations: Terminal blocks shall conform to NEMA ICS4. Terminal facilities shall be arranged for entrance of external conductors from the top or bottom of the enclosure. The main transfer switch terminals shall be suitable for the termination of conductors shown on the plans.

2.02 MATERIALS AND EQUIPMENT

- A. ATS ratings and voltage shall be as indicated on the Drawings. Ampacity ratings indicated shall be full load (100%) acceptance values without de-rating.
- B. Ratings: ATS shall be rated for continuous duty at minimum of 125% of the required load capacity. Voltage rating, phase and pole shall match the available utility supply unless directed by the Project Manager or stated on the Drawings.
- C. ATS shall consist of an inherently double-throw power transfer switch unit and an electric controller interconnected to provide those complete operations and functions identified.
- D. ATS shall transfer the load utilizing in-phase monitor transition including voltage sensing modes in order to avoid out-of-phase transfer operation or shall be of the programmed transition type as indicated by these Contract Documents. Transfer Switch time-delay functions shall be adjustable for sequential transfer of equipment and load isolation as indicated.

2.03 AUTOMATIC TRANSFER SWITCHES - GENERAL

- A. Each ATS unit shall be electrically operated and mechanically held. The electrical operator shall be a solenoid mechanism, momentarily energized. The switch shall be double throw being inherently interlocked both mechanically and electrically to ensure only one of two possible positions, normal or emergency (stand-by). All main contacts shall move simultaneously on the same shaft, without the utilization of multiple snap-action devices.
- B. ATS shall be fully completely factory assembled and wired such that only external circuit connections are required in the field.
- C. ATS shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.
- D. All main contacts shall be tin plated. Switches rated 600 amp and above shall have segmented blow-on construction for high withstand current capability and be protected by separate arcing contacts. Provide one set of auxiliary Form C (SPDT) contacts; rated 10 amp at 120 V for remote monitoring or control action. Auxiliary contacts to be provided on each source position of the switch.

- E. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to manually stop the contacts at any point throughout their entire travel to inspect and service the contacts when required.
- F. Where neutral conductors are to be solidly connected as shown on the Drawings, a neutral conductor terminal plate with fully rated CU pressure connectors shall be provided.
- G. Main contacts shall be designed to withstand multiple fault currents and shall meet UL 489 and/or UL 1087 requirements and shall be fully rated for all types of loads, inductive and resistive, without derating, either open or enclosed.
- H. Provide ATS complete with a fully rated isolated by-pass switch where indicated.
- I. An engine generator exercise timer shall be provided, including a selector switch to select exercise with or without load transfer.
- J. Refer to the Instrumentation Division specification and drawing for the complete Instrumentation Input Output List for monitored parameters.
- K. The equipment manufacturer shall factory enter the proper IP Address for such connection. Upon request by the Contractor, the Owner will provide the proper Internet Protocol Address (IP Address), which will be configured by the equipment manufacturer.

2.04 TIME DELAYS

- A. An adjustable time delay shall be provided to override the momentary normal source outages and delay all transfer and engine starting signals.
- B. An adjustable time delay shall be provided on transfer to emergency, adjustable from 0 to 5 minutes for controlled timing of transfer of loads to emergency.
- C. An adjustable time delay shall be provided on retransfer to normal, adjustable to 30 minutes. Time delays shall be automatically bypassed if emergency source fails and normal source is acceptable.
- D. A 5 minute cool down time delay shall be provided on shutdown of engine generator.
- E. All adjustable time delays shall be field adjustable without the use of tools.

2.05 ENCLOSURE

- A. In general, each ATS shall be furnished in a NEMA type 1 enclosure, unless otherwise directed by the Project Manager or shown on the Drawings.
- B. For outdoor applications, ATS shall be furnished in a NEMA type 4X 316SS enclosure. Contractor shall provide strip heater with thermostat for type 4X enclosure requirements.

- C. ATS shall be flush mounted display with LED indicators for switch position and source availability. ATS shall also include test and time delay by-pass switches. Provide auxiliary contacts to indicate source position.

2.06 NAMEPLATE

- A. ATS nameplate markings shall include the following:
 - 1. Name of manufacturer and catalog number, or equivalent serial number.
 - 2. Voltage and frequency ratings.
 - 3. Continuous current rating.
- B. Additional markings shall be those required by UL 1008.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products to the site under provisions of this Contract.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to internal components, enclosure and finish.

3.02 INSTALLATION

- A. Products shall be installed, connected, and interconnected, where indicated, and in accordance with the manufacturer's printed instructions, as specified herein and as indicated on the Drawings. Connections shall be made in a manner which will insure electrical continuity and operability of the products. Verify the work of other trades is complete to the extent that substrates on which electrical apparatus is to be installed is ready to receive same.

3.03 SERVICE WIRING

- A. Service installation as indicated on the Drawings except that the entire installation shall conform to the latest rules and regulations of the NEC.

3.04 TRAINING

- A. The ATS manufacturer shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. Training date shall be coordinated with owner representative.

3.05 ON-SITE ACCEPTANCE TEST

- A. The complete installation shall be tested for compliance with the Specification following the re-installation of the Standby Power Generator unit; testing of the generator shall include on-site testing of the ATS. The Contractor shall conduct testing in accordance with the manufacturer's literature with the owner representative being present. The Project Manager shall be notified in advance and shall have the option to witness the tests. The Contractor will be required to demonstrate operation of the transfer switch in bypass, normal and emergency modes.

END OF SECTION

SECTION 16360
UNDERGROUND SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install a complete underground system of raceways, manholes and handholes as shown on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
 - 1. Division 01 – General Requirements.

1.03 DIVISION 16 – ELECTRICAL.

1.04 SUBMITTALS

- A. Submit per Division 01 – General Requirements, and Section 16000 – Basic Electrical Requirements.
- B. Submit shop drawings and product data, for the following:
 - 1. Underground Ducts.
 - 2. Concrete Backfill.
 - 3. Plastic duct spacers.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ducts and Fittings
 - 1. Unless otherwise noted, provide Schedule 40 PVC conduit encased in concrete. Provide fittings of the same type material as the conduit.
- B. Concrete
 - 1. Provide concrete conforming to the following.
 - a. Compressive strength: 3,000 psi at 28 days.
 - b. Slump: Not exceeding six inches.
 - c. Aggregate size: Use pea gravel.

- d. Additive: Red ferrous oxide concrete coloring pigment mixed at the rate of 1- 1/2 pounds per sack of cement. Sprinkled color on the top of the duct bank will not be acceptable.
- e. All raceway concrete placements shall be continuous and water tight between manholes or handholes and between manholes or handholes and structures.
- f. Encasement shall be reinforced at all road crossings and where indicated on the drawings.
- g. Encasement shall be laid in trenches as and where indicated on drawings.
- h. Provide not less than 4 inches of concrete between the outside of a raceway and the earth unless otherwise noted on the drawings. Provide not less than 2 inches of concrete between adjacent raceways unless otherwise noted on the Drawings. Form as specified in division 3.
- i. Where raceways pass through concrete walls, concrete encasements shall be extended through the finished flush with inside surfaces. Watertight construction joints with waterstops conforming to division 3 shall be provided.

C. Reinforcing Bars

1. Provide Grade 40 steel reinforcing bars, for all duct banks.

D. Identifying Tape

1. Refer to specification section 16075 Identification for Electrical Systems for detectable warning tape characteristics.

E. Bends:

1. All bends in ductbanks shall be performed using long sweep elbows.

F. Transition to above ground conduit system:

1. When transitioning to above ground conduit systems, contractor shall use PVC coated aluminum conduit for bends and transitions.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 EXECUTION

3.01 DEMOLITION/PREPARATION

A. Location and Inspection

1. Before beginning trenching operations stake out the proposed duct bank routing and obtain approval of the Owner. After trenching has begun and before any ducts or conduits are placed, notify the Owner so that the trenching and installation may be inspected. Also

notify the Owner prior to any placement of concrete for duct banks, so that he may observe the placing. Placing concrete on muddy trench bottoms will not be acceptable.

3.02 INSTALLATION

A. Construction

1. Duct bank configurations are detailed on the drawings. A minimum of 3-inch concrete cover shall be required on all sides of the conduits. Conduits shall be spaced with 3-inch clearance on all sides.

B. Excavation and Backfill

1. Excavation: Excavate trenches for installation of duct banks. Form the trench bottom to follow closely the specified grade and depth for the duct banks.
2. Backfill: Trenches may be backfilled with excavated soil and supplemented as necessary with select materials. Compact the backfill and mound slightly above natural grade, compact to 95%.
3. Restoration: Restore adjacent areas disturbed by trenching or backfilling to a condition equal to the original.

C. Placing of Duct Banks

1. Cover: Unless otherwise shown, provide a minimum 18" of earth and select materials cover. Coordinate grade with other work, if in conflict, rework grade at no cost to Owner.
2. Grade: Place duct banks with a minimum grade of four inches per 100 feet. Grade between manholes may be from one manhole to the next manhole or from a high point between manholes. Where terminating ducts inside of buildings, always slope the grade away from building to the nearest manhole.
3. Changes in Direction: Make changes in direction of runs exceeding a total of 10 degrees, either horizontal or vertical, by using long sweep bends. Long sweep bends must have a minimum radius of curvature of 3 feet and may be made up of one or more curved or straight sections. Manufactured bends having a minimum radius of curvature of three feet may be used at the ends of duct runs which are less than 100 feet in length.
4. Joints: Make joints in ducts and conduits watertight, in accordance with manufacturers recommendations. Stagger joints in adjacent ducts and conduits a minimum of six inches. Make joints between ducts and conduit with appropriate no-thread-to-threaded adapters. Use appropriate sealant.
5. Spacing: Unless otherwise shown, space ducts and conduits with 3" spacers. Place spacers or separators on not greater than five-foot centers. Use spacers or separators made of plastic, concrete or a suitable nonmetallic, nondecaying material.
6. Drainage: All conduit duct banks shall be sloped sufficiently to drain into manholes, pull boxes or sumps.

D. Placing of Concrete

1. Place concrete using chutes and tremies as necessary to limit the free drop of the mix to a maximum of two feet. Carefully rod or vibrate the concrete to aid uniform encasement of the ducts. Smooth the top of the pour with a float. Encase the conduits in concrete, a minimum thickness of three inches, on all sides.

E. Special Project Requirements

1. Contractor shall employ hand trenching at locations where existing underground utilities are present.
2. All damaged utilities should be repaired immediately in manner acceptable to the Owner at Contractor's expense. Any damaged cables shall be replaced in full. Splices shall not be acceptable. Damaged conduits shall be replaced between the two closest manholes and cables repulled.
3. Install a #4/0 bare tin-coated copper grounding conductor centered over the ductbank. Bond ductbank grounding conductor to building or transformer ground loop at one end and to the manhole ground electrode at the other end.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING

- A. Thoroughly clean all ducts and conduits before placing. During construction and after the duct line is completed; plug open ends of ducts and conduits to prevent the entrance of foreign matter. After the duct line has been completed, pull a flexible mandrel through each duct and conduit. The mandrel must not be less than 12 inches long with a diameter approximately 1/4 inch less than the inside diameter of the duct or conduit. After cleaning, place in each duct and conduit a No. 30 nylon line with a plastic tag on each end reading "Pulling Line", and a tag identifying the location of the other end.

END OF SECTION

SECTION 16410
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish labor, materials, equipment and incidentals necessary to install disconnects. Electrical work shall be in accordance with Division 16 – Electrical.
- B. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Receptacle switches.
 - 4. Molded-case circuit breakers (MCCBs).
 - 5. Enclosures.

1.02 RELATED WORK

- A. Division 16 – Electrical.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 – General Provisions and Division 16 - Electrical Specification Sections, apply to this Section.

1.03 SUBMITTALS

- A. Submit per Division 01 – General Provisions and Section 16000 – Basic Electrical Requirements.
- B. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and Manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate). When the AIC of the switch or circuit breaker is not indicated in the project plans, the AIC shall be the same as the AIC of the serving electrical supply connection (Switchboard, panelboard, or MCC).
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.
 - C. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
 1. Wiring Diagrams: For power, signal, and control wiring.
 - D. Manufacturer's field service report.
 - E. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
- 1.04 QUALITY ASSURANCE
- A. Submit per Division 1 – General Provisions, and Section 16000 – Basic Electrical Requirements.
 - B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single Manufacturer.
 - C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
 - D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - E. Comply with NFPA 70.
- 1.05 DEFINITIONS
- A. NC: Normally closed.
 - B. NO: Normally open.
 - C. SPDT: Single pole, double throw.
- 1.06 PROJECT CONDITIONS
- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
 2. Altitude: Not exceeding 6600 feet (2010 m).
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
1. Notify Engineer no fewer than seven days in advance of proposed interruption of electric service.
 2. Indicate method of providing temporary electric service.
 3. Do not proceed with interruption of electric service without Engineer's written permission.
 4. Comply with NFPA 70E.

1.07 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.08 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 2. Fuse Pullers: Two for each size and type.

PART 2 PRODUCTS

2.01 FUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Eaton/Cutler Hammer.
 2. Square D.
 3. Siemens.
 4. ABB.

- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 - 5. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
 - a. Hookstick Handle: Allows use of a hookstick to operate the handle.
 - b. Lugs: Mechanical type, suitable for number, size, and conductor material.
 - c. Service-Rated Switches: Labeled for use as service equipment.

2.02 NONFUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Eaton/Cutler Hammer.
 - 2. Square D.
 - 3. Siemens.
 - 4. ABB.
- B. Type GD, General Duty, Single Throw, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

- C. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- F. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
 - 5. Hookstick Handle: Allows use of a hookstick to operate the handle.
 - 6. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.03 MOLDED-CASE CIRCUIT BREAKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Eaton/Cutler Hammer.
 - 2. Square D.
 - 3. Siemens.
 - 4. ABB.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

- D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 - 1. Instantaneous trip.
 - 2. Long- and short-time pickup levels.
 - 3. Long- and short-time time adjustments.
 - 4. Ground-fault pickup level, time delay, and I²t response.
- F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
- H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- I. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
 - 4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor. (Provide only when shown on the single line, or required by code).
 - 5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact. (Provide when indicated on drawing).
 - 6. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay. (Provide when indicated on drawings).
 - 7. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts. (Provide when indicated on drawing).

8. Alarm Switch: One NO contact that operates only when circuit breaker has tripped. (Provide when indicated on drawing).
9. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position. (Provide when indicated on drawing).

2.04 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 4X stainless steel.
 3. Corrosion Areas: NEMA 250, Type 4X fiberglass, Type 7.
 4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4X stainless steel.
 5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 4X stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with 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. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.03 IDENTIFICATION

- A. Comply with requirements in Division 16 – Electrical.
 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04 FIELD QUALITY CONTROL

- A. Inspect and test according to NETA ATS.
- B. Perform circuit breaker inspections and tests listed in NETA ATS.

3.05 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by Manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 16055 – Power System Studies.

END OF SECTION

SECTION 16425
SWITCHBOARDS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes distribution switchboard rated 600 V and less.
- B. Furnish and install service entrance rated switchboard as specified herein and shown on the associated electrical drawings.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
 - 1. 16000 – Electrical General Provisions.
 - 2. 01350 - Submittal Procedures.
- C. Coordinate layout and installation of switchboards and components with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- D. Coordinate size and location of concrete bases. Cast Type 316 stainless steel anchor- bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

1.03 SUBMITTALS

- A. Submittal shall be clearly marked showing only equipment provided. Mark through equipment provided. Mark through equipment option not provided.
- B. Submit a letter showing all the exception to the specification. If no exceptions are taken, the letter shall indicate no exception. Submittal will be rejected without preliminary review if the letter is not submitted.
- C. Product Data: For each type of switchboard, overcurrent protective device, ground- fault protector, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes as well as factory test result.

- D. Shop Drawings: For each switchboard and related equipment.
1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and details
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of switchboards and overcurrent protective devices.
 - d. Descriptive documentation of optional barriers specified for electrical insulation and isolation.
 - e. UL listing for series rating of installed devices.
 - f. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - g. Conduit/buses entrance locations and requirements.
 - h. One-line diagrams.
 - i. Equipment Schedule.
 - j. Switchboard instrument details.
 2. Wiring Diagrams: Power, signal, and control wiring.
 3. SPD per section 16443.
- E. Field quality-control test reports including the following:
1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- F. Operation and Maintenance Data: For switchboards and components to include in operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
1. Routine maintenance requirements for switchboards and all installed components.
 2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 3. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.04 REFERENCE STANDARDS

- A. The switchboards and overcurrent protection devices referenced herein shall be designed and manufactured according to the following appropriate specifications.
1. ANSI/NFPA 70 National Electrical Code (NEC).
 2. ANSI/IEEE C12.16 Solid State Electrical Metering.

3. ANSI C39.1 Electrical Analog Indicating Instruments.
4. ANSI C57.13 Instrument Transformers.
5. NEMA AB 1 Molded Case Circuit Breakers and Molded Case Switches.
6. NEMA KS 1 Enclosed Switches.
7. NEMA PB 2 Dead front Distribution Switchboards, File E 8681.
8. NEMA PB 2.1 Proper Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.
9. NEMA PB 2.2 Application Guide for Ground Fault Protective Devices for Equipment.
10. UL 50 Standard for Enclosures for Electrical Equipment.
11. UL 98 Enclosed and Dead Front Switches.
12. UL 489 Molded Case Circuit Breakers.
13. UL 943 Ground Fault Circuit Interrupters.
14. UL 891 Deadfront Switchboards.
15. UL 1053 Ground Fault Sensing and Relaying Equipment.
16. UL 977 Fused Power Circuit Devices.
17. NECA 400 Standard for Installing and Maintaining Switchboards.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Source Limitations: Obtain switchboards through one source from a single manufacturer.
2. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.
4. Comply with NEMA PB 2, "Deadfront Distribution Switchboards.
5. Comply with NFPA 70.

B. Acceptable Manufacturers

1. To be considered for approval, a Manufacturer shall have specialized in the manufacturing and assembly of switchboards for at least (thirty) 30 years.
 - a. Siemens.
 - b. Eaton
 - c. Square D
 - d. ABB.
2. Basis of design for the Wells Ranch WTP Service No. 1 is based on Siemens construction. KAIC withstand rating of the new ATS shall be coordinated with the new Switchboard. Footprint of equipment shall be able to fit in the existing space. If the Contractor submits equipment other than Siemens, the Contractor is responsible to ensure the equipment will fit in the existing space.

C. Services for Manufacturer's Representative

1. Demonstration: Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
 1. Ambient Temperature: Not exceeding 104 deg F (40 deg C).
- B. Service Conditions: NEMA PB 2, usual service conditions, as follows:
 1. Ambient temperatures within limits specified.
- C. Furnish products listed by Underwriters Laboratories Incorporated and in accordance with standards listed in Article 1.04 Reference Standards.

1.07 DELIVERY, HANDLING AND STORAGE

- A. Deliver in sections or lengths that can be moved past obstructions in delivery path.
- B. Store indoors in clean dry space with uniform temperature to prevent condensation. Protect from exposure to dirt, fumes, water, corrosive substances, and physical damage.
- C. If stored in areas subjected to weather, cover switchboards to provide protection from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside switchboards; install electric heating (250 W per section) to prevent condensation.
- D. Handle switchboards according to NEMA PB 2.1 and NECA 400.

1.08 MAINTENANCE/SPARE PARTS

- A. Provide one (1) set of installation and maintenance instructions with each switchboard. Instructions are to be easily identified and affixed within the incoming or main section of the line-up.

1.09 EXTENDED WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.
- B. Warranty Period: Two (2) years from date of Substantial Completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. Incoming Voltage: 480V, 3 phase.
2. Bus ratings: As indicated on contract drawing.
3. Short circuit current rating: 65,000 amperes symmetrical
4. Future Provisions: All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.
5. Accessibility: Accessible from the front only.
6. Enclosure: NEMA Type 1:
 - a. Sections configuration shall be as shown on contract drawing.
 - b. members and pull boxes.
 - c. The switchboards shall be of dead front construction.
 - d. The switchboard frame shall be of UL gauge steel and shall be of formed steel rigidly bolted together to support all cover plates, bussing and component devices during shipment and installation.
 - e. Steel base channels shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
 - f. Each switchboard section shall have an open bottom and an individually removable top plate for installation and termination of conduit.
 - g. Finish: All painted parts shall be pretreated, and provided with a corrosion- resistant, UL listed acrylic baked paint finish or approved equal. The paint color shall be the standard manufacturer color. Exterior part of the enclosure shall be of galvanized steel. All exterior hardware shall be stainless steel 316.
 - h. Top and bottom conduit areas shall be clearly indicated on shop drawings.
 - i. Each switchboard section shall have a space heater to remove condensation.

7. Walk-in type NEMA 3R Switchboards shall have a 60W, 120V light with a switch.
 8. NEMA 3R Switchboard shall have a thermostat-controlled heater in each section.
 9. Nameplates:
 - a. Main Nameplate: Provide switchboard nameplate prominently displayed on the front, indicating manufacturer's name, address and shop order number, year manufactured, and the following ratings:
 - 1) Nominal voltage rating and frequency.
 - 2) Main bus continuous current rating.
 - 3) Maximum 3-phase RMS (Root mean square) symmetrical short circuit current rating.
 - b. Unit Nameplates:
 - 1) Provide each unit with a black lettering on white phenolic name-plate with 3/16-inch high white lettering secured to front of unit by means of oval-head type 316 stainless steel screws, immediately below switch handle.
 - 2) Actual nameplate legend, which may consist of up to three lines, will be provided by the Owner on shop drawings as approved.
 - 3) Provide a preliminary list of nameplate with samples for approval by Owner.
 - c. Caution Signs: Provide caution signs in accordance with OSHA requirements.
 10. Bus Composition: Shall be tin plated copper. Plating shall be applied continuously to all bus work. The switchboard bussing shall be of sufficient cross-sectional area to meet UL Standard 891 temperature rise requirements. The phase through-bus shall have an ampacity as shown in the plans and shall be sized to carry 100% of that ampacity. Tapered bus shall not be acceptable. Neutral bus shall terminate in the Main circuit breaker section shall be of equivalent ampacity as the phase bus bar. Full provisions for the addition of future sections shall be provided. Bussing shall include all necessary hardware to accommodate splicing for future additions.
 11. Bus Connections: Shall be bolted with Grade 5 bolts and conical spring washers.
 12. Ground Bus: Sized per NFPA70 and UL 891 Tables 25.1 and 25.2 and shall extend the entire length of the switchboard. Provisions for the addition of the future sections shall be provided.
- B. Switchboard - incoming main section devices
1. Main Circuit Breaker
 - a. Electronic trip, full function 100% rated, motor operated circuit breaker.
 - 1) Individually fixed mounted.
 - a) Motor operated circuit breakers shall have power terminals to accommodate either cable or bolted bus connections.
 - b) Provide the following time/current curve shaping adjustments to maximize system selective coordination: LSIG. Each adjustment shall have discrete settings and each function is independent from all other adjustments.
 - Adjustable Long Time Ampere Rating and Delay.
 - Adjustable Short Time Pickup and Delay
 - Adjustable Instantaneous Pickup.
 - Adjustable Ground Fault Pickup and Delay.

- High Level Override
- c) Circuit breaker shall display phase current of A, B, and C phases and ground fault (when applicable) in real time. Circuit breaker shall contain trip indicators which shall indicate that the circuit breaker has tripped as a result of overcurrent, short circuit, or ground fault.
- d) Terminations
 - All lugs shall be UL listed to accept solid and/or stranded copper. Lugs shall be suitable for 75 C rated wire, temperature rating tables in the NEC.
 - All circuit breakers shall be UL listed to accept field installable/removable mechanical type lugs.
 - All circuit breakers shall be suitable for bus connection.
- b. Main breakers sized 600A and below shall be manually operated type breaker with 120V shunt-trip.

C. Metering

1. Provide a Power Quality Meter, GE EPM 7000 PQM on the incoming main feeder.
 - a. The information displayed by the Power Meter shall include the following quantities:
 - 1) Current, per phase.
 - 2) Volts, phase-to-phase and phase-neutral.
 - 3) Real Power (kW), three-phase total.
 - 4) Reactive Power (kVAR), three-phase total.
 - 5) Apparent Power (kVA), three-phase total.
 - 6) Power Factor, true, per-phase & three-phase total.
 - 7) Frequency.
 - 8) Current Demand, per- phase and neutral, present and peak.
 - 9) Real Power Demand (kWd), three- phase total, preset and peak.
 - 10) Reactive Power Demand (kVARd), three- phase total, preset and peak.
 - 11) Apparent Power Demand (kVAd), three- phase total, preset and peak.
 - 12) Real Energy (kVah), three- phase total.
 - 13) Reactive Energy (kVARh), three- phase total.
 - 14) Apparent Energy (kVAh), three- phase total.
 - 15) Energy Accumulation Modes signed absolute, energy in, energy out.
 - 16) Watt-hour KYZ Pulse Initiator Output.
 - 17) Total Harmonic Distortion, Voltage.
 - 18) Total Harmonic Distortion, Current.
 - 19) Date/Time Stamping.
 - 20) Communications port for Power Monitoring Systems communications and Modbus RTU communications.
 - b. The Power Meter shall be accurate to .25% for voltage and current sensing, 50% for power, energy, & demand sensing, and 1% for power factor sensing.
 - c. Provide factory installed UPS for PQM.
 - d. All information stored in the Power Meter shall be remotely accessible through data communications.
 - e. The Power Meter shall be UL listed, rated for an operating temperature range of 0 C to 55 C and have an overcurrent withstand rating of 500 amps for 1 second.
 - f. The Power Meter metering inputs shall utilize industry standard current transformers (5A secondary CT's), have VT inputs for direct connection VT leads to up to 600V, and adhere to UL standard 508 for dielectric voltage withstand.

- g. The power meter shall be provided with a Modbus TCP/IP Communicator Protocol Modules

D. Switchboard Distribution Section Devices

1. Feeder Circuit Breakers

- a. Thermal magnetic molded case circuit breakers, 250 amperes and below. 250A Breaker shall be 100% rated.
 - 1) Group mounted.
 - a) Circuit protective devices shall be molded case circuit breakers. Circuit breakers shall be standard, high, or extra high interruption capacity, or true current limiting as indicated in the drawings, or as result of the short circuit coordination study whichever is greater.
 - b) Branch circuit breakers shall be group mounted bolt-on with mechanical restraint on a common pan or rail assembly.
 - c) The interior shall have three flat bus bars aligned vertically with glass reinforced polyester insulators laminated between phases The molded polyester insulators shall support and provide phase isolation to the entire length of bus.
 - d) Circuit breakers equipped with line terminal jaws shall not require additional external mounting hardware. Circuit breakers shall be held in mounted position by a self-contained bracket secured to the mounting pan by fasteners. Circuit breakers of different frame size shall be capable of being mounted across from each other.
 - b. Electronic trip molded case, standard function, 100% rated circuit breakers, above 250 amperes.
 - 1) Group mounted through 1200 amperes.
 - 2) Individually mounted above 1200 amperes.
 - 3) Provide the following time/current curve shaping adjustments to maximize system selective coordination. Each adjustment shall have discrete settings and each function is independent from all other adjustments.
 - a) LSI
 - o Adjustable Long Time Amperes Rating and Delay.
 - o Adjustable Short Time Pickup and Delay.
 - o Adjustable Instantaneous Pickup.
 - o High Level Override for circuit breaker self-protection.

E. Surge Protection Device (SPD)

- 1. Refer to section 16443.
- 2. Shall be internal to switchboard.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS

- A. The switchboard manufacturer shall provide a minimum of one day of starting-up and testing of the switchboard.
- B. Start-up shall include inspection of the switchboard

PART 3 EXECUTION

3.01 DEMOLITION / PREPARATION

- A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.
- B. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance.
- C. Check that concrete pads are level and free of irregularities.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.
- B. Install switchboards and accessories according to NEMA PB 2.1 and NECA 40.
- C. Install and anchor switchboards level on concrete bases, 4-inch (100-mm) nominal thickness and concrete materials and installation requirements are specified in Division 3.
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.
 - 2. For switchboards, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to switchboards.
- D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.
- E. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

- F. Install overcurrent protective devices, surge protection devices, and instrumentation.
 - 1. Set field-adjustable switches and circuit-breaker trip ranges.
- G. Install spare-fuse in cabinet.
- H. Identification
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section 16075 - Identification for Electrical Systems.
- I. Environmental Requirements
 - 1. Conform to NEMA PB 2 service conditions during and after installation of switchboards.

3.03 INSPECTION

- A. Inspect completed installation for physical damage, proper alignment, anchorage and grounding.

3.04 FIELD TESTING

- A. Prepare for acceptance tests in accordance with specification 16060 Commissioning of Electrical Systems.
 - 1. Measure using a Megger, the insulation resistance of each bus section phase-to- phase and phase-to-ground for one minute each, at minimum test voltage at 1000 VDC; minimum acceptable for insulation resistance is 1 megohm.
 - 2. Check tightness of accessible bolted bus joints using calibrated torque wrench per manufacturer's recommended torque values.
 - 3. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
 - 4. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
 - 5. Instruments, Equipment, and Reports:
 - a. Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Prepare a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- B. Adjusting
 - 1. Adjust all operating mechanisms for free mechanical movement per

2. Tighten bolted bus connections in accordance with Manufacturer's instructions.
3. Adjust circuit breaker trip and time delay settings to values recommended by the Power System study as specified under section 16055 Power System Studies.

3.05 FIELD PAINTING

- A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

- A. On completion of installation, inspect interior and exterior of switchboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

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Section 16443

SURGE PROTECTIVE DEVICES FOR LOW VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes surge protective devices (SPDs) for low-voltage power equipment.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
 - 1. 01350 – Submittals
 - 2. 16000 – Electrical General Provisions
- C. Qualification Data: For testing agency.
- D. Field quality-control test reports, including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Failed test results and corrective action taken to achieve requirements.
- E. Operation and Maintenance Data: For transient voltage suppression devices to include in emergency, operation, and maintenance manuals.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated, include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.
- B. Product Certificates: For surge protective devices, signed by product manufacturer certifying compliance with the following standards:
 - 1. UL 1283 - Electromagnetic.
 - 2. UL 1449 4th Edition – UL Standard for Surge Protective Devices
- C. Qualification Data: For testing agency.

- D. Field quality-control test reports, including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Failed test results and corrective action taken to achieve requirements.
- E. Operation and Maintenance Data: For transient voltage suppression devices to include in emergency, operation, and maintenance manuals.

1.04 REFERENCE STANDARDS

- A. The surge protective devices referenced herein shall be designed and manufactured according to the following standards.
 - 1. UL 1283 – Electromagnetic Interference Filters.
 - 2. UL 1449 4th Edition – UL Standard for Surge Protective Devices.
 - 3. IEEE C62.41.1 – IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits.
 - 4. IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits.
 - 5. IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits.
 - 6. National Electrical Code: Article 285, 700, and 708.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm with at least 5 years of experience in manufacturing transient voltage suppressors.
- B. Manufacturer shall be ISO 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar equipment for a minimum period of (10) years. When requested by the Owner's Representative, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- D. Product Options: Drawings indicate size, dimensional requirements, and electrical performance of suppressors and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's Representative's written permission.
- B. Service Conditions: Rate surge protection devices for continuous operation under the following conditions, unless otherwise indicated.
 - 1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
 - 2. Operating Temperature: 30 to 120 deg F (0 to 50 deg C).
 - 3. Humidity: 0 to 85 percent, non-condensing.
 - 4. Altitude: Less than 20,000 feet (6090 m) above sea level.

1.07 DELIVERY, HANDLING AND STORAGE

- A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.
- B. Each internally mounted SPD shall be delivered fully assembled and installed as part of the associated electrical equipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB
2. Siemens.
3. Square D
4. Eaton

2.02 480V SWITCHBOARD AND 480V MCC SUPPRESSORS

A. Surge Protective Devices with the following features and accessories:

1. Fuses, rated at 200-kA interrupting capacity.
2. Fabrication using bolted compression lugs for internal wiring.
3. Integral disconnect switch.
4. Redundant suppression circuits.
5. Redundant or replaceable modules.
6. Arrangement with copper bus bars and for bolted connections to phase buses, neutral bus, and ground bus.
7. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
8. LED indicator lights for power and protection status.
9. Audible alarm, with silencing switch, to indicate when protection has failed.
10. One set of dry contacts rated at 5 A and 250Vac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
11. Surge-event operations counter.
12. Per UL96A service entrance SPD's shall have a nominal discharge current (In) rating of 20Ka

B. Peak Single-Impulse Surge Current Rating: 150kA/mode.

C. Connection Means: Permanently wired.

D. Protection modes and UL 1449 Voltage Protection Rating (VPR) for grounded wye circuits with voltages of 480Y/277, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 1200V

2. Line to Ground: 1200V
3. Neutral to Ground: 1200V

2.03 PANELBOARD SUPPRESSORS

A. SPD with the following features and accessories:

1. Fuses, rated at 200-kA interrupting capacity.
2. Fabrication using bolted compression lugs for internal wiring.
3. Integral disconnect switch.
4. Redundant suppression circuits.
5. Redundant replaceable modules.
6. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
7. LED indicator lights for power and protection status.
8. Audible alarm, with silencing switch, to indicate when protection has failed.
9. One set of dry contacts rated at 5 A and 250Vac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
10. Surge-event operations counter.

B. Peak Single-Impulse Surge Current Rating: 100 kA per mode

C. Protection modes and UL 1449 VPR for grounded wye circuits with voltages of 480Y/277, 208Y/120, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 1200 V for 480Y/277.
2. Line to Ground: 1200 V for 480Y/277.
3. Neutral to Ground: 1200 V for 480Y/277

2.04 ENCLOSURES

A. Install surge protective devices in the same cabinet as the MCC, switchboard, and 480V panelboard, MCC, and switchboard.

PART 3 EXECUTION

3.01 DEMOLITION / PREPARATION (NOT USED)

3.02 INSTALLATION

- A. Surge protective devices shall be installed by the MCC and panelboard manufacturer at the factory.
- B. Do not energize or connect service entrance equipment, panelboards, control terminals, data terminals to their sources until surge protection devices are installed and connected.
- C. Firestop caulk SPD connections.

3.03 INSPECTION

- A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.

3.04 FIELD TESTING

- A. Check all installed panels for proper grounding, fastening and alignment.
- B. Remove and replace malfunctioning units and retest.
- C. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transient voltage suppression devices.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END OF SECTION

SECTION 16450
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install grounding and bonding equipment for the electrical system. It is the intention of this specification that all electrical equipment be grounded. Furnish labor, materials, equipment and incidentals necessary to install a complete grounding system in strict accordance with Article 250 of the National Electrical Code (NEC) as shown on the drawings or as specified herein. Electrical work shall be in accordance with division 16000 Electrical General Provisions.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
 - 1. 01350 - Submittal Procedures.
 - 2. 16000 – Electrical General Provisions.

1.03 SUBMITTALS

- A. Submittal shall be in accordance with Division 1 and shall include:
 - 1. Grounding materials, equipment, and processes.
 - 2. Product Data: For each type of product supplied.
 - 3. Field quality-control test reports
- B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.
- C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.
- D. Submit a letter certifying full and complete compliance with the Specifications, Drawings, and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

- A. The following standards shall apply as if written here in their entirety:
 - 1. ANSI/IEEE Standard 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - 2. ANSI/UL 467 - Grounding and Bonding Equipment.
 - 3. NFPA 70 - National Electrical Code

1.05 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

- A. Measure the ground grid resistance with the earth test megger and install additional ground rods and conductors as required until the resistance to the ground conforms to National Electrical Code requirements. Ground resistance measurement shall not exceed 5 ohms.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 WARRANTY/EXTENDED WARRANTY (NOT USED)

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ground Rods:
 - 1. Material: Copper-clad, having a diameter of $\frac{3}{4}$ " and a minimum length of 10'.
 - 2. Listing: UL 467.
- B. Ground Cables:
 - 1. Stranded, tinned copper of 98% conductivity and as specified in Section 16120 - Low-Voltage Electrical Power Conductors and Cables
- C. Conduit Ground Fittings:
 - 1. Fittings for bonding ground cable to the conduit shall be FCI Burndy Corp., type NE or Thomas & Betts No. 3951 series.

D. Ground Rod Boxes

1. Precast Box with cast iron lid. Lid shall read “ground rod” on lid. Brooks Precast Model. “3-RT” or approved equal. Ground rod boxes shall have an AASHTO H-20 rating.

E. Ground Plate Electrodes

1. 20-gauge copper with terminated two (2) foot welded pigtail connection.

F. Connections

1. Type:
 - a. Unless otherwise noted, provide exothermic weld typed for all non-accessible and below-grade connections.
 - b. For above grade connections provide bonds and clamps of a nonferrous material which will not cause electrolytic action between the conductor and the connector.
2. Listing: UL 467.
3. Acceptable Manufacturers:
 - a. Below grade:
 - 1) Cadweld
 - 2) Thermoweld
 - b. Above grade:
 - 1) Burndy
 - 2) IlSCO
 - 3) Erico
 - 4) OZ/Gedney
 - 5) T&B

G. Certification

1. Contractor shall receive from the manufacturer proper training prior to execute the exothermic weld connection.

H. Wiring

1. Provide copper insulated conductors for bonding jumpers. All insulated grounding conductors shall be copper, stranded.
 - a. Provide 600-volt insulated conductors having a green-colored XHHW insulation for equipment grounding conductors, or green heat shrink over XHHW insulation in accordance with NFPA 70E.
 - b. Ground conductors shall be protected in conduit where subject to physical damage.
 - c. All exposed ground conductors shall be installed in conduits. Ground conductor attached to cable trays shall not be considered exposed.
 - d. Ground wire shall be un-insulated copper where ground wire is directly buried in earth or concrete.

I. Ground Bus

1. Round-edge tin plated copper bar with 98 percent International Annealed Copper Standard (IACS) conductivity.
2. Size the bus for not less than 25 percent of the cross-sectional area of the related feeder.
3. A minimum ground bus size of 3-inch by 2 inches is required.

J. Grounding for Instrumentation System

1. Ground Loop for instrumentation system shall be grounded at only one point to the building ground system.

K. Ground loop

1. All ground loop conductor shall be bare copper minimum wire size shall be #4/0 unless otherwise noted.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 EXECUTION

3.01 INSTALLATION

A. System ground

1. System neutral:
 - a. Where a system neutral is used, ground the system neutral conductor as required by NEC Article 250.
 - b. Ground the system neutral only at the point of service and isolate it from ground at all other points in the system.
2. Separately Derived Systems: Ground neutrals of separately derived systems such as generators, transformers, etc., in accordance with NEC 250-30.
3. Size: Size the system grounding conductors to comply with NEC Table 250-66, unless shown larger.

B. Equipment ground

1. Raceway Systems and Equipment Enclosures:
 - a. Ground cabinets, junction boxes, outlet boxes, motors, controllers, raceways, fittings, switchgear, transformer enclosures, handrail, stair, steel pipe and other equipment and metallic enclosures.

- b. Ground equipment and enclosures to the continuous-grounded, metallic raceway system in addition to any other specific grounding shown.
 - c. Provide bonding jumpers and ground wire throughout to ensure electrical continuity of the grounding system.
 - d. Provide grounding-type insulated bushings for metal conduits terminating in equipment enclosures containing a ground bus and connect the bushing to the ground bus.
 - e. Provide green insulated equipment grounding conductor for each feeder, power branch circuit, receptacle branch circuit and lighting branch circuit.
 - f. Raceways shall not be used for equipment ground. Provide individual equipment ground wires for all equipment even if not shown on plans.
 - g. Provide bonding jumper and bonding bushing on each metallic conduit entering or leaving the enclosure of the service equipment.
 - h. Where grounding conductors are shown, bond the wires to metallic enclosures at each end and to intermediate metallic enclosures. Connect grounding conductors to grounding bushings on raceway. Where any equipment contains a ground bus, extend and connect grounding conductors to that bus. Run ground conductor inside conduits enclosing the power conductors.
 - i. Make connections of any grounding conductors to motors ½ HP and above, or circuits 20 amps or above, by solderless terminal and a 5/16-inch minimum bolt tapped to the motor frame or equipment housing. Grounding clips mounted directly on the box, or with 3/8-inch machine screws. Completely remove all paint, dirt, or other surface coverings at grounding conductor at connection points so that good metal-to-metal contact is made.
 - j. Ground metal sheathing and any exposed metal vertical structural elements of buildings. Ground metal fences enclosing electrical equipment. Bond any metal equipment platforms which support electrical equipment to that equipment. Provide good electrical contact between metal frames and railings supporting pushbutton stations, receptacles, instrument cabinets, etc., and raceways carrying circuits to these devices.
 - k. Bond neutrals of transformers to the system ground network, and to any additional indicated grounding electrodes.
2. Size:
 - a. When grounding and bonding conductors are not sized on drawings, size the grounding conductors in accordance with NEC Table 250-122.
 - b. Size bonding jumper so that minimum cross-sectional area is greater than or equal to that of the equivalent grounding conductor as determined from NEC Table 250-122.
 3. Install sufficient ground rods in addition to those shown, or code required grounding so that resistance to ground as tested by standard methods does not exceed 5 ohms. Where more than one rod is required, install rods at least 20 feet apart.

C. Ground Connections

1. Unless shown otherwise, make connections of grounding conductors to ground rods at the upper end of the rod with the end of the rod and the connection point below finished grade.

2. Make connections of sections of outdoor ground mats (counterpoise) for substations or other equipment underground. Make connections of other grounding conductors generally accessible.
3. When making thermite welds, wire blush or file the point of contact to a bare metal surface. Use thermite welding cartridges and molds in accordance with the manufacturer's recommendations. After welds have been made and cooled, brush slag from the weld area and thoroughly clean the joint. For compression connectors, use homogeneous copper, anti-corrosion, surface treatment compound at connectors in accordance with connector manufacturer's recommendations. Use connectors of proper size for conductors and ground rods specified. Use connector manufacturer's compression tool. Notify Owner's Representative prior to backfilling any ground connections.

3.02 INSPECTION (NOT USED)

3.03 FIELD TESTING

- A. The testing shall be performed in accordance with Section 16060.

3.04 FIELD PAINTING (NOT USED)

3.05 CLEANING (NOT USED)

END OF SECTION

SECTION 16460
LOW VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install three phase and single phase, individually mounted, dry-type transformers.
- B. General purpose.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Other sections that may relate to the work in this section include, but are not limited to, the following:
 - 1. 01350 - Submittal Procedures.
 - 2. 16000 – Electrical General Provisions.

1.03 SUBMITTALS

- A. The following information shall be submitted to the Owner's Representative:
 - 1. Dimension drawing and weight.
 - 2. Technical certification sheet.
 - 3. Conduit entry/exit locations.
 - 4. Transformer ratings including:
 - a. Primary and secondary kVA.
 - b. Voltage.
 - c. Taps.
 - d. Primary and secondary continuous current.
 - e. Basic Impulse level for equipment over 600-volts.
 - f. Impedance.
 - g. Insulation class and temperature rise.
 - h. Sound level.
- B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.
- C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

- D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

- A. The following standards shall apply as if written here in their entirety:
 - 1. ANSI/NEMA Publication No. ST 20 - Dry-Type Transformers for General Application.
 - 2. ANSI/UL 506 - Specialty Transformers.
 - 3. NFPA 70 - National Electric Code.
 - 4. UL 1561- Dry Type General Purpose and Power Transformers.

1.05 QUALITY ASSURANCE

- A. Manufacturer's Qualifications
 - 1. The general construction of the transformer and the materials used shall be similar to that used for transformers of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.
 - 2. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the transformer. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.
- B. Acceptable Manufacturers
 - 1. ABB.
 - 2. Eaton/Cutler Hammer.
 - 3. Siemens.
 - 4. Square D.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

- A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: One (1) year from date of substantial completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ratings

- A. Transformer shall be designed for continuous operation at rated kVA, voltages, phases and winding configurations are indicated on the drawings. Transformers must be rated for 60 hertz operation and shall be ventilated or totally enclosed type.

B. Coils

- 1. Windings: Use copper windings. Aluminum windings shall not be acceptable. The windings shall be treated to resist the effect of moisture.
- 2. Taps: Furnish transformers with full load rated taps in the primary windings as follows:

kVA Rating	Taps
3-15 kVA, single phase;	Two 5 percent taps below rated voltage
9-15 kVA, three phase	Two 5 percent taps below rated voltage
25-167 kVA, single phase	Two 5 percent taps below
30-150 kVA, three phase	below and two above rated voltage

- 3. All transformers shall be UL listed and certified and carry the UL label.

C. Insulation

- 1. Provide UL recognized 220°C insulation system capable of continuous operation at 40°C ambient without exceeding 150°C winding temperature rise.

D. Sound Requirements

1. Average sound levels must not exceed the following values as measured in accordance with NEMA ST 20-4.12.

0 – 9	40
10 – 50	45
51 - 150	50

2.02 FABRICATION

- A. Indoor: Unless otherwise specified or indicated, transformers installed in NEMA 1 area shall be ventilated type, with corrosion resistant finish.
- B. Outdoor: For outdoor mounted transformers provide total enclosed NEMA 4X 316 stainless steel enclosure, enclosure shall be factory painted white.
- C. Totally Enclosed Transformers: Totally enclosed non-ventilated transformers shall be installed in areas subjected to washdown or corrosives. The transformers shall be rated at insulation class of 220 C with 150 C temperature rise at ambient temperature of 40 C in a 316 stainless steel enclosure.
- D. Wiring Compartment: Locate the wiring compartment below the core and coil. Have the compartment cooled by air circulation or insulated from the core and coil with a suitable thermal barrier.
- E. Grounding: Ground the core of the transformer to the enclosure with a flexible grounding conductor sized according to NEC requirements.
- F. Mounting Brackets: Furnish mounting brackets, as required, for wall or ceiling mounting of transformers rated 45 kVA and less.
- G. Transformers shall be provided with integrated vibration insulation to completely isolate the core and coil assembly from the transformer enclosure.
- H. Provide transformer nameplates of type 316 stainless steel, marked in accordance with NEC. Fasten nameplate to transformer with stainless steel screws or rivets.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 EXECUTION

3.01 DEMOLITION/PREPARATION

- A. Examine elements and surfaces to receive transformers for compliance with installation tolerances and other conditions affecting performance.

- B. Check that concrete pads are level and free of irregularities.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Conduit Connections

- 1. Attach incoming and outgoing conduits to the transformer enclosure with 24-inch long flexible conduit.
- 2. Run a bonding jumper, sized per NEC Table 250-122, on inside and along the outside of flexible conduit.

B. Cable Connections

- 1. Make transformer cable connections with compression-type lugs suitable for termination of 75 C rated conductors. Position lugs so that field connections and wiring will not be exposed to temperature above 75 C.

C. Floor Mounting

- 1. Construct concrete pad for floor-mounted transformers in accordance with Section 16000 - Electrical General Provisions.
- 2. Maintain a minimum of 6 inches free air space between enclosure and walls.

D. Wall Mounting

- 1. Securely anchor type 316 stainless steel mounting brackets to the wall to provide adequate transformers support.
- 2. Provide vibration isolation for mounting the transformers.

3.03 INSPECTION

- A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.
- B. Check all installed transformers for proper grounding, fastening and alignment.

3.04 FIELD TESTING

- A. Refer to section 16060 - Commissioning of Electrical Systems.

3.05 FIELD PAINTING

- A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

- A. Remove debris from installation site and wipe dust and dirt from all components.

END OF SECTION