



City of Hailey, ID

Woodside WRF - Headworks Improvements

**Construction Documents
Project Manual**

Volume 1

Divisions 00 - 06

Issued for Review

April 11, 2025

HDR Project No. 10381996



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TABLE OF CONTENTS

VOLUME 1 – DIVISIONS 00 - 06

DIVISION 00 — PROCUREMENT AND CONTRACTING REQUIREMENTS

- 00 01 07 - SEALS AND SIGNATURES
- 00 11 13 - ADVERTISEMENT FOR BIDS (EJCDC C-111-2018)
- 00 21 13 - INSTRUCTIONS TO BIDDERS (EJCDC C-200-2018)
- 00 41 13 - BID FORM (EJCDC C-410-2018)
- 00 43 13 - BID BOND PENAL SUM FORM (EJCDC C-430-2018)
- 00 45 13 - QUALIFICATIONS STATEMENT (EJCDC C-451-2018)
- 00 51 16 - NOTICE OF AWARD
- 00 52 13 - AGREEMENT (EJCDC C-520-2018)
- 00 61 13.13 - PERFORMANCE BOND (EJCDC C-610-2018)
- 00 61 13.16 - PAYMENT BOND (EJCDC C-615-2018)
- 00 72 13 - GENERAL CONDITIONS (EJCDC C-700-2018)
- 00 73 01 - SUPPLEMENTARY CONDITIONS (EJCDC C-800-2018)
- 00 91 13 - ADDENDUM FORM

DIVISION 01 — GENERAL REQUIREMENTS

- 01 11 00 - SUMMARY OF WORK
- 01 13 13 - MILESTONES
- 01 14 16 - COORDINATION WITH OWNER'S OPERATIONS
- 01 14 19 - USE OF SITE
- 01 21 00 - ALLOWANCES
- 01 22 00 - MEASUREMENT AND PAYMENT
- 01 23 00 - ALTERNATES
- 01 25 00 - SUBSTITUTION PROCEDURES
- 01 26 00 - CONTRACT MODIFICATION PROCEDURES
- 01 29 73 - SCHEDULE OF VALUES
- 01 29 76 - PROGRESS PAYMENT PROCEDURES
- 01 31 13 - PROJECT COORDINATION
- 01 31 19 - PROJECT MEETINGS
- 01 31 26 - ELECTRONIC COMMUNICATION PROTOCOLS
- 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE
- 01 33 00 - SUBMITTAL PROCEDURES
- 01 35 43.13 - ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS
- 01 35 73 - DELEGATED DESIGN PROCEDURES
- 01 41 24 - PERMIT REQUIREMENTS
- 01 41 28 - CONFINED SPACE ENTRY PERMIT
- 01 42 00 - REFERENCES
- 01 45 25 - TESTING AND DISINFECTING HYDRAULIC STRUCTURES
- 01 45 33 - IBC 2018 - CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES
- 01 51 05 - TEMPORARY UTILITIES
- 01 52 53 - FACILITY TEMPORARY PUMPING
- 01 57 05 - TEMPORARY CONTROLS
- 01 61 03 - EQUIPMENT - BASIC REQUIREMENTS
- 01 62 00 - PRODUCT OPTIONS
- 01 64 00 - OWNER-FURNISHED PRODUCTS
- 01 65 00 - PRODUCT DELIVERY REQUIREMENTS
- 01 66 00 - PRODUCT STORAGE AND HANDLING REQUIREMENTS
- 01 71 14 - MOBILIZATION AND DEMOBILIZATION
- 01 73 20 - OPENINGS AND PENETRATIONS IN CONSTRUCTION
- 01 73 29 - CUTTING AND PATCHING
- 01 74 00 - CLEANING
- 01 75 00 - CHECKOUT AND START-UP PROCEDURES
- 01 77 19 - CLOSEOUT REQUIREMENTS
- 01 78 23 - OPERATION AND MAINTENANCE DATA

- 01 78 36 - WARRANTIES
- 01 78 39 - PROJECT RECORD DOCUMENTS
- 01 79 23 - INSTRUCTION OF OPERATION AND MAINTENANCE PERSONNEL
- 01 81 10 - WIND AND SEISMIC DESIGN CRITERIA
- 01 81 33 - CYBER SECURITY REQUIREMENTS

DIVISION 02 — EXISTING CONDITIONS

- 02 41 00 - DEMOLITION

DIVISION 03 — CONCRETE

- 03 01 30 - REPAIR AND REHABILITATION OF EXISTING CONSTRUCTION
- 03 05 05 - CONCRETE TESTING AND INSPECTION
- 03 11 13 - FORMWORK
- 03 15 19 - ANCHORAGE TO CONCRETE
- 03 21 00 - REINFORCEMENT
- 03 31 30 - CONCRETE MATERIALS AND PROPORTIONING
- 03 31 31 - CONCRETE MIXING, PLACING, JOINTING, AND CURING
- 03 35 00 - CONCRETE FINISHING AND REPAIR OF SURFACE DEFECTS
- 03 41 33 - PRECAST AND PRESTRESSED CONCRETE

DIVISION 04 — MASONRY

- 04 01 20 - MASONRY CLEANING
- 04 05 13 - MASONRY MORTAR AND GROUT
- 04 05 23 - MASONRY ACCESSORIES
- 04 05 50 - COLD AND HOT WEATHER MASONRY CONSTRUCTION
- 04 22 00 - CONCRETE MASONRY

DIVISION 05 — METALS

- 05 40 00 - COLD-FORMED METAL FRAMING
- 05 50 00 - METAL FABRICATIONS
- 05 52 46 - MECHANICALLY FASTENED ALUMINUM RAILINGS

DIVISION 06 — WOOD, PLASTICS, AND COMPOSITES

- 06 10 00 - ROUGH CARPENTRY
- 06 82 00 - FIBERGLASS REINFORCED PLASTIC FABRICATIONS

VOLUME 2 – DIVISIONS 07 - 46

DIVISION 07 — THERMAL AND MOISTURE PROTECTION

- 07 16 16 - CRYSTALLINE CEMENTITIOUS WATERPROOFING
- 07 21 00 - BUILDING INSULATION
- 07 26 00 - UNDER SLAB VAPOR RETARDER
- 07 54 25 - FULLY ADHERED TPO ROOFING
- 07 62 00 - FLASHING AND SHEET METAL
- 07 84 00 - FIRESTOPPING
- 07 92 00 - JOINT SEALANTS

DIVISION 08 — OPENINGS

- 08 11 00 - HOLLOW METAL DOORS AND FRAMES
- 08 31 00 - ACCESS DOORS
- 08 33 23 - STEEL ROLLING OVERHEAD DOORS
- 08 70 00 - FINISH HARDWARE
- 08 90 00 - LOUVERS AND VENTS

DIVISION 09 — FINISHES

- 09 22 16 - NON-STRUCTURAL METAL FRAMING
- 09 29 00 - GYPSUM BOARD
- 09 96 00 - HIGH PERFORMANCE INDUSTRIAL COATINGS

DIVISION 10 — SPECIALTIES

- 10 14 00 - IDENTIFICATION DEVICES
- 10 14 23 - SIGNAGE
- 10 44 33 - FIRE PROTECTION SPECIALTIES

DIVISION 22 — PLUMBING

22 20 00 - PLUMBING FIXTURES AND EQUIPMENT

DIVISION 23 — HEATING VENTILATING AND AIR CONDITIONING

23 05 93 - HVAC SYSTEMS - BALANCING AND TESTING

23 31 00 - HVAC - DUCTWORK

23 34 00 - HVAC - FANS

23 80 00 - HVAC - EQUIPMENT

DIVISION 26 — ELECTRICAL

26 05 00 - GENERAL REQUIREMENTS FOR ELECTRICAL WORK

26 05 04 - BASIC ELECTRICAL MATERIALS AND METHODS

26 05 19 - CONDUCTORS AND COMMUNICATIONS CABLING

26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

26 05 33 - RACEWAYS AND BOXES

26 05 73 - ELECTRICAL SYSTEMS ANALYSIS

26 08 00 - COMMISSIONING OF ELECTRICAL SYSTEMS

26 09 13 - INSTRUMENT TRANSFORMERS AND METERS

26 22 00 - LOW-VOLTAGE TRANSFORMERS

26 24 16 - LOW-VOLTAGE PANELBOARDS

26 24 19 - LOW-VOLTAGE MOTOR CONTROL

26 27 26 - WIRING DEVICES

26 29 23 - LOW-VOLTAGE ADJUSTABLE FREQUENCY DRIVES

26 35 26 - ACTIVE HARMONIC FILTERS

26 43 13 - SURGE PROTECTIVE DEVICES (SPDs) 1000V OR LESS

26 50 00 - LIGHTING

DIVISION 31 — EARTHWORK

31 10 00 - SITE CLEARING

31 22 19 - FINISH GRADING

31 23 00 - EARTHWORK

31 23 16.43 - TEMPORARY SUPPORT OF EXCAVATIONS

31 23 33 - TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

DIVISION 32 — EXTERIOR IMPROVEMENTS

32 12 16 - ASPHALTIC CONCRETE VEHICULAR PAVING

32 13 13 - CONCRETE PAVEMENT

32 16 23 - CONCRETE SIDEWALK AND STEPS

32 31 13 - CHAIN LINK FENCE AND GATES

32 92 00 - SEEDING, SODDING AND LANDSCAPING

DIVISION 33 — UTILITIES

33 05 15 - PRECAST CONCRETE UTILITY STRUCTURES

33 05 31.11 - POLYVINYL CHLORIDE GRAVITY SEWER PIPE

33 05 33.23 - POLYETHYLENE PRESSURE PIPE AND TUBING (AWWA C901 AND AWWA C906)

33 05 33.53 - POLYETHYLENE GAS UTILITY PIPE

DIVISION 40 — PROCESS INTERCONNECTIONS

40 05 00 - PIPE AND PIPE FITTINGS - BASIC REQUIREMENTS

40 05 07 - PIPE SUPPORT SYSTEMS

40 05 19 - DUCTILE IRON PROCESS PIPE

40 05 24 - PIPE - STEEL

40 05 26 - PIPE - CAST-IRON SOIL

40 05 31 - PIPE - PLASTIC

40 05 31.3 - POLYVINYL CHLORIDE PRESSURE PROCESS PIPE (AWWA C900)

40 05 51 - COMMON REQUIREMENTS FOR PROCESS AND UTILITY VALVES

40 05 52 - MISCELLANEOUS VALVES

40 05 57 - ACTUATORS FOR PROCESS VALVES AND GATES

40 05 59 - FABRICATED STAINLESS STEEL SLIDE GATES

40 05 62 - PLUG VALVES

40 05 63 - BALL VALVES

- 40 05 66 - CHECK VALVES
- 40 41 13 - HEAT TRACING CABLE
- 40 42 00 - PIPE, DUCT AND EQUIPMENT INSULATION
- 40 71 00 - FLOW INSTRUMENTATION
- 40 72 00 - LEVEL INSTRUMENTATION
- 40 73 00 - PRESSURE INSTRUMENTATION
- 40 90 00 - INSTRUMENTATION FOR PROCESS CONTROL BASIC REQUIREMENTS
- 40 90 05 - CONTROL LOOP DESCRIPTIONS
- 40 91 10 - PRIMARY METERS AND TRANSMITTERS
- 40 94 43 - PROGRAMMABLE LOGIC CONTROLLER (PLC) CONTROL SYSTEM
- 40 96 52 - CONFIGURATION REQUIREMENTS HUMAN MACHINE INTERFACE (HMI) AND REPORTS
- 40 97 00 - CONTROL AUXILIARIES
- 40 98 00 - CONTROL PANELS AND ENCLOSURES

DIVISION 41 — MATERIAL PROCESSING AND HANDLING EQUIPMENT

- 41 22 23 - HOISTS, TROLLEYS, AND MONORAILS

DIVISION 43 — PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT

- 43 05 21 - COMMON MOTOR REQUIREMENTS FOR EQUIPMENT
- 43 21 00 - PUMPING EQUIPMENT - BASIC REQUIREMENTS
- 43 25 13 - PUMPING EQUIPMENT - SUBMERSIBLE END-SUCTION SEWAGE PUMPS

DIVISION 46 — WATER AND WASTEWATER EQUIPMENT

- 46 12 22 - GRIT CLASSIFIER WITH CYCLONE
- 46 21 00 - GRIT REMOVAL UNITS



DIVISION 00

PROCUREMENT AND CONTRACTING
REQUIREMENTS



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00 01 07
SEALS AND SIGNATURES

Owner Name: City of Hailey, ID
Facility or Site Name: Woodside Water Reclamation Facility
Project Name: Woodside WRF – Headworks Improvements
Project or Contract Designation: 10381996
Engineer: HDR

<i>Brad Bjerke, PE</i> License No. 8778	The seal and signature to the left applies to the following Specifications divisions and sections of this project manual: <ul style="list-style-type: none">• Division 01.• Division 02.• Division 07.• Division 08.• Division 09.• Division 10.• Division 22.• Division 23.• Division 31.• Division 32.• Division 33.• Division 40.• Division 41.• Division 43.• Division 46.
<i>Ron Manske, PE</i> License No. 21207	The seal and signature to the left applies to the following Specifications divisions and sections of this project manual: <ul style="list-style-type: none">• Division 03.• Division 04.• Division 05.• Division 06.

<p><i>John Barrutia, PE</i> License No. 7051</p>	<p>The seal and signature to the left applies to the following Specifications divisions and sections of this project manual:</p> <ul style="list-style-type: none"> • Division 26.
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Engineer's seal and signature does not apply to the documents that comprise Division 00, Bidding and Contracting Requirements.

It is a violation of applicable laws and regulations governing professional licensing and registration for any person, unless acting under the direction of the licensed and registered design professional(s) indicated above, to alter in any way the Specifications in this project manual.

END OF SEALS AND SIGNATURES

ADVERTISEMENT FOR BIDS

CITY OF HAILEY, IDAHO WOODSIDE WATER RECLAMATION FACILITY HEADWORKS IMPROVEMENTS

General Notice

The City of Hailey (Owner) is requesting Bids for the construction of the following Project:

Woodside Water Reclamation Facility (WRF) Headworks Improvements

Bids for the construction of the Project will be received at Hailey City Hall located at 115 Main Street South, Hailey, Idaho 83333, until 2:00 PM local time, June 18th, 2025 for receipt of Bids. At that time the Bids received will be publicly opened and read.

The Project includes the following Work:

Construction of a new headworks building, installation of new in-channel drum screens, construction of a new grit chamber, installation of a grit handling system, installation of new submersible pumps and piping in the Woodside Influent Lift Station, and demolition of the existing metal-frame headworks building and associated infrastructure.

A bid alternate also includes the construction of a new submersible pump station, piping, valves, and valve vaults in the Batch Tank.

Obtaining the Bidding Documents

Information and Bidding Documents for the Project can be viewed and downloaded from the following designated website: [Projects, Bidding, RFQs | Public Works | City of Hailey, ID \(haileycityhall.org\)](https://haileycityhall.org/projects-bidding-rfq-public-works).

Prospective Bidders are urged to register with the Hailey City Clerk (mary.cone@haileycityhall.org) as a Bidding Documents holder, even if Bidding Documents are obtained from a third-party plan room or source other than the designated website in either electronic or paper format. The designated website will be updated periodically with Addenda, lists of registered Bidding Documents holders, reports on the Site, and other information relevant to submitting a Bid for the Project. All official notifications, Addenda, and other Bidding Documents will be offered only through the designated website. Neither Owner nor Engineer will be responsible for Bidding Documents, including Addenda, if any, obtained from sources other than the designated website.

The Issuing Office for the Bidding Documents is:

Hailey City Hall
115 Main Street South, Hailey, Idaho 83333

Prospective Bidders may examine the Bidding Documents at the Issuing Office on Monday through Thursday between the hours of 9:00 AM to 5:00 PM local time or on Friday between the hours of 9:00 AM to 12:00 PM local time and may obtain electronic copies of the Bidding Documents from the Issuing Office as described below. Partial sets of Bidding Documents will not be available from the Issuing Office.

Pre-bid Conference

A pre-bid conference for the Project will be held on May 28th, 2025 at 1:00 PM (MST) at Woodside WRF, 4197 Glenbrook Drive, Hailey, Idaho 83333. Attendance at the pre-bid conference is encouraged but not required.

Instructions to Bidders

For all further requirements regarding bid submittal, qualifications, procedures, interpretations / addenda, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

This Advertisement is issued by:

Owner: City of Hailey

By: Mary Cone

Email: mary.cone@haileycityhall.org

Title: Hailey City Clerk

Date: May 14, 2025

Publish: May 14, 2025

May 21, 2025

INSTRUCTIONS TO BIDDERS

FOR CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1— Defined Terms.....	1
Article 2— Bidding Documents	1
Article 3— Qualifications of Bidders	2
Article 4— Pre-Bid Conference	3
Article 5— Site and Other Areas; Existing Site Conditions; Examination of Site; Owner’s Safety Program; Other Work at the Site	3
Article 6— Bidder’s Representations and Certifications	6
Article 7— Interpretations and Addenda	6
Article 8— Bid Security	7
Article 9— Contract Times	8
Article 10— Substitute and “Or Equal” Items	8
Article 11— Subcontractors, Suppliers, and Others.....	8
Article 12— Preparation of Bid	9
Article 13— Basis of Bid.....	10
Article 14— Submittal of Bid.....	10
Article 15— Modification and Withdrawal of Bid	11
Article 16— Opening of Bids	11
Article 17— Bids to Remain Subject to Acceptance	11
Article 18— Evaluation of Bids and Award of Contract	11
Article 19— Bonds and Insurance	12
Article 20— Signing of Agreement	12
Article 21— Sales and Use Taxes.....	13
Article 22— Contracts to Be Assigned	13

ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. Bidder – The individual or entity who submits a Bid directly to Buyer.
 - B. Issuing Office—The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered. For this project, the Issuing Office is the office of the City Clerk of the City of Hailey as listed in the Advertisement for Bids.

ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use, nor does it grant or confer ownership or any property interest in the Bidding Documents and other documents distributed for the Project. Authorization to download documents, or other distribution, includes the right for Bidding Documents holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the Bidding Documents holder pays all costs associated with printing or reproduction. Paper or other types of printed documents may not be re-sold under any circumstances.
- 2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a Bidding Documents holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered Bidding Documents holders will receive Addenda issued by Owner or Issuing Office.
- 2.04 Bidder may register as a Bidding Documents holder and obtain complete sets of Bidding Documents, in the format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered Bidding Documents holders will receive Addenda issued by Owner or Issuing Office.
- 2.05 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are encouraged to register as Bidding Documents holders from the Bidding Documents Website or Issuing Office. Owner is not responsible for omissions in Bidding

Documents or other documents obtained from plan rooms or other such sources (such as other prospective bidders), or for a Bidder's failure to obtain Addenda from a plan room.

2.06 *Electronic Documents*

- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to prospective Bidders as Electronic Documents in the manner specified.
 - 1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader Version 2022 or later. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor any bidder's or the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.
- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 Bidder must submit the following information with its bid to demonstrate Bidder's qualifications to perform the Work:
 - A. Bidder's state (or other issuing entity) contractor license number, if applicable.
 - B. Subcontractor (plumbing, HVAC, and electrical) names and license numbers.
 - C. Other required information regarding qualifications.
- 3.02 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:
 - A. Bidder's state (or other) contractor license number, if applicable.
 - B. Subcontractor and Supplier qualification information (apparent low-bidder only).
 - C. Other required information regarding qualifications (apparent low-bidder only).
- 3.03 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.04 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.
- 3.05 Bidders shall be experienced in the kind of Work to be performed, shall have the or be able to obtain construction equipment necessary for the Work, and shall possess sufficient capital to properly perform the Work within the time allowed. Bids received from Bidders who have

previously failed to complete work within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected. A Bid may be rejected if Bidder cannot show and document to Owner's satisfaction that Bidder has the necessary ability, facilities, equipment, and resources to commence the Work at the time prescribed and thereafter to prosecute and complete the Work at the rate or within the times specified. A Bid may be rejected if Bidder is already obligated for the performance of other work which would delay the commencement, prosecution or completion of the Work.

ARTICLE 4—PRE-BID CONFERENCE

- 4.01 A non-mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.
- 4.02 Information presented at the pre-bid conference does not alter the Bidding Documents. Owner or Issuing Office will issue Addenda to make any changes to the Bidding Documents that result from discussions at the pre-bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 *Site and Other Areas*

- A. The Site is identified in the Bidding Documents, including in Specifications Section 01 11 00 – Summary of Work. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 *Existing Site Conditions*

A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

- 1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
 - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
 - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
 - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
- 2. Owner will make copies of reports and drawings referenced above available to any prospective Bidder on request. These reports and drawings are not part of the Contract

Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-Related Documents*

- A. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.02.A of these Instructions to Bidders, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference:
 1. Construction of Woodside Wastewater Treatment Plant (Record Drawings), dated May 2001.
 2. Solids Handling Improvements (Record Drawings), dated February 2017.
 3. UV Installation Drawings (As-Built), dated December 2023.
 4. Generator Replacement (Record Drawings), dated March 2024.

Owner will make copies of these other Site-related documents available to any Bidder on request. Such Site-related drawings, reports, and other documents (if any) may be examined at the Issuing Office during normal business hours, Mondays through Fridays, upon 24 hours' notice to Mary Cone at (208)-788-4421 or mary.cone@haileycityhall.org.

- B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.
- C. The other Site-related documents are not part of the Contract Documents.
- D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.
- E. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

- A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.

- B. A Site visit is scheduled following the pre-bid conference. Maps, directions, or GPS coordinates to the Site, when the Site is remote from the pre-bid conference location, will be available at the pre-bid conference.
- C. A Site visit is scheduled for May 28th, 2025 at 1:00 PM MST at the Woodside WRF, located at 4197 Glenbrook Drive, Hailey, Idaho 83333. The location of the Site is indicated in the Bidding Documents, including in Specifications Section 01 11 00 – Summary of Work.
- D. Bidders visiting the Site are required to: (1) arrange their own transportation to the Site; and (2) each Bidder visiting the Site is responsible for providing and using its own personal protective equipment appropriate for the Site and conditions, and in accordance with posted requirements, if any. At minimum, each visitor to the Site should have an appropriate hardhat, steel-toed boots, eye and hearing protection (other than ordinary eyewear), and a high-visibility reflective safety vest. Comply with Paragraph 5.05 of these Instructions to Bidders.
- E. All access to the Site, other than during a regularly scheduled Site visit, must be coordinated through the following Owner or Engineer contact for visiting the Site: Bryson Ellsworth, Wastewater Division Supervisor, (208)-578-2211, ext. 21, bryson.ellsworth@haileycityhall.org. Bidder must conduct the required Site visit during normal working hours, Mondays through Fridays.
- F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites. Contact Bryson Ellsworth, Wastewater Division Supervisor, (208)-578-2211, ext. 21, bryson.ellsworth@haileycityhall.org for access requests.
- H. Bidder must comply with Laws and Regulations regarding excavation and location of utilities, obtain necessary permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be indicated in the Supplementary Conditions. Where the Bidding Documents indicate an Owner's safety program, visitors to the Site during the bidding phase and at other times shall comply with Owner's safety programs.

5.06 *Other Work at the Site*

- A. Reference is made to Specifications Section 01 11 00 – Summary of Work, for the identification of the general nature of other work of which Owner is aware (if any) that is to

be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other potentially confidential matters), if any.

ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will complete and submit contains express representations regarding the Bidder’s examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Successful Bidder (as Contractor) will make similar express representations and certifications when it signs the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Owner in writing and carbon-copy Engineer and Project Engineer. Contact information and submittal procedures for such questions are as follows:
 - A. Mary Cone, Hailey City Clerk.
 - 1. Phone: (208)-788-4421.
 - 2. Email: mary.cone@haileycityhall.org.
 - B. Brad Bjerke, Engineer.
 - 1. Phone: 208-387-7073.
 - 2. Email: brad.bjerke@hdrinc.com.
 - C. Kody Thomas, Project Engineer.
 - 1. Phone: (208)-387-7130.
 - 2. Email: kody.thomas@hdrinc.com.
- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all Bidding Documents holders registered with the Issuing Office. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract

Documents unless set forth in an Addendum that expressly modifies or supplements the Bidding Documents.

- 7.05 Addenda that engineer judges to have a material or significant effect on Bidders' preparation of pricing and other requirement element of the Bid will be transmitted via Addendum for Bidders' receipt not less than three days prior to the scheduled date for receipt of the Bids. Clarifications or modifications that Engineer deems will not have a material or substantial effect on the preparation of Bids may be transmitted for Bidders' receipt later, for receipt prior to the deadline for receipt of Bids.

ARTICLE 8— BID SECURITY

8.01 *Required Form and Amount of Bid Security*

- A. A Bid must be accompanied by bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions.
- B. Such bid bond will be issued in the form included in the Bidding Documents.

8.02 *Bid Security of Successful Bidder*

- A. The Bid security of the apparent Successful Bidder will be retained until Owner awards the Contract to such Bidder, and such Bidder has signed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Successful Bidder's bid security will be released.
- B. If the Successful Bidder fails to sign and deliver the Contract and furnish the required Contract security within the number of days, indicated in Paragraph 20.01 of these Instructions to Bidders, after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the bid security of that Bidder will be forfeited.
- C. Upon Successful Bidder's default:
 - 1. When the bid security is a penal sum bid bond, the entire penal sum amount of the bid bond will be forfeit and due Owner.
 - 2. When the bid security is a damages form of bid bond, to the extent of Owner's damages will be forfeit and due Owner.
 - 3. If a type of bid security other than a bid bond is allowed and is furnished, the amount that will be forfeit and due Owner will be the same as for the form of bid bond included in the Bidding Documents. Owner will so notify the defaulting Bidder in writing of the annulment and the amount of the forfeiture, with documentation of the amount forfeited.
- D. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

8.03 *Bid Security of Bidders other than the Successful Bidder*

- A. The bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon bid security furnished by such Bidders will be released.

- B. Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the bid opening.
- C. Release of Bid Security: Owner may release any Bidder's bid security by returning such bid security to the associated Bidder. When bid security is in the form of a bid bond, Owner may dispose of or destroy the bid bond and so advise the associated Bidder in writing that the bid bond has been released.

ARTICLE 9—CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any), are to be achieved are set forth in the Agreement.
- 9.02 Provisions for liquidated and special damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

- 10.01 The Contract for the Work, as awarded, will be on the basis of materials, equipment, and procedures specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items or procedures. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or-equal" item of material or equipment or procedure, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.
- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, and will perform the Work in accordance with procedures indicated in the Bidding Documents, as supplemented by Addenda, if any. Assumptions regarding the possibility of post-bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 11.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so in the Specifications or elsewhere in the Bidding Documents. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should not submit a Bid.
- 11.02 The Bidder must submit to Owner in the Bid Form a list of the Subcontractors and Suppliers proposed for the following portions of the Work:
 - A. Electrical.
 - B. Plumbing.
 - C. HVAC.
- 11.03 The list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier (or evidenced by Class of license appropriate for the dollar value of the Work). If Owner or Engineer,

after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and awarding the Contract.

- 11.04 If apparent Successful Bidder declines to make a requested substitution, Owner may award the Contract to another Bidder, consistent with the basis for evaluating the Bids for award as set forth in these Instructions to Bidders, that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to issuance of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

- 12.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
 - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8.5-inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 12.03 A Bid by a corporation must be signed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 12.04 A Bid by a partnership must 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 must be shown.
- 12.05 A Bid by a limited liability company must be signed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 12.06 A Bid by an individual must show the Bidder's name and official address.

- 12.07 A Bid by a joint venture must be signed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 12.08 All names must be printed in ink below the signatures.
- 12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be indicated on the Bid Form.
- 12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Base Bid with Alternates*

- A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate item described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.
- B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

ARTICLE 14—SUBMITTAL OF BID

- 14.01 The Bidding Documents includes the Bid Form and Bid Proposal and other required supplements to the Bid Form. The copy of the Bid Form and supplements (if any) is to be completed and submitted with the Bid security and the other documents required with the Bid by Article 2 of the Bid Form.
- 14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, and the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery method, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement or invitation to bid. The Bidder shall be aware that "over-night" delivery is often not reliable due to the Owner's mountain location and/or winter travel conditions.
- 14.03 Bids received after the date and time prescribed for the opening of Bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the

Bidder unopened. Owner accepts no responsibility for delays in returning Bids submitted or delivered to the incorrect location.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

- 15.01 An unopened Bid may be withdrawn by an appropriate document duly signed in the same manner that a Bid must be signed and delivered to the place where Bids are to be submitted, prior to the date and time established in the Bidding Documents for the receipt of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 of this Article and submit a new Bid prior to the date and time for established in the Bidding Documents the receipt of Bids.
- 15.03 If, within 24 hours after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the bid security will be returned.

ARTICLE 16—OPENING OF BIDS

- 16.01 Bids will be opened at the time and place indicated in the Advertisement or invitation to bid and, unless obviously non-responsive, will be read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.
- 16.02 An abstract of the amounts of the base Bids will be furnished by Owner or Engineer upon request.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. Owner may reject the Bid of any Bidder that fails to demonstrate appropriate qualifications, experience, and resources for the Work, in accordance with Article 3 of these Instructions to Bidders.
- 18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of

the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 *Basis for Award of Contract*

- A. If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest-priced, responsive Bid that has not otherwise been disqualified.

18.05 *Evaluation of Bids*

- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or elsewhere in the Bidding Documents, or prior to the Notice of Award.
- B. *Based Bid with Alternates:* In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all Bidders, present at the opening of Bids, a “Base Bid plus alternates” budget after receiving all Bids, but prior to opening the Bids; Bidders not present for the opening of Bids may obtain the announced budget amount from Owner or Engineer. For comparison purposes, alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions to Bidders, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate bid prices for which Owner determines funds will be available at the time of award.

18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications, experience, and resources of the Bidder and may consider the qualifications, experience, and resources of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner, with or without Engineer’s assistance, may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19—BONDS AND INSURANCE

19.01 Paragraph 2.01 and Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, set forth Owner’s requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the signed Agreement to Owner (or Owner’s representative), it must be accompanied by required bonds and insurance documentation.

19.02 Article 8 (“Bid Security”) of these Instructions to Bidders addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unsigned counterparts of the Agreement, along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the

required number of counterparts of the Agreement and required bonds and insurance documentation (as required by the Contract Documents) to Owner. Within 10 days thereafter, Owner will deliver one fully signed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

- 21.01 The Buyer is tax exempt per Idaho State Tax Commission *Form ST-101 Sales Tax Resale or Exemption Certificate* item 5 (Pollution Control) for improvements to real property used to meet water quality standards. The signed copy of said certificate shall be provided with the Agreement. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

ARTICLE 22—CONTRACTS TO BE ASSIGNED (NOT USED)

BID FORM

FOR CONSTRUCTION CONTRACT

CITY OF HAILEY

HEADWORKS IMPROVEMENTS

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

ARTICLE 1—OWNER AND BIDDER

- 1.01 This Bid is submitted to: City of Hailey; 115 Main Street South, Hailey, Idaho 83333. Attention Mary Cone.
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

- 2.01 The following documents are submitted with and made a condition of this Bid:
- A. Required Bid security;
 - B. List of Proposed Subcontractors and associated license numbers (table in this Bid Form);
 - C. Evidence of authority to do business in the state of the Project; and
 - D. Contractor's license number as evidence of Bidder's State Contractor's License with the Class commensurate with the value of the Work.

ARTICLE 3—BASIS OF BID—LUMP SUM BID

3.01 *Lump Sum Bids*

- A. Bidder will complete the Work in accordance with the Contract Documents for the following lump sum price:

1. Lump Sum Price (Base Bid and Alternates)

Lump Sum Bid Price for Base Bid (in numbers)	\$
Bid Alternate – Batch Tank Pumping (in numbers)	\$
Total for Base Bid and Bid Alternate	\$

(written amount)

- B. All specified contingency allowances are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.

Lump Sum Contingency Allowance 1 (Materials Testing)	\$25,000
Lump Sum Contingency Allowance 2 (Changes to Work)	\$75,000
Total for all Lump Sum Contingency Allowances	\$100,000

ARTICLE 4—TIME OF COMPLETION

- 4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of days indicated in the Agreement.
- 4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, SUBCONTRACTOR'S LIST, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Subcontractors List*

- A. As required by Idaho Code § 67-2310, Contractor shall list "self" and appropriate specialty license number or Subcontractor name, address, and license number.

Discipline	Name and Address	License No.
Plumbing		
HVAC		
Electrical		

5.04 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder’s Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder’s (Contractor’s) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

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

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Bidder's Address for giving notices:

Bidder's Contact Person:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable)

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BID BOND (PENAL SUM FORM)

Bidder Name: Address <i>(principal place of business)</i> :	Surety Name: Address <i>(principal place of business)</i> :
Owner Name: City of Hailey Address <i>(principal place of business)</i> : Hailey City Hall 115 Main Street South Hailey, Idaho 83333	Bid Project <i>(name and location)</i> : Woodside WRF – Headworks Improvements 4197 Glenbrook Drive Hailey, Idaho 83333 Bid Due Date: June 11, 2025
Bond Penal Sum: Date of Bond:	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder	Surety
_____ <i>(Full formal name of Bidder)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature) (Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>	

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

QUALIFICATIONS STATEMENT

ARTICLE 1—GENERAL INFORMATION

1.01 The Qualifications Statement shall be completed by the apparent low-bidder.

A. Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	<input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation		
<input type="checkbox"/> Limited Liability Company <input type="checkbox"/> Joint Venture comprised of the following companies:			
1.			
2.			
3.			
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Pending	

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	

Address:			
Name of business:		Affiliation:	
Address:			

1.04 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No		Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No		Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No		Limit of Authority:	\$
Name:		Title:	

ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3—SAFETY

3.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:			
Safety Certifications			
Certification Name	Issuing Agency	Expiration	

3.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s)

that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 4—SURETY INFORMATION

- 4.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is surety listed in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):			Phone (claims):

ARTICLE 5—INSURANCE

- 5.01 Provide information regarding Business’s insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No	

Does provider have an A.M. Best Rating of A-VII or better?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 6— CONSTRUCTION EXPERIENCE

6.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

6.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Provide full details in a separate attachment if the response to any of these questions is Yes.				

6.03 List all projects currently under contract in Schedule A and provide indicated information.

6.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

6.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the

Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 7—REQUIRED ATTACHMENTS

- 7.01 Provide the following information with the Statement of Qualifications:
- A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.
 - B. Certification of Business's safety performance if required by Paragraph 3.02.
 - C. Attachments providing additional information as required by Paragraph 6.02.
 - D. Schedule A (Current Projects) as required by Paragraph 6.03.
 - E. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 6.04.
 - F. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 6.05.
 - G. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(date signed)

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

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

Schedule A—Current Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project Completed		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule C—Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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SECTION 00 51 16
NOTICE OF AWARD

Date of Issuance: _____, 2025

Owners: City of Hailey, Idaho

Owner's Contract No.:

Engineer: HDR Engineering, Inc.

Engineer's Project No.: 10381996

Project: Woodside WRF – Headworks
Improvements

Contract Name: Woodside WRF –
Headworks Improvements

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated _____, 2025 for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

Construction of a new headworks building, installation of new in-channel drum screens, construction of a new grit chamber, installation of a grit handling system, installation of new submersible pumps and piping in the Woodside Influent Lift Station, and demolition of the existing metal-frame headworks building and associated infrastructure. A bid alternate also includes the construction of a new submersible pump station, piping, valves, and valve vaults in the Batch Tank

The Contract Price of the awarded Contract is: \$[_____].

Four (4) unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award (transmitted to Bidder electronically).

You must comply with the following conditions precedent within 15 days of the date of this Notice of Award:

1. Deliver to Owner four (4) counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security (*e.g., performance and payment bonds*) and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): None

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

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: City of Hailey, Idaho

By: Martha Burke

(Authorized Signature)

Title: City of Hailey, Idaho Mayor

Copy: Mary Cone, Hailey City Clerk
Brad Bjerke, HDR Engineering

AGREEMENT

BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between City of Hailey (“Owner”) and [_____]
 (“Contractor”).

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

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

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

Construction of a new headworks building, installation of new in-channel drum screens, construction of a new grit chamber, installation of a grit handling system, installation of new submersible pumps and piping in the Woodside Influent Lift Station, and demolition of the existing metal-frame headworks building and associated infrastructure.

A bid alternate also includes the construction of a new submersible pump station, piping, valves, and valve vaults in the Batch Tank.

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows:

Woodside WRF – Headworks Improvements

ARTICLE 3—ENGINEER

3.01 The Owner has retained HDR Engineering, Inc. (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by Engineer.

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

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

4.02 *Contract Times: Days*

A. The Work will be substantially complete within 455 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 515 days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
 - 1. *Substantial Completion*: Contractor shall pay Owner \$1,500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
 - 2. *Completion of Remaining Work*: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$500 for each day that expires after such time until the Work is completed and ready for final payment.
 - 3. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.
- C.

- 4.05 Owner reserves the right to withhold from payments due Contractor under the Contract amounts for liquidated damages (if any), special damages (if any), and performance damages (if any) in accordance with the Contract.

ARTICLE 5—CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:
 - A. For all Work other than Unit Price Work, a lump sum of \$[_____].
 - B. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the 25th day of each month during performance of the Work as provided in

Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

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

a. Ninety-five (95) percent of the value of the Work completed (with the balance being retainage).

1) If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

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

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to ninety-seven and one half (97.5) percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

A. All amounts not paid when due will bear interest at the rate of twelve (12) percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

A. The Contract Documents consist of all of the following:

1. This Agreement.

2. Bonds:

a. Performance bond (together with power of attorney).

b. Payment bond (together with power of attorney).

3. General Conditions.
4. Supplementary Conditions.
5. Statutory and Funding-Financing Entity Requirements.
6. Specifications as listed in the table of contents of the project manual (copy of list attached).
7. Drawings (not attached but incorporated by reference) consisting of sheets with each sheet bearing the following general title: Woodside WRF – Headworks Improvements.
8. Drawings listed on the attached sheet index.
9. Addenda (numbers [] to [], inclusive).
10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid.
11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
 - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 Contractor's Representations

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
 1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to

existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

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

8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or “track changes” (redline/strikeout), or in the Supplementary Conditions.

Contractor:

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

License No.:

(where applicable)

State:

PERFORMANCE BOND

Contractor Name: _____ Address (<i>principal place of business</i>): _____	Surety Name: _____ Address (<i>principal place of business</i>): _____
Owner Name: City of Hailey Mailing address (<i>principal place of business</i>): Hailey City Hall 115 Main Street South Hailey, Idaho 83333	Contract Description (<i>name and location</i>): Woodside WRF – Headworks Improvements 4197 Glenbrook Drive Hailey, Idaho 83333 Contract Price: _____ Effective Date of Contract: _____
Bond Bond Amount: _____ Date of Bond: _____ <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
_____ <i>(Full formal name of Contractor)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
 - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: [_____].

PAYMENT BOND

Contractor Name: Address <i>(principal place of business)</i> :	Surety Name: Address <i>(principal place of business)</i> :
Owner Name: City of Hailey Mailing address <i>(principal place of business)</i> : Hailey City Hall 115 Main Street South Hailey, ID 83333	Contract Description <i>(name and location)</i> : Woodside WRF – Headworks Improvements 4197 Glenbrook Drive Hailey, Idaho 83333 Contract Price: Effective Date of Contract:
Bond Bond Amount: Date of Bond: <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - 5.1. Claimants who do not have a direct contract with the Contractor
 - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2. Pay or arrange for payment of any undisputed amounts.
 - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
 - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - 16.1.7. The total amount of previous payments received by the Claimant; and
 - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic’s lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of “labor, materials, or equipment” that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor’s subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: [_____].

STANDARD GENERAL CONDITIONS

OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1—Definitions and Terminology.....	1
1.01 Defined Terms.....	1
1.02 Terminology	6
Article 2—Preliminary Matters	7
2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance.....	7
2.02 Copies of Documents	7
2.03 Before Starting Construction	7
2.04 Preconstruction Conference; Designation of Authorized Representatives	8
2.05 Acceptance of Schedules	8
2.06 Electronic Transmittals	8
Article 3—Contract Documents: Intent, Requirements, Reuse	9
3.01 Intent.....	9
3.02 Reference Standards	9
3.03 Reporting and Resolving Discrepancies	10
3.04 Requirements of the Contract Documents	10
3.05 Reuse of Documents	11
Article 4—Commencement and Progress of the Work	11
4.01 Commencement of Contract Times; Notice to Proceed.....	11
4.02 Starting the Work.....	11
4.03 Reference Points	11
4.04 Progress Schedule	12
4.05 Delays in Contractor’s Progress	12
Article 5—Site; Subsurface and Physical Conditions; Hazardous Environmental Conditions	13
5.01 Availability of Lands	13
5.02 Use of Site and Other Areas.....	14
5.03 Subsurface and Physical Conditions.....	15
5.04 Differing Subsurface or Physical Conditions	16
5.05 Underground Facilities	17

5.06	Hazardous Environmental Conditions at Site	19
Article 6—Bonds and Insurance.....		21
6.01	Performance, Payment, and Other Bonds	21
6.02	Insurance—General Provisions	22
6.03	Contractor’s Insurance	24
6.04	Builder’s Risk and Other Property Insurance	25
6.05	Property Losses; Subrogation	25
6.06	Receipt and Application of Property Insurance Proceeds	27
Article 7—Contractor’s Responsibilities		27
7.01	Contractor’s Means and Methods of Construction	27
7.02	Supervision and Superintendence	27
7.03	Labor; Working Hours	27
7.04	Services, Materials, and Equipment	28
7.05	“Or Equals”	28
7.06	Substitutes	29
7.07	Concerning Subcontractors and Suppliers.....	31
7.08	Patent Fees and Royalties.....	32
7.09	Permits	33
7.10	Taxes	33
7.11	Laws and Regulations.....	33
7.12	Record Documents.....	33
7.13	Safety and Protection.....	34
7.14	Hazard Communication Programs	35
7.15	Emergencies	35
7.16	Submittals	35
7.17	Contractor’s General Warranty and Guarantee	38
7.18	Indemnification	39
7.19	Delegation of Professional Design Services	39
Article 8—Other Work at the Site.....		40
8.01	Other Work	40
8.02	Coordination	41
8.03	Legal Relationships.....	41
Article 9—Owner’s Responsibilities		42

9.01	Communications to Contractor	42
9.02	Replacement of Engineer	42
9.03	Furnish Data	42
9.04	Pay When Due	42
9.05	Lands and Easements; Reports, Tests, and Drawings	43
9.06	Insurance	43
9.07	Change Orders	43
9.08	Inspections, Tests, and Approvals	43
9.09	Limitations on Owner's Responsibilities	43
9.10	Undisclosed Hazardous Environmental Condition	43
9.11	Evidence of Financial Arrangements	43
9.12	Safety Programs	43
Article 10—Engineer's Status During Construction		44
10.01	Owner's Representative	44
10.02	Visits to Site	44
10.03	Resident Project Representative	44
10.04	Engineer's Authority	44
10.05	Determinations for Unit Price Work	45
10.06	Decisions on Requirements of Contract Documents and Acceptability of Work	45
10.07	Limitations on Engineer's Authority and Responsibilities	45
10.08	Compliance with Safety Program	45
Article 11—Changes to the Contract		46
11.01	Amending and Supplementing the Contract	46
11.02	Change Orders	46
11.03	Work Change Directives	46
11.04	Field Orders	47
11.05	Owner-Authorized Changes in the Work	47
11.06	Unauthorized Changes in the Work	47
11.07	Change of Contract Price	47
11.08	Change of Contract Times	49
11.09	Change Proposals	49
11.10	Notification to Surety	50
Article 12—Claims		50

12.01	Claims	50
Article 13—Cost of the Work; Allowances; Unit Price Work		51
13.01	Cost of the Work	51
13.02	Allowances	55
13.03	Unit Price Work	55
Article 14—Tests and Inspections; Correction, Removal, or Acceptance of Defective Work		56
14.01	Access to Work.....	56
14.02	Tests, Inspections, and Approvals.....	56
14.03	Defective Work	57
14.04	Acceptance of Defective Work.....	58
14.05	Uncovering Work	58
14.06	Owner May Stop the Work	58
14.07	Owner May Correct Defective Work.....	59
Article 15—Payments to Contractor; Set-Offs; Completion; Correction Period		59
15.01	Progress Payments	59
15.02	Contractor’s Warranty of Title	62
15.03	Substantial Completion.....	62
15.04	Partial Use or Occupancy	63
15.05	Final Inspection	64
15.06	Final Payment.....	64
15.07	Waiver of Claims	65
15.08	Correction Period	66
Article 16—Suspension of Work and Termination		67
16.01	Owner May Suspend Work	67
16.02	Owner May Terminate for Cause.....	67
16.03	Owner May Terminate for Convenience.....	68
16.04	Contractor May Stop Work or Terminate	68
Article 17—Final Resolution of Disputes		69
17.01	Methods and Procedures.....	69
Article 18—Miscellaneous		69
18.01	Giving Notice	69
18.02	Computation of Times	69
18.03	Cumulative Remedies	70

18.04	Limitation of Damages	70
18.05	No Waiver	70
18.06	Survival of Obligations	70
18.07	Controlling Law	70
18.08	Assignment of Contract	70
18.09	Successors and Assigns	70
18.10	Headings.....	70

STANDARD GENERAL CONDITIONS

OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.
- 11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
 - 12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
 - 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
 - 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
 - 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
 - 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
 - 17. *Cost of the Work*—See Paragraph 13.01 for definition.
 - 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
 - 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
 - 20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 - 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 - 1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 - 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

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

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

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

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

- D. *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;
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
 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.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), 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.

- B. *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 whether it is necessary for Owner to obtain 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 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption 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.
- C. *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 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.
- D. *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.
- E. *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:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
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:
 - a. 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;
 - b. 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
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
 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 will 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.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* 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 Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, 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.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, 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:

- a. 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 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. 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 will be set forth in a Change Order.
 3. 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 Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. 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;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 - 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

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

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

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

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

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

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

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

7.15 *Emergencies*

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

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
- 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 1. Observations by Engineer;
 - 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. Use or occupancy of the Work or any part thereof by Owner;
 - 5. Any review and approval of a Shop Drawing or Sample submittal;
 - 6. The issuance of a notice of acceptability by Engineer;
 - 7. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 Indemnification

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 Delegation of Professional Design Services

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
1. A mutually acceptable fixed fee; or
 2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.
- B. *Change Proposal Procedures*
 - 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
 - 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

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

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
 5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
 - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work does not include any of the following items:
 - 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 - 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
 - 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 - 6. Expenses incurred in preparing and advancing Claims.
 - 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*
 - 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
 - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

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

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work,

or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
 - 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

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

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 - 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
 - 1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 - 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 - 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

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SUPPLEMENTARY CONDITIONS

OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1— Definitions and Terminology	1
Article 2— Preliminary Matters	1
Article 3— Contract Documents: Intent, Requirements, Reuse	2
Article 4— Commencement and Progress of the Work	2
Article 5— Site, Subsurface and Physical Conditions, Hazardous Environmental Conditions.....	2
Article 6— Bonds and Insurance	5
Article 7— Contractor’s Responsibilities	11
Article 8— Other Work at the Site	13
Article 9— Owner’s Responsibilities	13
Article 10— Engineer’s Status During Construction.....	14
Article 11— Changes to the Contract.....	15
Article 12— Claims	15
Article 13— Cost of Work; Allowances, Unit Price Work	15
Article 14— Tests and Inspections; Correction, Removal, or Acceptance of Defective Work	17
Article 15— Payments to Contractor, Set Offs; Completions; Correction Period.....	17
Article 16— Suspension of Work and Termination	18
Article 17— Final Resolutions of Disputes.....	18
Article 18— Miscellaneous	18
Exhibit A— Software Requirements for Electronic Document Exchange.....	Error! Bookmark not defined.
Exhibit B— Foreseeable Bad Weather Days	Error! Bookmark not defined.
Exhibit C— Geotechnical Baseline Report Supplement to the Supplementary Conditions	Error! Bookmark not defined.

SUPPLEMENTARY CONDITIONS

OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

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

The paragraph address system used in these Supplementary Conditions is the same as the paragraph address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC-4.05."

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

SC-1.01.A.40 Add the following to Paragraph 1.01.A.40:

Trucking, shipping, delivery firms, consultants, and entities performing testing or inspection retained by Contractor or any Subcontractor are considered to be Subcontractors.

SC-1.01.A.45 Add the following to Paragraph 1.01.A.45:

Entities that rent construction equipment or machinery, but are not incorporated into the Work, are considered to be Suppliers. If such rental entity furnishes both equipment and one or more personnel to operate and maintain the equipment, such entity is a Subcontractor.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

SC-2.01 Delete Paragraphs 2.01.B. and C. in their entirety and insert the following in their place:

- B. *Evidence of Contractor's Insurance:* When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

2.02 *Copies of Documents*

SC-2.02 Amend the first sentence of Paragraph 2.02.A to read as follows:

Owner shall furnish to Contractor one paper copies of the Contract Documents (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF).

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

- A. Owner shall furnish to Contractor one paper copy of conformed Contract Documents incorporating and integrating all Addenda and amendments, if any, negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional paper copies of the conformed Contract Documents for Contractor use will be the responsibility of the Contractor. The conformed Contract Documents shall be used solely for reference or convenience of Contractor.

2.06 *Electronic Transmittals*

SC-2.06 Delete in its entirety Paragraph 2.06.B and replace with the following new paragraph:

- B. *Electronic Document Protocol*: Comply with Specifications Section 01 31 26 – Electronic Communication Protocols.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

SC-3.01 Add the following new paragraphs immediately after Paragraph 3.01.E:

- F. The Specifications and other verbal components of the Contract Documents may vary in form, format, and style. Some Specification sections are written in varying degrees of streamlined or declarative style and some Specifications sections may, in comparison, employ a more-narrative style. Omissions of such words and phrases as "Contractor shall," "in conformity with," "as shown," or "as specified" are intentional in streamlined language in the Contract Documents. Omitted words and phrases are incorporated by inference. Similar types of provisions may appear in various parts of a Specifications section or elsewhere in the Contract Documents. Contractor shall not attempt to take advantage of any variation of form, format or style in Change Proposal(s) and Claim(s).
- G. Cross referencing of Specification sections in a Specifications section's heading "Related Sections includes, but are not necessarily limited to: "and elsewhere within each Specifications section is provided as an aid and convenience to Contractor. Contractor shall not rely on cross referencing indicated and is responsible for coordinating the entire Work and providing a complete Project whether or not cross referencing is provided in each Specifications section or whether or not cross referencing is complete.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.05 *Delays in Contractor's Progress*

SC-4.05.C Amend Paragraph 4.05.C by adding the following subparagraphs:

5. Weather-Related Delays

- a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: (1) that weather conditions were abnormal for the period of time in which the delay occurred, (2) that such weather conditions could not have been

reasonably anticipated, and (3) that such weather conditions had an adverse effect on the Work on the critical path at the time of the delay.

- b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:
 - 1) Every workday on which one or more of the following conditions exist will be considered a “bad weather day”:
 - i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds 1.0 inch of precipitation (as rain equivalent- two inches of sleet equals one inch of rain, and fifteen inches of “dry” powder snow equals one inch of rain).
 - ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: 10 degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: 95 degrees Fahrenheit.
 - iii) Contractor understands that the Project Site commonly retains snow on the ground from late October to early May each year and shall plan the construction schedule appropriately. “Abnormal weather conditions” outside of weather records will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor’s then-current Progress Schedule’s critical path for the project.
 - 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by Western Regional Climate Center weather monitoring station at Ketchum Ranger Station (104845).

ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.03 *Subsurface and Physical Conditions*

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

- E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely.

Report Title	Date of Report	Technical Data
Geotechnical Engineering Evaluation	December 31, 1997	Geotechnical evaluation performed to inform Construction of Woodside Wastewater Treatment Plant design.

Report Title	Date of Report	Technical Data
Geotechnical Engineering Evaluation Addendum	January 17, 2014	Geotechnical supplemental evaluation performed to supplement 1997 evaluation to inform Solids Handling Improvements design.
REPORT (Revised) Geotechnical Engineering Evaluation – Proposed Headworks	June 4, 2024	Geotechnical supplemental evaluation performed to supplement 1997 and 2014 evaluations to inform Headworks Improvements design.

- F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
Construction of Woodside Wastewater Treatment Plant	May 15, 2001	Record Drawings
Solids Handling Improvements	February 27, 2017	Record Drawings
UV Installation Drawings	December 19, 2023	Contractor As-Builts
Generator Replacement	March 27, 2024	Record Drawings

- G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents at the Woodside WRF during regular business hours, or may request copies from Engineer. Request access to hard copies of record drawings from Wastewater Superintendent.

SC-5.04.A Add the following new paragraph immediately after Paragraph 5.04.A.4:

5. Contractor encounters human remains, recognizes the existence of burial markers, archaeological sites, historical sites, artifacts of potential archaeological or historical interest, or wetlands not shown or indicated in the Contract Documents, Contractor shall immediately cease operations that may disturb such area(s) and secure the adjacent Work; and Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations (Contractor shall continue to suspend such operations until otherwise instructed by Owner but shall continue with all other operations that do not affect those remains or features);

5.06 *Hazardous Environmental Conditions*

- SC-5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:
- A. There are no reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner. B. Not used.
- SC-5.06 Delete Paragraph 5.06.I in its entirety.

ARTICLE 6—BONDS AND INSURANCE

6.01 Performance, Payment, and Other Bonds

- SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:
1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2018 edition).
 2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2018 edition).
- SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.B:
1. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be eighteen months after Substantial Completion.
 2. After Substantial Completion, Contractor shall furnish a warranty bond issued in the form of EJCDC® C-612, Warranty Bond (2018). The warranty bond must be in a bond amount of 10 percent of the final Contract Price. The warranty bond period will extend to a date eighteen months after Substantial Completion of the Work. Contractor shall deliver the fully executed warranty bond to Owner prior to or with the final Application for Payment, and in any event not later than six (6) months after Substantial Completion.
 3. The warranty bond must be issued by the same surety that issues the performance bond required under Paragraph 6.01.A of the General Conditions.

6.03 Contractor's Insurance

- SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:
- D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following: Contractor shall list by legal name (not Project role or classification) other persons or entities to be included as additional insureds. See GC-6.03.C.
- E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Employer's Liability	
Bodily injury by accident - each accident	\$500,000
Bodily injury by disease - each employee	\$500,000
Bodily injury by disease - aggregate	\$500,000

- F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
 2. damages insured by reasonably available personal injury liability coverage, and
 3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage.
 - a. Such insurance must be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
 4. Underground, explosion, and collapse coverage.
 5. Personal injury coverage.
 6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.

7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 “Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured” or its equivalent.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:
1. Any modification of the standard definition of “insured contract” (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
 2. Any exclusion for water intrusion or water damage.
 3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
 4. Any exclusion of coverage relating to earth subsidence or movement.
 5. Any exclusion for the insured’s vicarious liability, strict liability, or statutory liability (other than worker’s compensation).
 6. Any limitation or exclusion based on the nature of Contractor’s work.
 7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	\$1,000,000
Products—Completed Operations Aggregate	\$1,000,000
Personal and Advertising Injury	\$1,000,000
Bodily Injury and Property Damage—Each Occurrence	\$1,000,000

- J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy must be written on an occurrence basis.

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	\$1,500,000
Each Accident	\$1,500,000

Automobile Liability	Policy limits of not less than:
Property Damage	
Each Accident	\$1,500,000

- K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	\$1,000,000
General Aggregate	\$5,000,000

- L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of \$4,000,000 after accounting for partial attribution of its limits to underlying policies, as allowed above.
- M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

Contractor's Pollution Liability	Policy limits of not less than:
Each Occurrence/Claim	\$500,000
General Aggregate	\$500,000

- N. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

Contractor's Professional Liability	Policy limits of not less than:
Each Claim	\$1,000,000
Annual Aggregate	\$1,000,000

- O. *Railroad Protective Liability Insurance*: Not applicable. P. *Unmanned Aerial Vehicle Liability Insurance*: If Contractor uses unmanned aerial vehicles (UAV—commonly referred to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor's compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.

Unmanned Aerial Vehicle Liability Insurance	Policy limits of not less than:
Each Claim	\$1,000,000
General Aggregate	\$1,000,000

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Supplement Paragraph 6.04 with the following provisions:

- F. *Builder's Risk Requirements*: The builder's risk insurance must:
1. be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).
 - a. Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.
 - b. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.
 2. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or

assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

3. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of contractors, engineers, and architects).
4. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier). If this coverage is subject to a sublimit, such sublimit will be a minimum of \$2,000,000.
5. extend to cover damage or loss to insured property while in transit. If this coverage is subject to a sublimit, such sublimit will be a minimum of \$1,000,000.
6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.
7. allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.
8. include performance/hot testing and start-up, if applicable.
9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.
10. include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds."
11. include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:
 - a. Influent Screen 01 (SCRN-02-01) & Influent Screen 02 (SCRN-02-02): \$525,000.
12. If debris removal in connection with repair or replacement of insured property is subject to a coverage sublimit, such sublimit will be a minimum of \$500,000.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provision:

- G. *Coverage for Completion Delays:* The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

- H. *Builder's Risk and Other Property Insurance Deductibles:* The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.
1. The builder's risk policy (or if applicable the installation floater) will be subject to a deductible amount of not more than \$500,000 for direct physical loss in any one occurrence.

6.05 *Property Losses; Subrogation*

SC-6.05 Delete Paragraph 6.05.A.1 and replace with the following new paragraph:

1. Contractor waives all rights against the Owner and their respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waives all rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the other officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.

SC-6.05 Delete Paragraph 6.05.B in its entirety.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.02 *Supervision and Superintendence*

SC-7.02 Add the following to Paragraph 7.02, following Paragraph 7.02.B:

- C. Unless Owner otherwise agrees in writing, the superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

7.03 *Labor; Working Hours*

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be 7:30 AM to 7:00 PM, local time.
2. Owner's legal holidays are:
 - a. New Year's Day (January 1st);
 - b. Martin Luther King Jr./Idaho Human Rights Day (3rd Monday in January);
 - c. President's Day (3rd Monday in February);
 - d. Memorial Day (last Monday in May);
 - e. Juneteenth National Independence Day (June 19th);
 - f. Independence Day (July 4th);
 - g. Labor Day (1st Monday in September);

- h. Columbus Day (2nd Monday in October);
- i. Veterans Day (November 11th);
- j. Thanksgiving (4th Thursday in November, including following Friday);
- k. Christmas Eve and Christmas Day (December 24th and 25th).

SC-7.03 Amend the first and second sentences of Paragraph 7.03.C to state "...all Work at the Site must be performed during regular working hours, Monday through Saturday. Contractor will not perform Work on a Sunday, or any legal holiday." City of Hailey Code of Ordinances Title 9, Chapter 4, Section 030.B.2 restricts Saturday construction activities to between 8:00 AM and 7:00 PM, local time. The balance of Paragraph 7.03.C remains unchanged except for the foregoing.

SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C:

- D. Contractor shall be responsible for the cost of overtime (premium) pay and other expense incurred by Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-7.03 Add the following new subparagraph immediately after Paragraph SC-7.03.D:

- 1. For purposes of administering the foregoing requirement, additional overtime costs are defined as additional hours worked outside of regular business hours in a good-faith effort to complete the Work prior to the designated milestone completion times (finish Work before end of Contract Times).

7.10 *Taxes*

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:

- A. Owner may be partially exempt from payment of sales and compensating use taxes of the State of Idaho and of cities and counties thereof on real property to be incorporated into the Work.
 - 1. Owner will furnish the certificates of tax exemption (Form ST-103C or ST-101) to Contractor for use of equipment to be incorporated into the Owner's real property to meet water quality standards.
 - 2. Owner's exemption does not apply to construction tools or machinery, construction equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.
 - 3. It is the Contractor's responsibility to determine the tax exemption applicability to the Work involved.

7.11 *Laws and Regulations*

SC-7.11 Add the following new paragraph immediately after Paragraph 7.10.C:

- D. Refer to Article SC-19 for Laws and Regulations that, by terms of said Laws and Regulations, are to be included in the Contract Documents. The failure to include in

Article SC-19 or any Law or Regulation applicable to the performance of the Work does not diminish Contractor's responsibility to comply with all Laws and Regulations applicable to the performance of the Work.

7.13 *Safety and Protection*

SC-7.13 Insert the following after the second sentence of Paragraph 7.13.G:

The following Owner safety programs are applicable to the Work: Woodside WRF Safety/Training Manual.

7.14 *Hazard Communication Programs*

SC-7.14 Add the following new paragraph immediately after Paragraph 7.14.A:

- B. *Single Prime Contract*: Contractor shall be responsible for coordinating exchange of safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws and Regulations. Contractor shall provide a centralized location for the maintenance of the safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the material safety data sheets or other hazard communication information shall be readily accessible to the employees of employers on the Site.

ARTICLE 8—OTHER WORK AT THE SITE

8.02 *Coordination*

SC-8.02 Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:

- C. Owner intends to contract with others for the performance of other work at or adjacent to the Site, which is indicated in Specifications Section 01 11 00 – Summary of Work.
 - 1. Wastewater Superintendent shall have authority and responsibility for coordination of the various contractors and work forces at the Site;
 - 2. The following specific matters are to be covered by such authority and responsibility: coordination between Contractors while performing Work in adjacent areas, coordination between Contractor staging areas;
 - 3. The extent of such authority and responsibilities is: Provide one point of Owner contact between Contractors performing work at the Project Location.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.13 *Owner's Site Representative*

SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:

9.13 *Owner's Site Representative*

- A. Owner will furnish an "Owner's Site Representative" (OSR) to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner's Site Representative will be defined at the preconstruction meeting.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.03 *Resident Project Representative*

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.B:

- C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:
1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.
 2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.
 3. *Liaison*
 - a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
 - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
 - c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.
 4. *Review of Work; Defective Work*
 - a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Observe whether any Work in place appears to be defective. This does not impose on either RPR or Engineer any obligation to find all, or any specific element of, defective Work, for which Contractor remains solely responsible.
 - b. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.
 5. *Inspections and Tests*
 - a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to (1) code-required tests and special inspections, and (2) those performed by public or other agencies having jurisdiction over the Work.
 - b. Observe specific tests, inspections, and other field quality control required by the Contract Documents and performed by Contractor, Subcontractor, Supplier, or by testing or laboratories retained by any of them, .
 - c. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor and advise Contractor regarding quantities or extent of the Work eligible for payment.

7. *Completion*

- a. Participate in Engineer's visits regarding inspection for Substantial Completion.
- b. Assist in the augmenting or amending the punch list of items to be completed or corrected prior to final inspection.
- c. *Final Inspection:* Participate in Engineer's visit to the Site, in the company of Owner and Contractor, regarding completion of the Work, and prepare a final punch list (if any) of items to be completed or corrected by Contractor.
- d. Observe whether items on the final punch list have been completed or corrected.
- d. *Record Documents:* Periodically during the Work, review with Contractor the status of Contractor's record documents required by the Contract Documents and advise Contractor on whether such record documents appear to comply with the Contract's requirements for record documents. Review final record documents submitted by Contractor.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials, equipment (including "or-equal" items), or procedures or sequences indicated in the Contract Documents.
2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.
4. Advise on, issue directions relative to, or assume control or responsibility over any aspect of the means, methods, techniques, sequences or procedures of construction.
5. Advise on, issue directions regarding, or assume control over security protection, or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
7. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11—CHANGES TO THE CONTRACT

No Supplementary Conditions in this Article.

ARTICLE 12—CLAIMS

No Supplementary Conditions in this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

13.01 *Cost of the Work*

SC-13.01.B.5.c.(1) Supplement Paragraph 13.01.B.5.c.(1) by adding the following subparagraphs:

- a) Prior to commencing Work at the Site, submit to Owner, through Engineer, copies of the equipment rental blue book intended for use in rates typical for equipment rented within 200 miles of project.
- b) Should Contractor perform Work using rented construction equipment or machinery without Owner's written approval of the associated rental agreement and the parties subsequently disagree on the applicable rental rates, use of such construction equipment and machinery will be compensated on the basis of the rental rate book indicated in Paragraph SC-13.01.B.5.c.(2).
- c) When the rental rate book is used basis for determining compensation for construction equipment and machinery leased from a rental firm, the hourly rate for such equipment shall be determined in accordance with Paragraph 13.01.B.5.(2) of the General Conditions.

SC-13.01.B.5.c.(2) Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of The Blue Book – Building & Construction Network (Tates Rents – Boise Idaho, or equal)..

SC-13.01.B.5.c Supplement Paragraph 13.01.B.5.c by adding the following subparagraphs:

- 4) *Inactive Equipment and Machinery*: Rental of construction equipment and machinery shall cease when the use thereof is no longer necessary for the Work. Periods of inactivity for such construction equipment or machinery will not be compensable unless agreed upon in writing by Owner, unless the costs of disassembly, removal, transportation, reassembly, and remobilization, as submitted to and accepted by Owner (with advice of Engineer) would exceed the cost of continuing to rent the item(s) during the period(s) of inactivity. Contractor is responsible for obtaining Owner's written approval for compensation for construction equipment and machinery for periods of inactivity. Owner is not responsible for retroactively approving such inactivity. "Period of inactivity" for such items includes periods when the construction equipment or machinery is not used or necessary for the logical and efficient progression of the Work, or when other, available equipment or machinery is suitable for performing the given task.
- 5) *Condition of Equipment and Machinery*: Construction equipment and machinery will be compensable only for serviceable construction equipment and machinery capable of efficiently performing its intended function at the Site. Construction equipment and machinery not in compliance with this Paragraph SC-13.01.B.5.c.5) is not eligible for compensation.
- 6) *Capped Compensation*: Compensation paid Contractor for a given item of Contractor-owned construction equipment or machinery will be capped at, and shall

not exceed, the comparable purchase price of such item of equal or comparable capacity and capability.

SC-13.01.C.2 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

a. For purposes of this paragraph, “small tools and hand tools” means items in one or more of the following categories: (1) Items that are ordinarily required for the performing worker’s job function, including but not limited to equipment which ordinarily has no associated licensing, insurance, or substantive storage costs; such as hammers, wrenches, socket tools, manual saws, power saws, chainsaws, common power tools, impact drills, threaders, benders, transits and theodolites and related equipment, and other tools transportable by hand, regardless of ownership of such items; (2) Items such as gang-boxes, ladders, hand carts and similar wheeled items manually operated by workers, extension cords, and similar items; (3) common testing equipment such as insulation testers (megger-testing equipment), amp meters, gas detectors, pressure gauges, and similar items; (4) A purchase price (if purchased new, at retail) of \$500, although such limit is not absolute, and certain items may be deemed by Owner or Engineer as “small tools or hand tools” (and not eligible for compensation) even though such item may have a purchase price greater than the amount indicated in this Paragraph 13.01.C.2.

SC-13.03 Delete Paragraph 13.03 in its entirety.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

No Supplementary Conditions in this Article.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.01 Progress Payments

SC-15.01.C.1 Change 10 days to 14 days.

SC-15.01.D.1 Change 10 days to 30 days.

SC-15.01 Add the following new Paragraph 15.01.F:

- F. For contracts in which the Contract Price is based on the Cost of Work plus a fee, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

15.03 Substantial Completion

SC-15.03.B Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined by Engineer not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer or other entity retained by Owner, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor

does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

15.08 *Correction Period*

SC-15.08.G Add the following new Paragraph 15.08.G:

- G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in Paragraph SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be eighteen (18) months after the date of Substantial Completion established in Engineer's certificate of Substantial Completion.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

No Supplementary Conditions in this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

17.02 *Attorneys' Fees*

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

SC-17.02 *Attorneys' Fees*

- A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18—MISCELLANEOUS

SC-18.11 Add a new paragraph immediately after Paragraph 18.10:

SC-18.11 *Confidential Information*

- A. All Drawings, Specifications, technical data, and other information furnished to Contractor either by Owner or Engineer or developed by Contractor or others in connection with the Work are, and will remain, the property of Owner or Engineer, and shall not be copied or otherwise reproduced or used in any way except in connection with the Work, or disclosed to third parties or used in any manner detrimental to the interests of Owner or Engineer.
- B. The following information is not subject to the above confidentiality requirements:
 - 1. information in the public domain through no action of Contractor in breach of the Contract Documents; or
 - 2. information lawfully possessed by Contractor before receipt from Owner or Engineer; or
 - 3. information required to be disclosed by Laws or Regulations, or by a court or agency of competent jurisdiction. However, in the event Contractor shall be so required to disclose such information, Contractor shall, prior to disclosure, provide reasonable

notice to Owner and Engineer, who shall have the right to interpose all objections Owner may have to the disclosure of such information.

SC-18.12 Add a new paragraph immediately after Paragraph 18.11, to read as follows:

SC-18.12 *Publicity*

- A. Contractor shall not disclose to any third party the nature of its Work on the Project, nor engage in publicity or public media disclosures with respect to the Project without the prior written consent of Owner.

SC-18.13 Add a new paragraph immediately after Paragraph 18.12, to read as follows:

SC-18.13 *Certification Regarding Boycotting Certain Section*

- A. Pursuant to Idaho Code § 67-2347A, Contractor certifies that it is not currently engaged in, and will not for the duration of the contract engage in, a boycott of any individual or company because the individual or company:
 - 1. Engages in or supports the exploration, production, utilization, transportation, sale, or manufacture of fossil fuel-based energy, timber, minerals, hydroelectric power, nuclear energy, or agriculture; or
 - 2. Engages in or supports the manufacture, distribution, sale, or use of firearms, as defined in Idaho Code § 18-3302(2)(d).

SC-18.14 Add a new paragraph immediately after Paragraph 18.13, to read as follows:

SC-18.14 *Certification Regarding Anti-Boycott of Israel*

- A. Pursuant to Idaho Code § 67-2346 Contractor certifies that it is not currently engaged in, and will not for the duration of this Agreement engage in, a boycott of goods or services from Israel or territories under its control.

SC-18.15 Add a new paragraph immediately after Paragraph 18.14, to read as follows:

SC-18.15 *Certification Regarding Ownership and Operation*

- A. Pursuant to Idaho Code § 67-2359, Contractor certifies that it is not currently owned or operated by the government of China, and will not, for the duration of this contract, be owned or operated by the government of China.

SC-19 Add new article immediately after Article 18, to read as follows:

ARTICLE SC-19 – STATUTORY REQUIREMENTS

SC-19.01 This article contains portions of certain Laws or Regulations which, by provision of Laws or Regulations, are required to be included in the Contract Documents. The matters addressed in this Article SC-19 may not be complete or current. Contractor's obligation to comply with all Laws and Regulations is set forth in Paragraph 7.11 of the General Conditions.

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Woodside WRF – Headworks Improvements

City of Hailey
Hailey, Idaho

ADDENDUM NO. [1] [Month] [Day], [Year]

TO: Prospective Bidders

FROM: HDR (Engineer)
412 East Parkcenter Boulevard, Suite 100
Boise, Idaho 83716

OWNER: City of Hailey
115 Main Street South
Hailey, Idaho 83333

SUBJECT: Woodside WRF – Headworks Improvements

This Addendum is part of the Bidding Documents and the Contract Documents and modifies the original Bidding Documents dated [____], as indicated below. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification for award of the associated Contract.

This Addendum consists of [____] pages and the attachments, if any, listed on the last page.

CHANGES TO PRIOR ADDENDA

None

CHANGES TO INTRODUCTORY INFORMATION

None

CHANGES TO BIDDING REQUIREMENTS

None

CHANGES TO CONTRACTING REQUIREMENTS

None

CHANGES TO SPECIFICATIONS

None

CHANGES TO DRAWINGS

None

ATTACHMENTS

None

THIS ADDENDUM IS MADE PART OF THE CONTRACT DOCUMENTS AND SHALL BE NOTED ON THE BID PROPOSAL.

Bradley S. Bjerke

Idaho PE#8778

Date

Bradley S. Bjerke, P.E.
Senior Project Manager
HDR Engineering, Inc.
412 E. Parkcenter Blvd, Suite 100
Boise, ID 83706
(208)-387-7073
(208)-841-3822

END OF ADDENDUM NO. [1]



DIVISION 01

GENERAL REQUIREMENTS



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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Location and description of Work and prior uses of the Site.
2. Construction Contracts for this Project.
3. Others retained by Owner for the Project.
4. Work by others under Owner's control on other projects.
5. Work by others not under Owner's control.
6. Work by Owner.
7. Sequence and progress of Work.
8. Contractor's use of the Site.
9. Easements and rights-of-way.
10. Partial utilization by Owner.
11. Utility owners.
12. Tree trimming, clearing, and tree removal.

B. Related Requirements:

1. Include, but are not limited to, the following:
 - a. Section 01 14 16 - Coordination with Owner's Operations.
 - b. Section 01 14 19 - Use of Site
 - c. Section 01 45 33 - Code-Required Special Inspections and Procedures.
 - d. Section 01 64 00 - Owner-Furnished Products.

1.2 LOCATION AND DESCRIPTION OF WORK

- A.** The Work is located in the City of Hailey. The Site is located on the eastern side of South Main Street on the southern edge of Hailey, Idaho.
- B.** Work to be performed under this Contract includes, but is not limited to, demolition of an existing headworks building and associated equipment, constructing a new headworks building, installation of new in-channel drum screens and grit handling equipment, installation of new submersible pumps and piping systems, and all other Work required in accordance with the Contract Documents.
- C.** The Work is located at the Woodside WRF, 4197 Glenbrook Drive, Hailey, Idaho 83333.
- D.** The Project includes constructing the Work broadly described below, in accordance with the Contract Documents, with all related appurtenances. Work shown on the Drawings, or indicated in the Specifications, or indicated elsewhere in the Contract Documents is part of the Work, regardless of whether indicated below. The Work includes, but is not limited to, the following:
1. Demolition of existing headworks building.
 2. Construction of new headworks building.
 3. Installation of new:
 - a. Electrical infrastructure for new equipment.
 - b. Removal of existing Woodside influent pumps with replacement pump installation.
 - c. In-channel drum screens.
 - d. New grit chamber and associated equipment.

- e. Grit pump.
 - f. Grit classifier.
 - g. New influent piping and new conduit.
 - h. New Batch Tank pumps, piping, and appurtenances (bid alternate).
 - i. Associated appurtenances.
- E. Contracting Method: The Project will be constructed under a single prime construction Contract.
- F. Hazardous Environmental Conditions:
- 1. The Woodside Influent Lift Station is approximately 26 feet deep as measured from the top of concrete lid. This concrete structure accepts raw influent wastewater. Work in and around this structure will require safe entrance and exit for the Work. Contractor shall determine requirements for working in the confined space.
 - 2. The Work in and around the existing headworks building and the new headworks building will require operation in spaces that handle raw influent wastewater.
 - 3. The Batch Tank is approximately 10.5 feet deep as measured from the top of concrete wall. This concrete tank accepts screened and degritted wastewater. Work in and around this structure will require safe entrance and exit for the Work. Contractor shall determine requirements for working in the confined space.
- G. Owner-Furnished Materials and Equipment:
- 1. Administrative and procedural requirements for Owner-furnished materials and equipment to be incorporated into the Work are in Section 01 64 00 - Owner-Furnished Products.

1.3 CONSTRUCTION CONTRACTS FOR THIS PROJECT

- A. Single Prime Construction Contract: The Contract requires all the Work for the Project not expressly allocated to Owner or others in the Contract Documents.

1.4 OTHERS RETAINED BY OWNER FOR THE PROJECT

- A. Engineer:
- 1. Engineer is identified in the Agreement.
 - 2. Engineer's responsibilities for the Project, relative to Contractor, are indicated throughout the Contract Documents.
 - 3. Whether the Engineer will furnish the services of a Resident Project Representative (RPR) for the Project is indicated in the Supplementary Conditions.
- B. Non-Professional Services Contracted by Owner: Owner will retain services of the following entities to perform the services indicated relative to the Project. Contractor shall coordinate and schedule the Work with, and cooperate with, the entities performing the following services for Owner.
- 1. Code-Required Special Inspections and Testing:
 - a. Owner has, or will, retain the services of a qualified testing laboratory to perform code-required testing and special inspections for the Work, in accordance with Section 01 45 33 - Code-Required Special Inspections and Procedures, and selected other provisions of the Contract Documents related to field testing.
 - b. Identification: Code-required special inspections retained by Owner will be performed by **TBD**.
 - 2. SCADA Configuration and Integration Services:
 - a. Owner has, or will, retain the services of a qualified systems integration firm to perform SCADA configuration services and other information technology services relative to the Work, in accordance with Section 40 90 05 – Control Loop Descriptions.

1.5 WORK BY OTHERS UNDER OWNER'S CONTROL - OTHER PROJECTS

- A. No other construction contracts have been or will be awarded by Owner that are in close proximity to or border on the Work of this Project. Work under these other contracts is briefly described in this Article.

1.6 WORK BY OWNER

- A. Owner will perform the following in connection with the Work:
 - 1. Operate all existing valves, flow-control gates, pumps, equipment, and appurtenances that will affect Owner's operations or facility processes, unless otherwise specified or indicated.

1.7 SEQUENCE AND PROGRESS OF WORK

- A. Requirements for sequencing and coordinating with Owner's operations, including maintenance of facility operations during construction, and requirements for tie-ins and shutdowns, are in Section 01 14 16 - Coordination with Owner's Operations.

1.8 CONTRACTOR'S USE OF SITE

- A. Use of Site - General:
 - 1. Limits on Contractor's use of the Site are indicated in Section 01 14 19 - Use of Site, and as may be shown on the Drawings.
 - 2. Contractors shall share use of the Site with other contractors and others specified in Articles 1.3 through 1.6 (inclusive) of this Section.
 - 3. Relocate stored materials and equipment that interfere with operations of Owner, other contractors, and others performing work for Owner.
 - 4. Comply with restrictions set forth in Section 01 14 19 - Use of Site.
- B. Owner will occupy the Site jointly with Contractor during construction for performance of Owner's typical operations. Coordinate with Owner in all construction operations to minimize conflicts between Contractor and Owner's employees and others under Owner's control. If the Site is a treatment facility or other production facility, Owner will have Owner's suppliers for deliveries of chemicals and other items accessing the Site from time to time, possibly on a daily basis.

1.9 EASEMENTS AND RIGHTS-OF-WAY

- A. Easements and Rights-of-Way - General:
 - 1. Easements and rights-of-way required for the permanent improvements included in the Work will be provided by Owner in accordance with the General Conditions and Supplementary Conditions.
 - 2. Confine construction operations within Owner's property, public rights-of-way, easements obtained by Owner, and limits shown, and property for which Contractor has made arrangements directly with property owner(s).
 - 3. Use care in placing construction tools, machinery and equipment, excavated materials, and materials and equipment to be incorporated into the Work to avoid damaging property and interfering with traffic.
 - 4. Do not enter private property outside the construction limits without permission from the owner of the property.
- B. On Private Property:
 - 1. General limits of Owner-furnished easements are shown on the Drawings.

1.10 PARTIAL UTILIZATION BY OWNER

- A. Prior to Substantial Completion of the entire Work under the Contract, substantially complete the Work as follows:
 - 1. Work indicated for Milestones (if any).

- a. Construction of new headworks building and installation of equipment within new headworks building.
- b. Cutover of wastewater influent lines into new headworks building and influent channels within headworks building.
- c. Demolition of existing headworks building and site improvements.

1.11 UTILITY OWNERS

- A. Utilities known to Engineer and that may have Underground Facilities or other facilities in the vicinity of the Work are:
 - 1. Intermountain Gas Company:
 - a. Natural gas.
 - b. 220 South River Street, Hailey, Idaho 83333.
 - c. Telephone: (800)-548-3679.
 - 2. Idaho Power Company:
 - a. Electrical services.
 - b. 121 Hospital Drive, Ketchum, Idaho 83340.
 - c. Telephone: (208)-726-5520.
 - 3. CenturyLink:
 - a. Telephone services.
 - b. 250 1st Avenue, Bliss, Idaho 83314.
 - c. Telephone: (855)-508-3495.
 - 4. Syringa Networks:
 - a. Fiber optic services.
 - b. 12301 West Explorer Drive, Boise, Idaho 83713.
 - c. Telephone: (208)-229-6100.
- B. Utilities and their owners indicated in the Contract Documents are for Contractor's convenience. Neither Owner nor Engineer will be liable to Contractor or any utility owner for failure to indicate utility, its owner, or complete and correct contact information in the Contract Documents where Contractor's reasonable and ordinarily-exercised diligence would reveal the presence of the utility and its owner. Nothing in the Contract mitigates Contractor's responsibilities under the General Conditions, and Laws and Regulations, including "call before you dig" regulations.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

SECTION 01 13 13

MILESTONES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Section describes the Work to be substantially completed to comply with Milestones indicated in the Agreement.
2. This Specifications section is not intended to describe all the Work or its constraints, interrelationships, or sequential requirements.

1.2 GENERAL

1. Contractor shall provide all labor, materials, equipment, tools, and incidentals required to perform the Work in accordance with the Contract Times provisions of the Contract Documents.
2. To achieve each Milestone indicated in this the Contract Documents, substantially complete those elements of the Work indicated starting with Article 1.2 of this Specifications Section, together with related materials, equipment, systems, and appurtenant Work and activities.
3. Comply with the General Conditions, as may be modified by the Supplementary Conditions, and other provisions of the Contract Documents, regarding partial utilization and property insurance.

1.3 WORK TO ACHIEVE MILESTONES

A. Milestone No. 1:

1. To achieve this Milestone, substantially complete the following Work:
 - a. Construction of the new headworks building.
 - b. Install new equipment within the new headworks building.
 - c. Install new degritted sewage pipe into batch tank.

B. Milestone No. 2:

1. To achieve this Milestone, substantially complete the following Work:
 - a. Cutover of wastewater influent lines into new headworks building.
 - b. Bring new headworks system into service.

C. Milestone No. 3:

1. To achieve this Milestone, substantially complete the following Work:
 - a. Demolish existing headworks building and wood-frame canopy covering the grit chamber.
 - b. Complete new site improvements adjacent to new headworks building, including, but not limited to site paving, grading, and concrete fill of existing channels and existing grit chamber.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 14 16
COORDINATION WITH OWNER'S OPERATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for coordinating with Owner's operations during the Project.
2. Requirements for tie-ins and shutdowns necessary to complete the Work without impact on Owner's operations except as allowed in this Specifications section.

B. Scope:

1. Contractor shall provide all labor, materials, equipment, tools, and incidentals shown, specified, and required to coordinate with Owner's operations during the Work in accordance with this Specifications section.
2. Except for shutdowns specified in this Specifications section, perform the Work such that Owner's facilities remain in continuous, satisfactory operation during the Project. Schedule and perform the Work such that the Work does not: impede Owner's production or processes, create potential hazards to operating equipment and personnel, reduce the quality of the facility's products or effluent, cause odors or other nuisances, does not affect the public health, safety, welfare, and convenience, and does not adversely affect the environment resulting in violation of Laws or Regulations.
3. Work not specifically addressed in this Specifications section or in referenced sections may, in general, be performed, to be completed within the Contract Times, at any time during regular working hours in accordance with the Contract Documents, subject to the requirements in this section.

C. Related Requirements: Include but are not necessarily limited to:

1. Section 01 11 00 - Summary of Work.
2. Section 01 52 53 - Facility Temporary Pumping.
3. Section 01 73 29 - Cutting and Patching.
4. Section 01 75 00 - Checkout and Startup Procedures.
5. Section 02 41 00 - Demolition.

1.2 REFERENCES

A. Terminology:

1. Terminology indicated below are not defined terms and are not indicated with initial capital letters, but when used in this Specifications section have the meaning indicated below:
 - a. The term "Owner" is used throughout this section. When the facility is operated or managed by an entity other than Owner, references in this section to "Owner" as the operator or manager of the facility will be interpreted as referring to the facility manager.
 - b. A "shutdown" is when a portion of the normal operation of Owner's facility, whether equipment, systems, conduit (including piping and ducting), has to be temporarily suspended or taken out of service to perform the Work.
 - c. A "tie-in" is a connection of new Work to existing facilities, including connecting to existing conduits (including piping and ducting), electrical systems, structural

elements, process/mechanical elements, and other physical connections. Some tie-ins may require that the tie-in be made without an associated shutdown.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Review construction procedures under other Specifications sections and coordinate Work that will be performed with or before the Work indicated in this Section.

B. Sequencing and Scheduling:

1. Refer to this Specifications sections articles on sequencing, tie-ins, and shutdowns.

1.4 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Shutdown Planning Submittal:

- a. For each shutdown, submit an inventory of labor, materials, and equipment required to perform the shutdown and tie-in tasks, an estimate of time required to accomplish the complete shutdown including time for Owner to take down and start up existing equipment, systems, or conduits, and written description of steps required to complete the Work associated with the shutdown.
- b. Furnish submittal to Engineer not less than 30 days prior to proposed shutdown start date. Do not start shutdown until obtaining Engineer's acceptance of shutdown planning Submittal.

2. Shutdown Notification:

- a. After Engineer's acceptance of shutdown planning Submittal and prior to starting the shutdown, submit written notification to Owner and Engineer of date and time each shutdown is to start. Submit notification not less than 72 hours in advance of each shutdown.

1.5 GENERAL CONSTRAINTS

A. Indicated in the Contract Documents are the sequence and shutdown durations, where applicable, for Owner's equipment, systems, and conduits (including piping and ducting) that are to be taken out of service temporarily for the Work. New materials and equipment may be used by Owner after the specified field quality control activities are successfully completed and the materials or equipment are substantially complete in accordance with the Contract Documents.

B. The following constraints apply to coordination with Owner's operations:

1. Operational Access: Owner's personnel shall have access to equipment and areas of the facility that remain in operation.
2. Temporary Partitions and Enclosures: Provide temporary partitions and enclosures necessary to maintain dust-free, heated, and ventilated spaces in areas of the facility that are adjacent to the Work and that must be kept operational. Comply with Section 01 51 05 -Temporary Utilities.
3. Schedule and perform equipment and system start-ups in accordance with Section 01 75 00 - Checkout and Startup procedures. Equipment and systems shall not be placed into operation on Friday, Saturday, Sunday, or holidays without prior approval of Owner, unless specifically indicated otherwise in the Contract Documents.
4. Dead End Valves or Conduits:

- a. Provide blind flanges, watertight bulkheads, or valve at temporary and permanent terminuses of conduits, including piping and ducting.
 - b. Blind flanges and bulkheads shall be suitable for the service and braced and blocked, as required, or otherwise restrained as necessary or as required by Engineer.
 - c. Temporary valves shall be suitable for their associated service. Where valve is provided at permanent terminus of conduit, including piping or ducting, also provide on downstream side of valve a blind flange with drain/flushing connection.
5. Owner will assist Contractor in dewatering process tanks, basins, conduits, and other work areas to be dewatered for shutdowns. Maintain clean, dry work area by pumping and properly disposing of fluid and other material that accumulates in work areas.
6. Draining and Cleaning of Conduits, Tanks, and Basins:
- a. Unless otherwise shown or indicated in the Contract Documents, Contractor shall dewater process tanks, basins, conduits (including piping) at beginning of each shutdown. Flush, wash down, and clean tanks, basins, conduits (including piping), and other work areas.
 - b. Contractor shall remove liquids and solids and dispose of them at appropriate location at the Site as directed by Engineer. Unless otherwise specified or indicated, contents of tanks, basins, and conduits (including piping) undergoing modifications shall be transferred to existing process tanks or conduits at the Site with capacity sufficient to accept such discharges, using hoses, temporary piping, temporary pumps, and other means provided by Contractor. Discharge of fluids across floors is not allowed.
 - c. If drainage point is not available on the conduit (including piping) to be drained, provide a wet tap using tapping saddle and valve or other method approved by Engineer. Uncontrolled spillage of contents of conduits (including piping) is not allowed.
 - d. Spillage shall be brought to Engineer's attention immediately, both orally and in writing, and reported in accordance with Laws and Regulations. Contractor shall wash down spillage to floor drains or sumps or other appropriate location and flush the system to prevent clogging and odors. If spillage is not suitable for discharge to the drainage system, such as chemical spills, as determined by Engineer, Contractor shall remove spillage by other means, such as vacuum truck, sorbents, or other method acceptable to Engineer.

1.6 SEQUENCE OF WORK

- A. Perform the Work in the indicated sequence. Certain phases or stages of the Work may require working 24 hour days or work during hours outside of regular working hours. Work may be accelerated from a later stage to an earlier stage if Owner's operations are not adversely affected by proposed substitute sequence, with Engineer's approval. Stages specified in this article are sequence-dependent.
- B. Stage I – Construction of New Headworks Building:
 1. Installation of new stormwater catch basin and piping.
 2. Construction of new concrete retaining walls and installation of new guard rails.
 3. Installation of under-slab piping and conduit.
 4. Construction of building and channels.
 5. Installation of new in-channel drum screens, grit equipment, electrical and mechanical equipment, and piping and appurtenances not otherwise stated.

C. Stage II – Batch Tank Modifications:

1. Stage II Work may be completed concurrently with Stage I Work.
2. Bypassing will be required to perform Work within the Batch Tank. Contractor shall provide temporary pumping system to transfer wastewater from the existing grit chamber into the SBRs.
3. Base Bid work:
 - a. Core new hole in the existing Batch Tank for the installation of the new degritted sewage gravity pipeline.
 - 1) Install new piping as completely as practical prior to cutover.
 - b. Core new hole in the existing Batch Tank for the re-routing of the existing filter backwash pipeline (4"-PD).
 - c. Install heat trace and insulation on the filter backwash pipeline to extents shown on Drawings.
4. Bid Alternate – Batch Tank Pumping work:
 - a. Core new holes for the installation of the new degritted sewage pipelines in the Batch Tank, SBR 1, and SBR 2.
 - b. Relocate existing submersible mixer.
 - c. Install new pumps, instruments, valves, valve vaults, and appurtenances.

D. Stage III – Influent Pumping Cutover:

1. Stage III Work shall not commence until Stage I Work is complete.
 - a. New Headworks Building and equipment must be ready to receive and treat raw influent wastewater for Stage III to commence.
2. Removal of existing Woodside Influent Pumps and installation of new pumps and associated appurtenances.
 - a. Bypassing will be required to perform Work within the Woodside Influent Lift Station. Contractor shall provide temporary pumping system to transfer wastewater from the manhole upstream of the lift station direct into the existing screening channels.
3. Raw influent force main cutover from existing headworks into new headworks building as shown on Drawings.
 - a. Install new piping as completely as practical prior to cutover.
 - b. Cutovers will be required for both the Riverside and Woodside influent force mains.
4. Complete installation of new screenate pipeline into the new Headworks Building (6"-PD).
 - a. Install new piping as completely as practical prior to cutover.

E. Stage IV – Demolition of Existing Headworks Building and Site Improvements:

1. Stage IV Work shall not commence until Stage III Work is complete.
2. Demolish existing metal-framed headworks building.
3. Demolish existing wood-framed canopy covering the existing grit chamber.
4. Demolish and remove existing ancillary equipment and appurtenances associated with the existing headworks building (i.e., building makeup air unit and ductwork, utility water services).
5. Cut existing headworks foundation walls to finished floor elevation.
6. Fill existing influent channels and grit chamber with concrete to finished floor elevation as shown on Drawings.

7. Install new paving adjacent to new Headworks Building as shown on Drawings.

1.7 TIE-INS

- A. Table 01 14 16-A in this Specifications section lists connections by Contractor to existing facilities. Table 01 14 16-A may not indicate all tie-ins required for the Work; Contractor shall perform tie-ins necessary and required to complete the Work as shown or indicated in the Contract Documents, regardless of whether tie-in is indicated in Table 01 14 16-A. For tie-ins not indicated in Table 01 14 16-A, obtain requirements for tie-ins from Engineer by requesting an interpretation or clarification.

1.8 SHUTDOWNS

- A. Shutdowns shall be in accordance with Table 01 14 16-B of this Specifications section. Work requiring service interruptions for tie-ins shall be performed during scheduled shutdowns.
- B. Work that may interrupt normal operations shall be accomplished at times convenient to Owner unless otherwise indicated in the Contract Documents.
- C. If Contractor's operations cause an unscheduled interruption of Owner's operations, immediately re-establish satisfactory operation for Owner.
- D. Fines and Penalties Imposed by Authorities Having Jurisdiction:
 1. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of Owner's facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by Contractor if, in Engineer's opinion, Contractor did not comply with requirements of the Contract Documents, or was negligent in the Work, or did not exercise proper precautions in performing the Work and complying with applicable permits, Laws, and Regulations.
 2. Owner or Engineer may deduct as set-offs such amounts from payments due Contractor.
- E. Temporary, short-term shutdowns of smaller conduits (including piping and ducting), equipment, and systems may not be included in Table 01 14 16-B. Coordinate requirements for such shutdowns with Engineer and Owner. Where necessary, obtain Engineer's interpretation or clarification before proceeding.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 SUBSTITUTE PROCEDURES

- A. Proposal of Substitute Sequencing, Shutdowns, and Tie-Ins:
 1. As a substitute to the procedures indicated in this Specifications section, Contractor may propose providing additional temporary facilities that can eliminate or mitigate a constraint without additional cost to Owner, provided such additional temporary facilities: do not present hazards to the public, personnel, structures, and equipment; that such additional temporary facilities do not adversely affect Owner's ability to comply with Laws and Regulations, permits, and operating requirements; that such temporary facilities do not generate or foster the generation of odors and other nuisances; and that requirements of the Contract Documents are fulfilled.
 2. Engineer will consider proposals for substitute procedures after the Effective Date of the Contract. All Bids shall be based on the requirements of the Contract Documents, including this section.
 3. Substitution Requests:

- a. When proposing a substitute procedure for a tie-in or shutdown or other requirements of this section, comply with the requirements of the General Conditions and Supplementary Conditions (regarding substitutes) and Section 01 25 00 - Substitution Procedures.
- b. When deviation from specified sequence or procedures is proposed, Contractor's proposal shall explain in detail the proposed sequence and procedures and associated effects, including evidence that Owner's operations will not be adversely affected, to an extent greater than originally contemplated in the Contract Documents, by proposed substitution. List benefits of proposed substitution, including benefits to Progress Schedule.

3.2 GENERAL PROVISIONS FOR COORDINATING WITH OWNER'S OPERATIONS

- A. When possible, combine multiple tie-ins into a single shutdown to reduce impacts on Owner's operations and processes.
- B. Operation of Existing Systems and Equipment during the Work:
 1. Do not shut off or disconnect existing operating systems or equipment, unless accepted by Engineer in writing.
 2. Operation of existing systems and equipment will be by Owner unless otherwise specified or indicated.
 3. Where necessary for the Work, Contractor shall seal or bulkhead Owner-operated gates and valves to prevent leakage that may affect the Work, Owner's operations, or both.
 4. Provide temporary watertight plugs, bulkheads, and line stops as necessary and as required. After completing the Work, remove seals, plugs, bulkhead, and line stops to satisfaction of Engineer.
- C. Bypassing:
- D. Requirements for temporary pumping are in Section 01 52 53 - Facility Temporary Pumping. Requirements for temporary pumping associated with specific shutdowns are indicated in this Section.
- E. Performing the Work of this section constitutes Contractor's approval of underlying work and field conditions prevailing at the time of the Work.

3.3 PREPARATION

- A. Coordinate preparations for removals with requirements of Section 01 73 29 - Cutting and Patching and Section 02 41 00 - Demolition, as applicable.
- B. Shutdowns - General Preparation:
 1. Coordinate shutdowns with Owner and Engineer.
 2. Submit shutdown planning Submittals and shutdown notification Submittals in accordance with this Specifications section's "Submittals" Article.
 3. Furnish at the Site, in close proximity to the shutdown and tie-in work areas, tools, materials, equipment, spare parts, both temporary and permanent, necessary to successfully perform the shutdown. Complete to the extent possible, prefabrication of piping and other assemblies prior to commencing the associated shutdown. Demonstrate to Engineer's satisfaction that Contractor has complied with such requirements before commencing the shutdown.
 4. Engineer shall have no duty to Contractor to advise Contractor of inadequate preparations by Contractor; Contractor is solely responsible for the means, methods, procedures, techniques, and sequences of construction.

C. Shutdowns of Electrical Systems:

1. Comply with Laws and Regulations, including the National Electric Code.
2. Contractor shall lock out and tag circuit breakers and switches operated by Owner and shall verify that affected cables and wires are de-energized to ground potential before starting other Work associated with the shutdown.
3. Upon completion of shutdown Work, remove the locks and tags and advise Engineer or Resident Project Representative (RPR) that facilities are available for use.

3.4 DETAILED SHUTDOWN REQUIREMENTS

A. Shutdown A:

1. General:
 - a. Affected Equipment Operating Prior to Shutdown: Batch Tank, existing grit chamber.
 - b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Specifications section.
 - c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this section.
 - d. Impact on Other Equipment and Processes: Not applicable.
 - e. Procedure: Temporary pumping system will bypass Batch Tank to allow for installation of new Batch Tank pumps, pump appurtenances, and piping in accordance with Stage II requirements and Drawings.
 - f. Time: Shutdown shall not be allowed in early spring during snowmelt times (April through May).
 - g. Coordinate with Owner on Batch Tank dewatering.
2. Temporary Pumping: Provide temporary pumping system, including controls, as follows:
 - a. Purpose: To convey plant influent past Batch Tank for duration of the shutdown, using the existing grit chamber as a temporary wet well.
 - b. System Capacity: 1,000 GPM.
 - c. Fluid Pumped: Screened raw wastewater in a combined sewer system, including floatables, between 35 to 60 DEGF, pH typically ranging from 6.0 to 8.0.
 - d. Controls: Provide a complete control system to maintain the liquid level in the existing grit chamber between elevation 5253.10 and elevation 5250.10.
 - e. Suction Location: Grit chamber.
 - f. Discharge Location: SBR 1 and SBR 2. Coordinate with Owner on SBR sequencing.
 - g. Flow Meter: 0 to 1,500 GPM measurement range. Display flow rate at pump controls and provide temporary 4 to 20 mA VDC signal connected to terminal no. XX in Owner's I/O Panel XX.
3. Prior to Shutdown:
 - a. Obtain Engineer's acceptance of proposed shutdown planning Submittal and shutdown notification Submittal.
 - b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
 - c. Assist Owner in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.

- d. Coordinate other tie-ins to be performed simultaneously.
 - e. Install, check, and test the temporary pumping system.
 - 4. During Shutdown:
 - a. Place temporary pumping system into operation.
 - b. Dewater the Batch Tank.
 - c. Relocate existing mixer.
 - d. Install new pumps and appurtenances inside Batch Tank.
 - e. With Owner, return equipment and system to operation.
 - 5. Following Shutdown:
 - a. Verify functionality of equipment and systems.
 - b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
 - c. Repair joints that are not watertight or gastight, as applicable.
 - d. Remove temporary pumping system and appurtenances.
- B. Shutdown B-1:
- 1. General:
 - a. Affected Equipment Operating Prior to Shutdown: P-01-01, P-01-02, Woodside Influent Lift Station.
 - b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Specifications section.
 - c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this section.
 - d. Impact on Other Equipment and Processes: Upstream raw influent wastewater gravity flow will require mitigation during Work within lift station.
 - e. Procedure: Existing pumps, pump base elbows, and existing piping within lift station shall be removed and new pumps, pump base elbows, and new piping shall be installed in accordance with Stage III requirements and Drawings.
 - f. Time: Shutdown shall be performed during low-flow conditions.
 - g. Owner shall use their collection system "vac" truck to dewater lift station prior to entry.
 - 2. Temporary Pumping: Provide temporary pumping system, including controls, as follows:
 - a. Purpose: To convey plant influent past Woodside Influent Lift Station for duration of the shutdown.
 - b. System Capacity: 770 GPM.
 - c. Fluid Pumped: Unscreened raw wastewater in a combined sewer system, including floatables, between 35 to 60 DEGF, pH typically ranging from 6.0 to 8.0.
 - d. Controls: Provide a complete control system to maintain the liquid level in the suction chamber between elevation 5235.50 and elevation 5225.50.
 - e. Suction Location: Sewer manhole to west-southwest of Woodside Influent Lift Station.
 - f. Discharge Location: Existing headworks influent channel.
 - g. Flow Meter: 0 to 1,000 GPM measurement range. Display flow rate at pump controls and provide temporary 4 to 20 mA VDC signal connected to terminal no. XX in Owner's I/O Panel XX.

3. Prior to Shutdown:
 - a. Obtain Engineer's acceptance of proposed shutdown planning Submittal and shutdown notification Submittal.
 - b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
 - c. Assist Owner in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
 - d. Coordinate other tie-ins to be performed simultaneously.
 - e. Install, check, and test the temporary pumping system.
 4. During Shutdown:
 - a. Place temporary pumping system into operation.
 - b. Dewater the Woodside Influent Lift Station.
 - c. Remove existing pumps, pump base elbows, and piping as required. Install new pumps and appurtenances inside lift station.
 - d. With Owner, return equipment and system to operation.
 5. Following Shutdown:
 - a. Verify functionality of equipment and systems.
 - b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
 - c. Repair joints that are not watertight or gastight, as applicable.
 - d. Remove temporary pumping system and appurtenances.
- C. Shutdown B-2:
1. General:
 - a. Affected Equipment Operating Prior to Shutdown: Riverside Influent Lift Station.
 - b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Specifications section.
 - c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this section.
 - d. Impact on Other Equipment and Processes: Riverside collection system.
 - e. Procedure: Riverside Lift Station pumps shall be turned off and pump check valves shall be manually held open to allow raw sewage line to be drained prior to interconnection. New piping shall be installed in accordance with Stage III requirements and Drawings.
 - f. Dates: Shutdown shall be completed concurrently with Shutdown B-1.
 - g. Time: Shutdown shall be performed during low-flow conditions.
 2. Prior to Shutdown:
 - a. Obtain Engineer's acceptance of proposed shutdown planning Submittal and shutdown notification Submittal.
 - b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
 - c. Assist Owner in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
 - d. Coordinate other tie-ins to be performed simultaneously.
 3. During Shutdown:

- a. Shut down Riverside Influent Lift Station pumps and drain the raw sewage force main to perform the Work, making sure not to flood the Riverside Influent Lift Station.
 - b. Install new pipe and appurtenances as shown on Drawings.
 - c. With Owner, return equipment and system to operation.
 - 4. Following Shutdown:
 - a. Verify functionality of equipment and systems.
 - b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
 - c. Repair joints that are not watertight or gastight, as applicable.
- D. Shutdown B-3:
- 1. General:
 - a. Affected Equipment Operating Prior to Shutdown: P-12-61, P-12-62.
 - b. Equipment Operating During Shutdown: In accordance with Table 01 14 16-B of this Specifications section.
 - c. Equipment Out of Service During Shutdown: In accordance with Table 01 14 16-B of this section.
 - d. Impact on Other Equipment and Processes: Digester scum removal, solids thickening drainage, and dewatering drainage systems.
 - e. Procedure: Screenate pumps shall be turned off and pump check valves shall be manually held open to allow pumped drainage line to be drained prior to interconnection. New piping shall be installed in accordance with Stage III requirements and Drawings.
 - f. Dates: Shutdown shall be accomplished by **Month** 2025.
 - g. Time: Shutdown shall be performed during normal business hours.
 - 2. Prior to Shutdown:
 - a. Obtain Engineer's acceptance of proposed shutdown planning Submittal and shutdown notification Submittal.
 - b. Bring necessary piping, couplings, valves, equipment, and appurtenances to the work areas.
 - c. Assist Owner in preparing to take equipment, tanks, basins, and conduits (including piping and ducting) temporarily out of service.
 - d. Coordinate other tie-ins to be performed simultaneously.
 - 3. During Shutdown:
 - a. Shut down screenate pumps and drain the pumped drainage force main to perform the Work, making sure not to flood the Screenate Lift Station.
 - b. Install new pipe and appurtenances as shown on Drawings.
 - c. With Owner, return equipment and system to operation.
 - 4. Following Shutdown:
 - a. Verify functionality of equipment and systems.
 - b. Verify operation of new equipment and systems, and verify that joints in conduits (including piping and ducting) are watertight or gastight as applicable.
 - c. Repair joints that are not watertight or gastight, as applicable.

3.5 ATTACHMENTS

- A. The following, bound after this Specifications Section's "End of Section" designation, are part of this Specifications Section:
 - 1. Tables:
 - a. Table 01 14 16-A, Schedule of Tie-ins.
 - b. Table 01 14 16-B, Schedule of Shutdowns.

END OF SECTION

**Table 01 14 16-A
Schedule of Tie-Ins**

Tie-In No.	New Line Size and Service	Existing (Connecting) Line Size & Service	Tie-In Building/Location	Construction Stage	Remarks
1	3"-W1	6"-W1	Yard; north of existing shop	I	Add service connection to existing natural gas main line through yard.
2	1-1/2"-NG	2"-NG	Yard; southwest of existing Batch Tank	I	Field-verify routing location.
3*	12"-DGS	N/A	Batch Tank; SBR 1; SBR 2	II	Installation of new degritted sewage piping from new Batch Tank Pumps into SBR 1 and SBR 2.
4	20"-DGS	N/A	Batch Tank	II	New degritted sewage piping from new Headworks Building into existing Batch Tank.
5	4"-PD	4"-PD	Batch Tank	II	Re-route existing filter backwash into existing batch tank.
6	6"-PD	6"-PD	Northwest corner of existing Batch Tank	III	Re-routing of existing Screenate force main to new Headworks Building
7	16"-RS	14"-RS	Northern edge of existing Woodside influent valve vault	III	Re-routing of existing Woodside influent force main to new Headworks Building
8	14"-RS	14"-RS	Yard; north of existing Woodside Influent Lift Station	III	Re-routing of existing Riverside influent force main to new Headworks Building

* Bid Alternate – Batch Tank Pumping Work.

**Table 01 14 16-B
Schedule of Shutdowns**

Shut-Down No.	Process Equipment and Service Lines Out-of-Service During Shutdown	Process Equipment in Operation During Shutdown	Tie-In Nos.	Maximum Duration
A	Batch Tank, existing Grit Chamber	Temporary pump bypassing system	3*, 4, 5	30 days
B-1	Woodside Influent Lift Station P-01-01, P-01-02	Temporary pump bypassing system	7	10 days
B-2	Riverside Influent Lift Station	N/A	8	4 hours
B-3	P-12-61, P-12-62	Solids handling equipment	6	8 hours

* Bid Alternate – Batch Tank Pumping Work.

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SECTION 01 14 19

USE OF SITE

PART 1 - GENERAL

1.1 SUMMARY

1. Section Includes: Restrictions on Contractor's use of the Site and premises.
 2. Restrictions on use of existing buildings and structures, including:
 - a. Permanent utilities and sanitary facilities.
 - b. Existing elevators.
 - c. Existing hoisting equipment.
- B. Scope:
1. Contractor shall provide all labor, materials, equipment, tools, and incidentals shown, specified, and required to comply with restrictions on Contractor's use of the Site and other areas.
 2. Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions, regarding the Contractor's use of the Site and other areas.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
1. American Society of Mechanical Engineers (ASME):
 - a. B30.2, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist).
 - b. B30.17, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist).

1.3 SUBMITTALS

- A. Action Submittals: Submit the following:
1. Shop Drawings:
 - a. Site plan showing proposed location of field offices, storage trailers, staging and laydown areas, temporary sanitary facilities, fuel and oil storage, fueling location, bottle gas storage facilities, and other areas Contractor proposes to occupy.
 2. Testing Plans: Plan for load testing of Owner's hoisting equipment at the Site.
- B. Informational Submittals: Submit the following:
1. Notices of Condition:
 - a. Notice of condition of Owner's existing hoisting equipment that Contractor proposes to use, together with written evaluation of condition of equipment including condition of equipment's safety devices. If corrective work is necessary or advisable, transmit concurrently with the Submittal Contractor's Change Proposal for remedial work, in accordance with Section 01 26 00 - Contract Modification Procedures.
 2. Field Quality Control Submittals:
 - a. After completion of Contractor's use of Owner's hoist(s), submit load test report, including copy of certifications of test weights.
 3. Hoist Manufacturer's Reports: Submit written report of results of each visit to Site by equipment manufacturer's service technician, including purpose and time of visit, tasks performed, and results obtained.
 4. Qualifications Statements:
 - a. Identification by name, and qualifications and experience of, person Contractor proposes as Contractor's operator of Owner's hoisting equipment.

1.4 USE OF PREMISES

- A. Limit use of premises at the Site to work areas shown or indicated on the Drawings and as specified in this Section. Do not disturb portions of the Site beyond areas of the Work.
 - 1. Limits:
 - a. Confine construction operations to the following areas:
 - 1) Areas adjacent to existing Headworks Building and Batch Tank, as indicated on Drawings.
 - 2) Areas as needed on site to construct new gravel access road.
 - b. Confine storage of materials and equipment, and locations of temporary facilities to the following areas:
 - 1) Contractor Staging Area to the in the existing grass field adjacent to the existing Admin Building and Electrical Building, as indicated on Drawings.
 - 2) Contractor's gang boxes and storage containers for tools in active use in the Work may be kept in reasonable quantity in the work areas as long as such items do not obstruct access to the facilities by Owner or occupants.
 - 3) Do not store items of any sort, whether temporarily or otherwise, in stairways and ramps, whether existing or under construction.
 - c. Do not enter the following areas:
 - 1) Passenger elevators at the Site, unless such use is expressly allowed by other provisions of this Specifications section.
 - 2) Areas outside of the work areas indicated in Paragraph A.1.a of the "Use of Premises" Article in this Specifications section, and outside of work areas indicated on the Drawings.
 - 2. Prohibitions:
 - a. Do not use the Site for the following:
 - 1) Conducting Contractor's business not related to the Project or other work for Owner.
 - 2) Overnight lodging or other, non-work use of the Site by workers or others for whom Contractor is responsible, whether housed in recreational vehicles, other vehicles, tents, quarters in field offices or Contractor-furnished temporary structures, or in work areas, is unacceptable.
 - 3. Access to Site, Access Roads, Parking Areas, and Haul Routes:
 - a. Access to Site through main entrance gates on Glenbrook Drive.
 - b. Parking areas are included in the Contractor Staging Area as shown on Drawings.
- B. Use of Existing Buildings and Structures: Maintain existing buildings and structures in weather-tight condition throughout construction unless otherwise indicated in the Contract Documents. Protect buildings, structures, and occupants during construction.
 - 1. Use of Existing Utilities, Sanitary Facilities, and First-aid Facilities:
 - a. Refer to Section 01 51 05 - Temporary Utilities.
 - b. Do not use permanent sanitary facilities, whether provided under the Project or existing prior to the Project, at the Site.
 - c. Do not use permanent telephone, Internet, or other communications utilities and facilities at the Site, regardless of whether such services and facilities were provided under the Project or existed prior to the Project, except in cases of emergency.
 - d. Do not use Owner's or occupants' first-aid facilities, except in cases of medical emergency. Promptly replenish used items and supplies with items identical to those used.
 - 2. Use of Owner's Hoisting Equipment and Access to Work Areas for Loading:
 - a. General Provisions:

- 1) For each of Owner's hoisting systems used by Contractor, Contractor shall thoroughly check the equipment and submit to Engineer written certification that Contractor believes the equipment is sufficient for the intended use and that all safety mechanisms are in place and operating. If existing equipment has one or more deficiencies, notify Engineer before attempting to use such equipment.
 - 2) When one or more deficiencies are noted in existing hoisting equipment prior to Contractor's use thereof, Owner may authorize Contractor to perform remedial work on the hoisting equipment under a Change Order or allowance authorization (if any).
 - 3) Contractor's person operating Owner's hoisting equipment shall be experienced with and qualified in using such equipment. Assign one person to operate Owner's hoisting equipment and advise Engineer in writing of the identity and experience of the designated person.
 - 4) Following completion of Contractor's use of Owner's hoisting equipment, remedy damage and wear caused by Contractor's use of equipment at no cost to Owner. Perform field quality control testing and inspections as indicated in Article 3.1 of this Specifications section; if not indicated in Article 3.1, perform field quality control tests as mutually agreed upon by hoisting equipment manufacturer's service technical and Engineer. Submit results of field quality control testing to Engineer.
- b. Contractor may use Owner's hoisting equipment as follows:
- 1) Monorail for grit pump installation.
- c. Contractor may use the hoisting equipment and access ways indicated above for moving materials and equipment during construction. Hoisting equipment shall be available to Owner and occupants at all times unless otherwise arranged with Owner and Engineer. Do not load hoisting equipment beyond posted capacity.
- C. Promptly repair damage to premises, including existing structures, finishes, equipment, and other features, caused by construction operations. Upon completion of the Work, restore premises to specified condition; if condition is not specified, restore to pre-construction condition.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

3.1 FIELD QUALITY CONTROL

- A. Site Tests of Owner's Hoisting Equipment after Use by Contractor:
1. After Contractor has finished using Owner's hoisting equipment and associated controls, perform at the Site the following field quality controls, including load-test of Owner's hoisting equipment in accordance with this Article 3.1 and Laws and Regulations including applicable building code.
 2. Should testing indicate malfunction, make repairs and adjustments as necessary. Repeat testing and adjusting (at no additional cost to Owner) until, in Owner's opinion, Owner's hoisting equipment is functioning properly. Contractor's obligations to remedy deficiencies in Owner's hoisting equipment will not be complete until field tests are successfully completed and acceptable documentation thereof is submitted to Engineer.
 3. Load Test:
 - a. Perform load tests under supervision of hoisting equipment manufacturer's factory-trained service technician, in presence of Engineer or Resident Project Representative.
 - b. Weights used in load testing shall be certified by a state or local bureau of weights and measures. Submit weight certification as part of load test report.
 - c. Load testing shall comply with ASME B30.2 or ASME B30.17, as applicable, and the following:

- 1) Power failure test with rated load: Load shall be held suspended when power is removed.
 - 2) For Bridge Cranes: Bridge travel full length of runway with rated load, while verifying that all functions operate properly.
 - 3) For Hoisting Equipment with Trolley: Trolley travel full length of rail or bridge (as applicable) with rated load, while verifying that all functions operate properly.
 - 4) Hoist brake drift test with rated load: Lift weight, measure distance to floor, allow five minutes to elapse, and re-measure. Record the results measured. Criteria for Acceptance: No difference in measurements.
 - 5) Motorized Hoists: Upper/lower limit switch test with no load.
 - 6) Motorized Hoists: Emergency stop test with no load.
- d. Load Test Report: Submit results of load testing in a report that lists tests performed, data collected, results of each test, and corrective actions taken (if any). Test report shall be signed by manufacturer's service technician present during testing. Submittal shall include an affirmative statement that, to best of Contractor's knowledge, information, and belief, the hoisting equipment is in equal or better condition than when Contractor first used such hoisting equipment, and that hoisting equipment complies with Laws and Regulations and requirements of the Contract Documents.
4. Remedy damage to and wear imposed on Owner's hoisting equipment, at no additional cost to Owner. Remedy equipment in accordance with the Contract Documents. If not addressed in the Contract Documents, remedy damage and defects to pre-construction conditions, in accordance with recommendations of hoisting equipment manufacturer's written recommendations, using parts in accordance with hoisting equipment manufacturer's written recommendations. Do not void warranties in effect.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Administrative and procedural requirements for:
 - a. Contingency allowances.
- B. Related Requirements:
 - 1. Include but are not necessarily limited to the following:
 - a. Section 01 26 00 - Contract Modification Procedures.
 - b. Section 01 29 73 - Schedule of Values.
 - c. Section 01 32 16 - Construction Progress Schedule.

1.2 REFERENCES

- A. Terminology:
 - 1. Terminology indicated below are not defined terms and are not indicated with initial capital letters, but when used in this section have the following meanings:
 - a. "Allowance authorization" or "authorization", whether singular or plural, are Owner's written and signed approval for using a specific allowance item, in a specific authorized amount, for a specific construction task or activity. Allowance authorizations include all associated attachments at the time of Owner's signature and as delivered to Contractor.
 - b. "Contingency allowance" is a stipulated amount included in the Contract Price, controlled by Owner, for Owner's sole use to cover unanticipated costs and costs for Work authorized by Owner that is not part of any other bid/pay item in the Contract.

1.3 ALLOWANCES – GENERAL

- A. This Article applies to all allowance types and all authorized allowance Work performed in accordance with the Contract Documents.
- B. All allowances in the Contract are Owner-controlled and for Owner's sole use. Contractor has no right or entitlement to any allowance or part thereof without express, written authorization from Owner.
- C. Authorization of Allowances:
 - 1. Only Owner can authorize use of an allowance. No other entity, including Engineer, Resident Project Representative (RPR, if any), Owner's Site Representative (OSR, if any), or others may authorize use of allowances in place of Owner.
 - 2. Owner's personnel empowered to authorize use of allowances are:
 - a. Brian Yeager, Hailey Public Works Director.
 - b. Mary Cone, Hailey City Clerk.
 - 3. Allowance Authorization Mechanism:
 - a. To be binding and enforceable, allowance authorizations must be in writing, signed by one of the Owner's employees indicated immediately above.
 - b. Allowance authorization form is attached to this Section.
 - c. Allowance authorizations issued in accordance with the procedures set forth in this Section, are binding and enforceable under the Contract, unless promptly contested in writing by Contractor in accordance with this Section.
 - d. Oral authorizations, authorizations without an appropriate signature, and authorizations not on the proper form, will not be binding or enforceable.

4. Allowance authorizations duly signed by Owner's authorized person may be delivered to Contractor by Engineer, RPR, OSR, or other Owner-authorized representative, and shall be binding and enforceable when so delivered (unless properly contested).
5. Do not perform Work presumed for compensation under an allowance without first obtaining Owner's allowance authorization.
6. Work presumed by Contractor to be under an allowance and performed without: (a) written authorization duly signed by Owner, or (b) Change Order, or (c) Work Change Directive, is not eligible for payment.

D. Contract Times:

1. Allowance authorizations do not have any effect on, and do not change, the Contract Times. The Contract Times can be changed only via a duly authorized Change Order.
2. Should the Work included in an allowance authorization adversely affect Contractor's ability to comply with the Contract Times, promptly submit Change Proposal (including appropriate supporting documentation), in accordance with the Contract Documents, indicating the associated, specific, proposed effect on each of the Contract Times.

E. Payment for Work Under an Allowance Authorization:

1. Work duly authorized by Owner under an allowance is eligible for payment upon performance of the associated Work, in accordance with the Contract Documents and the associated allowance authorization.
2. When applying for payment for Work under an allowance authorization, the Application for Payment shall include a copy of the associated allowance authorization(s) signed by Owner.
3. When requested by Owner or Engineer, amend the Schedule of Values to indicate Work authorized under contingency allowances or cash allowances.

F. Compensation for Bonds and Insurance:

1. Contractor is not eligible for compensation under an allowance, or for an increase in the Contract Price, for costs associated with insurance, performance bond, payment bond, or warranty bond (when such bond is required by the Contract). Compensation for such costs is included elsewhere in the Contract Price, under other (non-allowance) bid/pay items.

G. Change Orders:

1. A Change Order is not required for authorization of an allowance that is already included in the Contract.
2. Prior to final payment, all allowances with funds remaining (not yet authorized) shall be reduced to the total amount authorized by Owner for that allowance item, via a Change Order.

1.4 CONTINGENCY ALLOWANCES

- A. Provisions on contingency allowance(s) are set forth in the General Conditions, as may be modified by the Supplementary Conditions, and in this Section.
- B. Owner may authorize use of all or part of a contingency allowance included in the Contract for Work not otherwise covered under one or more other bid/pay items already in the Contract.
- C. Procedure for Using Contingency Allowances:
 1. Prior to Work being authorized under a contingency allowance, Contractor shall submit complete Change Proposal for the associated Work, in accordance with the Contract Documents.
 2. Compensation proposed via the Change Proposal for the contemplated allowance Work shall be complete and sufficient for the entire scope of the contemplated allowance Work, unless expressly indicated otherwise in the Change Proposal or an associated, Owner- or Engineer-issued Proposal Request.
 3. Compensation eligible under a contingency allowance includes:

- a. Materials and equipment furnished to Owner or incorporated into the Work; labor; construction equipment and machinery; services, incidentals, and related costs, in accordance with the Contract Documents' provisions for Contract modifications.
 - b. Overhead and profit for the associated Work, for Contractor and Subcontractors.
 - c. Other costs and expense mutually agreeable to Owner and Contractor.
4. Excluded are costs not mutually agreeable to the parties and costs excluded in accordance with Article 1.3 of this Section.
5. Should Change Proposal indicate, and Owner accept that, change in the Contract Times is necessary, Owner (or Engineer, on Owner's behalf) will issue an appropriate Change Order for signature by the parties, upon mutual agreement to the changed Contract Times.
6. Upon receipt of contingency allowance authorization, when Contractor does not reject or disagree with the authorization, Contractor shall sign allowance authorization form indicating acceptance and return signed form to Owner and Engineer within [two] days of receipt.
7. Commence performing the allowance Work promptly upon receipt of allowance authorization.
8. Application for Payment for the associated Work may be made in accordance with Article 1.3 of this Section and the Contract's provisions governing progress payments.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. The following, bound after this Specifications Section's "End of Section" designation, are part of this Specifications Section:
 1. Forms:
 - a. Allowance Authorization Form, (one page).

END OF SECTION

ALLOWANCE AUTHORIZATION

Project: Woodside WRF – Headworks Authorization Number: _____
Improvements From: _____
To: _____ Date: _____
_____ Engineer Project No.: 10381996
Re: _____ Contract For: _____

Contractor is authorized to perform the following item(s) of Work and to be eligible to apply for payment under the designated Contract allowance(s) indicated below for the amount indicated below for each item:

1. [Allowance Title] / [Title of Change]:

--

This instrument is not a Change Order and does not modify the Contract Price, nor does it modify the Contract Times.

Original Allowance	\$
Allowance Expenditures prior to this Authorization	\$
Allowance Balance prior to this Authorization	\$
Allowance will be decreased by this Authorization	\$
New Allowance Balance.....	\$

RECOMMENDED BY

HDR

Engineer

By _____ Date _____

OWNER APPROVAL

Owner

By _____ Date _____

CONTRACTOR ACCEPTANCE

Contractor

By _____ Date _____

☐ Attachments

Copies: ☐ Owner ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ File

SECTION 01 22 00
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. General requirements applicable to all bid/pay items.
 - 2. General provisions on unit prices and quantities.
 - 3. General provisions on lump sums.
 - 4. Listing of the various bid/pay items in the Project, together with criteria for measuring Unit Price Work for payment.
- B. Related Requirements:
 - 1. Include but are not necessarily limited to:
 - a. Section 01 21 00 - Allowances.
 - b. Section 01 23 00 - Alternates.
 - c. Section 01 26 00 - Contract Modification Procedures.
 - d. Section 01 29 73 - Schedule of Values.
 - e. Section 01 29 76 - Progress Payment Procedures.

1.2 REQUIREMENTS APPLICABLE TO ALL BID/PAY ITEMS

- A. In this Section and elsewhere in the Contract Documents, the terms “bid item”, “pay item”, “bid/pay item”, “Item” followed by a number designation, “this item”, and the like all have the same meaning, and refer to one or more specific elements of the Contract, established for pricing and payment, as indicated in the Bid Form and in the Agreement (or exhibit to the Agreement) at the time the Contract was signed by the parties.
- B. This Article applies to all bid/pay items in the Contract.
- C. Prices – General:
 - 1. The bid/pay items listed starting with Article 1.4 of this Section refer to and are the same bid items listed in the Bid Form and included in the Contract, and constitute all bid/pay items for the Work at the time the Contract was signed by the parties.
 - 2. No direct or separate payment will be made, outside of the bid/pay items in the Contract, for the following: providing miscellaneous temporary or accessory materials or equipment, temporary works, temporary construction facilities, Contractor’s project management, superintendence, and similar costs for Subcontractors or Suppliers; bonds and insurance; schedules and schedule updates; coordination (with: Owner’s operations (including, but not limited to, lockout/tag-out procedures), other contractors, utility owners, owners of transportation facilities, adjacent property owners and occupants, authorities having jurisdiction, Subcontractors and Suppliers, and others with whom Contractor is to coordinate the Work); information technology systems required by the Contract Documents; Submittals; photographic documentation; Project meetings; Contractor’s hazard communication program; Contractor’s compliance with environmental procedures for Constituents of Concern (including spill control and countermeasures plans and implementation); professional services (required for Contractor’s means and methods of construction, and for delegated designs required by the Contract Documents); obtaining and complying with permits and licenses; temporary utilities (including electric power, water supply and disposal, fuel, and communications); temporary lighting; temporary fire protection; temporary enclosures and HVAC; temporary sanitary facilities; temporary first-aid facilities and services; ; Contractor’s field offices and sheds, Engineer’s field offices (when required elsewhere in the Contract Documents); temporary vehicular access and parking (including access to the Site, temporary access roads and parking, onsite traffic

controls for construction traffic, and offsite haul routes); traffic control of non-construction vehicular and pedestrian traffic; temporary controls (including temporary erosion and sediment controls, noise control, control of storm water, surface water, and groundwater, pollution controls (including solid waste control, water pollution control, and control of atmospheric pollution), dust control, pest and rodent controls, odor controls, and other temporary controls required by the Contract Documents); temporary security for the Work; temporary barriers; Project signage (when required elsewhere in the Contract Documents); delivering, handling, and storing materials and equipment to be incorporated into the Work; layouts and surveys for the Work; construction equipment, machinery, tools, and vehicles; safety and protection; Site maintenance during construction; cleaning and removal and disposal of waste and debris; checkout and startup; testing and other quality control activities required by the Contract Documents; record documents, operation and maintenance data; warranties; spare parts and extra materials required by the Contract Documents; instruction of facility personnel as required by the Contract Documents; commissioning (when required elsewhere in the Contract Documents); Contractor's correction period, Contractor's general warranty and guarantee; Contractor's indemnification obligations; other labor, cost, or effort required by the General Conditions and Supplementary Conditions, Division 01 Specifications, and other requirements of the Contract Documents.

3. Price Escalation:

- a. Unless expressly indicated otherwise in the Contract Documents, Owner is not obligated to change the stipulated prices (including lump sums, unit prices, and allowances) that are all or part of the Contract Price because of escalation of costs when there is no corresponding change in the Contract Times.
 - b. Changes in the Contract Times do not necessarily entitle Contractor to a change in Contract Price due to escalation.
 - c. Should Contractor claim a change in Contract Price for one or more stipulated price pay items without a corresponding change in scope, extent, or quality in the associated Work, prior to receiving any such change in Contract Price, Contractor shall submit with Contractor's associated Change Proposal, documentation satisfactory to Engineer supporting and documenting that Contractor's costs have increased because of delays beyond Contractor's control within the associated change in Contract Times included in such Change Proposal.
4. Compensation for all services, labor, materials, and equipment shall be included in prices stipulated for the lump sum bid/pay items in the Contract.
5. Each lump sum in the Contract shall include an amount considered by Contractor as sufficient for all overhead and profit for each separately identified bid/pay item.

D. Contract Price, Payment Procedures, and Related Matters:

1. Contract Price: The Contract Price, as apportioned among bid/pay items in the Contract, is indicated in the Agreement and any associated exhibits thereto and may be modified by Change Order.
2. Payments to Contractor: Refer to the General Conditions (as may be modified by the Supplementary Conditions), the Agreement (including provisions on retainage, if any), and Section 01 29 76 - Progress Payment Procedures, among other applicable Contract Documents.
3. Schedule of Values: Refer to the General Conditions (as may be modified by the Supplementary Conditions) and Section 01 29 73 - Schedule of Values.
4. Procedures for Changes in Contract Price: Refer to the General Conditions (as may be modified by the Supplementary Conditions) and Section 01 26 00 - Contract Modification Procedures.
5. Defective Work is not eligible for payment.

1.3 GENERAL PROVISIONS ON LUMP SUM ITEMS

- A. Progress payments for Work paid on a lump sum basis will be based on Engineer's estimate of the Work (in accordance with the Contract Documents) performed through the end of the associated pay period, based on the Schedule of Values accepted by Engineer in accordance with the Contract Documents.
- B. At its sole discretion, Engineer may correct amounts of lump sum Work included in prior payment requests based on improved data or information available to Engineer, or Engineer's knowledge or reasonable belief that Work is incomplete or defective.

1.4 BID/PAY ITEMS – GENERAL CONTRACT

- A. Item 1 – General Construction:
 - 1. Measurement: As set forth in the Contract's provisions regarding the Schedule of Values and progress payment procedures.
 - 2. Payment: Lump sum payment for this item will be full compensation for completing the Work, as shown and indicated in the Contract Documents not included under other bid/pay items.
- B. Item 2 – Contingency Allowance:
 - 1. Measurement: As indicated in the Agreement and Section 01 21 00 - Allowances, the Contract includes in this item a stipulated amount available as reserve for sole use by Owner, for costs authorized by Owner during construction, for Work not included under other bid/pay items.
 - 2. Payment: Payment for Work authorized in accordance with Section 01 21 00 - Allowances, and performed under this item will be full compensation for providing all Work authorized under this allowance, complete as shown, indicated, or directed by Engineer in accordance with the associated allowance authorizations.
- C. :

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 23 00

ALTERNATES

1.1 SUMMARY

A. Section Includes:

1. Section identifies each alternate and describes the basic changes that shall be incorporated into the Work when that alternate is made part of the Work.

B. Scope:

1. When alternate item(s) are included in the Work as awarded by Owner, the Contractor shall provide all labor, materials, equipment, tools, and incidentals required to provide the Work included under the alternate(s) so awarded.

1.2 ADMINISTRATIVE PROCEDURES

A. Coordination:

1. Contractor shall coordinate related Work as required to complete the Work under each alternate included in the Work. Include as part of each alternate miscellaneous devices, accessories, and similar items incidental to or required for a complete installation whether or not shown or indicated as part of the alternate.
2. Notification: Immediately following award of the Contract, notify in writing each Subcontractor and Supplier involved of the status of each alternate item. In such notice, indicate which alternate items have been accepted, rejected, or deferred for later consideration, and include complete description of negotiated modifications to alternates.

1.3 DESCRIPTION OF ALTERNATES

A. Bid Alternate – Batch Tank Pumping:

1. Description:
 - a. The Batch Tank Pumping bid alternate includes construction of a new lift station within the existing Batch Tank, including three new (and one future) submersible pumps, pipelines, valves, precast concrete valve vaults, instrumentation, and relocation of an existing submersible mixer.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements applicable to all substitution requests.
2. Provisions specific to Contractor's substitution requests for:
 - a. Materials and equipment to be incorporated into the Work.
 - b. Methods, procedures, and sequences indicated in the Contract Documents.

B. Scope:

1. Contractor shall provide all labor, materials, equipment, tools, services, and incidentals, and pay all costs associated with requests for approval of substitutes.
2. Where the Contract Documents expressly indicate that substitutes are not allowed, are unacceptable, or time-barred, do not submit substitution requests for such items or procedures.
3. Requirements for Contractor's proposal of "or-equals", where allowed by the Contract, are in Section 01 62 00 - Product Options, and the General Conditions, as may be modified by the Supplementary Conditions.

C. Related Requirements:

1. Include, but are not necessarily limited to:
 - a. Section 01 26 00 - Contract Modification Procedures.
 - b. Section 01 62 00 - Product Options.

1.2 REFERENCES

A. Terminology:

1. The following terminology, although not indicated with initial capital letters, has the following meaning in this Section:
 - a. "Or-equal" and "or equal" each means material or equipment items to be incorporated into the completed Work as a functioning whole, or method, procedure, or sequence that, in Engineer's sole opinion, are equivalent to that shown or indicated in the Contract Documents.
 - b. "Substitute" means a proposed materials or equipment to be incorporated into the completed Work as a functioning whole, or a proposed construction method, procedure, or sequence that is not, in Engineer's sole opinion, equivalent to the associated, similar material or equipment item or method, procedure, or sequence shown or indicated in the Contract Documents, but accomplishes the same or similar purpose. Unless expressly indicated otherwise in the Contract Documents, Contractor's proposals for "value engineering" (and similar terms) are substitutes.
 - c. "Substitution request" means Contractor's written request for Engineer's approval of a proposed substitute, in accordance with this Section. Substitution requests are separate from Shop drawings and other Submittals required by the Contract Documents.

1.3 SUBSTITUTES - GENERAL

- A. This Article applies to all substitutes and substitution requests, whether for substitute materials or equipment, or for substitute methods, procedures, or sequences.
- B. This Section expands on the provisions on substitutes in the General Conditions, as may be modified by the Supplementary Conditions.
- C. Time Limits for Submitting Substitution Requests:
 - 1. Where the Contract allows Contractor's substitution requests, such proposals will be considered by Engineer only during a period of 30 days after the date the Contract Times start to run, unless otherwise indicated.
 - 2. Substitution requests will be accepted for consideration by Engineer after the time limit indicated in the paragraph above this, when materials or equipment shown or indicated, and all associated "or-equals", are either:
 - a. Unavailable; or
 - b. Despite Contractor's due diligence, are unavailable in time for the Work to be completed within the Contract Times.
 - 3. The foregoing notwithstanding, substitutes will not be approved when received by Engineer after Contractor has commenced the associated Work at the Site, where approval of the substitute would require rework or removing Work already installed.
- D. Design Professional:
 - 1. Engineer is responsible for design of the completed Project as a functioning whole and has responsible charge of the Project except for Work for which design responsibility is expressly delegated by the Contract Documents.
 - 2. Do not retain services of any third-party design professional to prepare modifications of Engineer's design of the completed Project as a functioning whole without Engineer's express, written consent via an appropriate Contract modification setting forth appropriate performance and design criteria for delegating the design of the substitute.
- E. Contractor's Representations:
 - 1. In submitting each substitution request, Contractor represents that:
 - a. Contractor has read and understands the Contract's provisions on substitutes, as indicated in the General Conditions, as may be modified by the Supplementary Conditions, this Section, and elsewhere in the Contract Documents.
 - b. Substitution request is complete and includes all documents and information required by the Contract Documents.
 - c. Contractor certifications required by the General Conditions, as may be modified by the Supplementary Conditions, and this Section are valid and made with Contractor's full knowledge, information, and belief.
 - d. Contractor will provide the same or better guarantees and warranties for substitute as for the specified materials, equipment, methods, procedures, and sequences (as applicable).
 - e. Contractor waives all rights for increasing the Contract Price or extending the Contract Times, related to the substitute, that subsequently may become apparent to Contractor after issuance of the associated Contract modification instrument approving such substitute, except for those associated with differing subsurface or physical conditions or discovery of a previously unforeseen

Hazardous Environmental Condition associated with the Work involving the approved substitute.

F. Submittal of Substitution Requests - General:

1. Substitution requests must be submitted by Contractor. Engineer will not accept or review substitution requests from prospective or bona-fide Subcontractors or Suppliers.
2. Submit separate substitution request for each proposed substitute.
3. Submit substitution requests in accordance with requirements for Shop Drawings and other Submittals, as indicated in the General Conditions, as may be modified by the Supplementary Conditions, Section 01 33 00 - Submittal Procedures, and Section 01 31 26 - Electronic Communication Protocols.
4. Do not submit substitution requests as any of the following (such substitution requests will be returned by Engineer without review):
 - a. Shop Drawing, Sample, or other Submittal.
 - b. Request for approval of an "or-equal".
 - c. Request for interpretation (RFI) or clarification.
 - d. Change Proposal without all other, required substitution request elements indicated below.
 - e. Other oral or written communication not in accordance with this Section.
5. Each substitution request shall include:
 - a. Transmittal letter (one per substitution request) expressly indicating the communication is a substitution request.
 - b. Completed substitution request form, on the form attached to this Section.
 - c. Change Proposal, submitted in accordance with the Contract Documents, including Section 01 26 00 - Contract Modification Procedures. Clearly indicate the proposed changes in Contract Price and Contract Times if substitute is approved; if none, clearly so indicate on the Change Proposal.
 - d. Certifications and written representations required by the Contract Documents to accompany substitution requests.
 - e. Other information: (1) required elsewhere in this Section and in other elements of the Contract Documents, and (2) deemed appropriate by Contractor to support Contractor's substitution request.
6. When Engineer requires additional information to evaluate a substitution request, furnish such information within five days of receipt of Engineer's request, unless additional time is granted by Engineer, in writing.
7. Engineer and Owner have the right to rely upon the completeness and accuracy of information, documents, certifications, and representations in Contractor's substitution request. Contractor accepts full responsibility for completeness and accuracy of substitution requests (except for Engineer's professional liability).

G. Engineer's Review of Substitution Requests:

1. Engineer has no obligation to approve any substitute.
2. Substitutes will not be approved unless all of the following are satisfied for the associated substitute:
 - a. The Contract supports submittal of such substitution request; and
 - b. Substitute is reasonably consistent with Engineer's design intent for the Project as a completed, functioning whole; and
 - c. As indicated in Paragraph 1.3.A.3 of this Section.

- d. Substitute will not have an adverse effect on the work of other contractors, or existing or proposed construction; and
 - e. Substitution request is complete in accordance with the Contract Documents and Engineer's requests, and
 - f. Owner agrees to the substitute; and
 - g. Associated changes in Contract Price and Contract Times, if any, are acceptable to Owner.
3. Engineer is not obligated to approve any substitute where such approval is conditioned on an increase in the Contract Price, the Contract Times, or both.
 4. Timeliness of Engineer's Review:
 - a. Allow not less than 14 days for Engineer's review of each substitute. Allow longer for larger, more-complex substitutes.
 - b. Engineer will endeavor to perform timely review of substitution requests. However, Contractor is responsible for complying with the Contract Times, regardless of whether the substitute is approved.
 - c. Where approval of a substitute would necessitate other changes to the Project's design, additional time, beyond that indicated above, will be necessary for Engineer's preparation of revisions to the design.
 5. When Design Changes are Required with Approval of Substitute:
 - a. Engineer will advise Contractor promptly following Engineer's review (and Owner's comment, if any) on substitution request to indicate whether the substitute will be acceptable. Engineer's advisory to Contractor will indicate whether changes in Engineer's design are necessary and include a preliminary estimate of Engineer's fee and time required for modifying the design and preparing an associated Proposal Request to Contractor.
 - b. Engineer's preliminary estimates of fee and time for design modifications will be prepared in good faith, but are not binding on Owner or Engineer.
 - c. Contractor shall reimburse Owner for costs incurred by Owner for design modifications necessitated by approval of substitute. Owner may deduct such amounts, as one or more set-offs, from payments due Contractor under the Contract.
 - d. Upon Contractor's receipt of Engineer's estimate of fee and time for design modifications, contractor shall advise Engineer, in writing, within three days whether Contractor will continue pursuing approval of the substitute.
 - e. Request to Contractor.
 - f. Engineer may reject a substitute that would require substantial changes in the Project's design.

H. Approval of Substitutes:

1. Substitutes are approved only via issuance of an appropriate Field Order or Change Order in accordance with Section 01 26 00 - Contract Modification procedures, and the General Conditions, as may be modified by the Supplementary Conditions.
2. Approval of a substitute does not relieve Contractor from obligation to comply with the Contract Documents, including submitting Shop Drawings, Samples, and other Submittals in accordance with the Contract Documents.

1.4 SUBSTITUTE MATERIALS AND EQUIPMENT

- A. In addition to other requirements of this Section and elsewhere in the Contract Documents, substitution requests for substitute materials or equipment shall include:

1. Manufacturer and Location:
 - a. Name and address of manufacturer of the proposed substitute. Indicate country where manufacturer is incorporated and owned.
 - b. Companies and brands owned by or affiliated with manufacturer.
 - c. Name of manufacturers of principal component items, such as motors, bearings, and similar items.
 - d. Location where the items would be manufactured, including country and address. Indicate the total percentage of the items' value that will be manufactured outside of the United States and its territories.
 - e. Name, address, and driving distance from the Site of:
 - 1) Manufacturer's sales representative.
 - 2) Nearest service center offering full array of service capabilities.
 - 3) Warehouse or other location where spare parts for the proposed substitute are available.
 - f. Number of years that manufacturer has actively participated the North American market.
2. Proposed Materials and Equipment:
 - a. Model designation and quantity of each proposed for the Work.
 - b. Manufacturer's literature for proposed substitute, with description of the materials and equipment.
 - c. Performance information and representative test data.
 - d. Indication of reference standards with which materials and equipment comply.
 - e. Preliminary process and instrumentation diagrams (P&ID), where applicable.
 - f. Identification of hazardous materials, including Constituents of Concern, used in the materials and equipment, and associated permitting or licensing required.
 - g. Manufacturer's standard warranty and applicable, proposed special or extended warranties, including indication of specific entities that will be beneficiary of such warranties.
 - h. Complete list of proposed deviations from requirements of the Contract Documents.
 - i. Itemized comparison of specified materials and equipment and proposed substitute, indicating:
 - 1) Size (physical dimensions) when: item is in use, when not in use, and space required for routine and major maintenance.
 - 2) Weight and loading at supports, when item is full and empty.
3. Operation requirements, including:
 - a. Anticipated consumption of each item of: Electricity, other energy sources, water, chemicals (indicate each), and other needs for operation at the Site.
 - b. Typical labor required for operation and associated skill level.
 - c. Description of remote monitoring and control capabilities, as applicable.
4. Maintenance requirements, including:
 - a. Anticipated life in the service and environment required.
 - b. Frequency and general scope of routine and major maintenance typically necessary.

- c. Typical labor requirements and general qualifications of personnel performing routine maintenance.
 - d. Major, associated equipment necessary for routing and major maintenance, including hoisting equipment type and capacity (when applicable).
 - e. Availability, scope, cost, and general conditions of service and maintenance contracts, if any.
5. References for similar projects on which the materials and equipment were used. Indicate for each:
- a. Project owner name, name of facility where installed, and name of project.
 - b. City, state, and country of installation.
 - c. Model number/size and quantity furnished and installed.
 - d. Year of installation.
 - e. Contact information for owner and design professional, including telephone numbers.
6. Other information required by the Contract Documents.
7. Other information reasonably requested by Engineer.

1.5 SUBSTITUTE CONSTRUCTION METHODS, PROCEDURES, OR SEQUENCES

- A. Provisions of the General Conditions, as may be modified by the Supplementary Conditions, regarding substitutes of materials and equipment are hereby extended to apply to substitute methods, procedures, and sequences as shown or indicated in the Contract Documents.
- B. In addition to other requirements of this Section and elsewhere in the Contract Documents, substitution requests for substitute methods, procedures, or sequences shall include:
- 1. Clear identification of the method, procedure, or sequence shown or indicated in the Contract Documents for which substitute is requested.
 - 2. Detailed description of proposed substitute method, procedure, sequence, or combination thereof.
 - 3. Reasons why substitute is proposed and benefits to the Project should the substitute be approved.
 - 4. Detailed list of how the proposed substitute deviates from associated method, procedure, or sequence shown or indicated in the Contract Documents.
 - 5. Impact of the substitute, if approved, on Owner's or facility manager's operations, when the Work is at an existing facility.
 - 6. Effect on other contractors working at the Site, if substitute is approved.
 - 7. Description of temporary equipment and temporary facilities needed, should the substitute be approved, including quantity of items, capacities, performance characteristics, permitting and approvals required by authorities having jurisdiction, and proposed location at the Site.
 - 8. Written evaluation of how substitute method, procedure, or sequence complies with Laws and Regulations.
 - 9. Drawings illustrating method, procedure, or sequence.
 - 10. Materials to be used that contain Constituents of Concern or that have potential to cause or exacerbate a Hazardous Environmental Condition.
 - 11. Other information and data required by the Contract Documents.
 - 12. Other information reasonably required by Engineer.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. The following, bound after this Section's "End of Section" designation, are part of this Specifications Section:
 - 1. Exhibit A - Substitution Request Form (one page).

END OF SECTION

EXHIBIT A

Substitution Request Form

(One Item per each Form)

Project: Woodside WRF – Headworks Improvements		Date:	
Substitution Requestor:			
Contractor:			
Specification Section No:	Paragraph No. (i.e. 2.1.A.1.c):	Specified Item:	
Proposed Substitution:			
Provide Product Data Sheets, Manufacturer's written installation instructions, drawings, diagrams, or any other information as an attached to this Form that will demonstrate the proposed substitution is an Approved Equal.			
State differences between proposed substitutions and specified item. Differences include but are not limited to interrelationship with other items; materials, equipment, function, utility, life cycle costs, applied finished, appearances, and quality. <div style="display: flex; justify-content: space-around; margin-top: 5px;"> [][] [][] [][] [][] </div>			
Document how the proposed substitution is compatible with or modifies other systems, parts, equipment or components of the Project and Work under the Contract <div style="display: flex; justify-content: space-around; margin-top: 5px;"> [][] [][] [][] </div>			
Describe what effect the proposed substitution has on dimensions indicated on the Drawings and previously reviewed Shop Drawings? <div style="display: flex; justify-content: space-around; margin-top: 5px;"> [][] [][] [][] </div>			
Describe what effect the proposed substitution has on the Construction Schedule and Contract Time. <div style="display: flex; justify-content: space-around; margin-top: 5px;"> [][] [][] [][] </div>			
Describe what effect the proposed substitution has on the Contract Price. This includes all direct, indirect, impact and delay costs. <div style="display: flex; justify-content: space-around; margin-top: 5px;"> [][] [][] [][] </div>			
Manufacturer's guarantees of the proposed and specified items are: <input type="checkbox"/> Same <input type="checkbox"/> Different (explain on attachment)			
The undersigned state that the function, utility, life cycle costs, applied finishes, appearance and quality of the proposed substitution are equal or superior to those of the specified item.			
For use by Engineer: <input type="checkbox"/> Accepted – eligible for approval via Change Order <input type="checkbox"/> Accepted as Noted – approval via Change Order <input type="checkbox"/> Not Accepted <div style="display: flex; justify-content: space-between; margin-top: 10px;"> [][] [][] <i>Date</i> (Telephone): </div> <div style="margin-top: 10px;"> [][] Signature of PE, RA, or PG in Responsible Charge </div>		<div style="display: flex; justify-content: space-between; margin-top: 10px;"> [][] (Contractor's Signature) </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> [][] (Contractor's Firm) </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> [][] (Firms Address) </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> [][] (Telephone) </div>	

Comments:

SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

1.1 SUMMARY

A. Section Includes:

1. This Specifications section expands upon provisions of the General Conditions, as may be modified by the Supplementary Conditions, and includes:
 - a. Requests for interpretation.
 - b. Written clarifications.
 - c. Minor changes in the Work and Field Orders.
 - d. Work Change Directives.
 - e. Proposal Requests.
 - f. Change Proposals.
 - g. Change Orders.

1.2 GENERAL – APPLICABLE TO ALL PROVISIONS OF THIS SECTION

- A. Submit Contract modification documents to Engineer, addressed to the contact person and contact information indicated in Section 01 33 00 - Submittal Procedures, and in accordance with Section 01 31 26 - Electronic Communication Protocols.
- B. Retain at Contractor's office and at the Site complete copy of each Contract modification document, all interpretations and clarifications, related documents, and Engineer's response.

1.3 REQUESTS FOR INTERPRETATION

A. General.

1. Transmit written requests for interpretation to Engineer. Contractor and Owner may prepare and transmit requests for interpretation.
2. Prepare and transmit request for interpretation to obtain clarifications or interpretations of the Contract Documents. Report conflicts, errors, ambiguities, and discrepancies in the Contract Documents by requesting an interpretation.
3. Do not transmit request for interpretation when other form of communication is appropriate, such as Submittals, requests for approvals of substitutes, notices, ordinary correspondence, or other form of communication. Improperly prepared or inappropriate requests for interpretation will be returned without response or action by Engineer.
4. Do not submit request for interpretation or clarification when:
 - a. answer may be obtained by observations at the Site; or.
 - b. required information is clearly indicated in the Contract Documents; or.
 - c. required information is included in industry standards referenced in the Contract Documents or Supplier's instructions that are consistent with the Contract Documents; or.
 - d. are reasonably inferable from any of foregoing.
5. Engineer will return requests for interpretation without response for any of the following reasons:
 - a. Request is regarding one of the items addressed in Paragraphs 1.3.A.3 and 4 of this Specifications section.
 - b. Request is unclear or incomplete.
 - c. Request was answered in Engineer's response to a prior request for interpretation.
 - d. Request is related to construction means, methods, techniques, procedures, or sequences of construction that are not required by the Contract Documents.
 - e. Request is related to safety and protection matters that are solely Contractor's responsibility.

- f. Request resulted in whole or in part to lack of adequate coordination by Contractor, including coordination of Subcontractors and Suppliers.
 - g. Requests that are otherwise frivolous or unnecessary.
- 6. Should requests be categorized by Engineer as within the limits of Paragraphs 1.3.A.3, 4, or 5 of this Specifications Section, Engineer may recommend and Owner may withhold from payments due Contractor under the Contract set-off(s) sufficient to cover Owner's costs of Contractor's submittal of invalid, frivolous, unnecessary, or inappropriate requests for interpretation or clarification.
- 7. Contractor shall have sole financial responsibility for Contractor's costs for requests for interpretation or clarification that are submitted late, out of sequence, or that are unnecessary.

B. Procedure.

- 1. Transmit requests for interpretation in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section. Include with each request for interpretation a separate letter of transmittal.
- 2. If Engineer requests additional information to make an interpretation, entity requesting the interpretation shall transmit the information requested within 10 days, unless Engineer allows additional time, via correspondence referring to request for interpretation number.
- 3. Engineer will review and respond to requests for interpretation with reasonable promptness. Allow sufficient time for review and response.
- 4. Engineer will maintain log of requests for interpretation. Upon request, copy of log will be transmitted to requestor.
- 5. Engineer's response to requests for interpretation will be transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section. Each response to a request for interpretation will include a separate letter of transmittal.
- 6. Engineer's response to each request for interpretation will be distributed to:
 - a. Contractor.
 - b. Owner.
 - c. Resident Project Representative (RPR).
 - d. Engineer.
- 7. If Contractor desires to appeal Engineer's interpretation or clarification, comply with the appeals procedure set forth in the General Conditions, as may be modified by the Supplementary Conditions.
- 8. Interpretations that One or Both Parties Believes Entails a Change to the Contract:
 - a. If Contractor or Owner believes that a change in the Contract Price or Contract Times or other change to the Contract is required as a result of Engineer's interpretation, so advise Engineer in writing before proceeding with the Work associated with the request for interpretation.
 - b. If, after this initial communication, either Owner or Contractor believes that change in Contract Price, Contract Times, both, or other relief with respect to the terms of the Contract is necessary, recourse shall be in accordance with the Contract Documents.

C. Preparation of Requests for Interpretation:

- 1. Prepare each request for interpretation on the "Request for Interpretation" form included with this Specifications section, or other form acceptable to Engineer.
- 2. Number each request for interpretation as follows: Numbering system shall be the Contract number and designation followed by a hyphen and three-digit sequential number. Example: First request for interpretation on the general contract for project titled, "Contract WWTP09" would be, "RFI No. WWTP09-GC-001".

3. In space provided on form, describe the interpretation requested. Provide additional sheets as necessary. Include text and sketches as required in sufficient detail to describe the need for interpretation.
4. When applicable, request for interpretation shall include Contractor's recommended resolution.

1.4 WRITTEN CLARIFICATIONS

A. General:

1. Written clarifications, when required, will be initiated and issued by Engineer.
2. Written clarifications do not change the Contract Price or Contract Times, and do not alter the Contract Documents.
3. Written clarifications will be issued as correspondence or using clarification notice form acceptable to Engineer, with additional information as required.

B. Procedure.

1. Engineer's written clarifications will be transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section.
2. Each written clarification will be distributed to:
 - a. Contractor.
 - b. Owner.
 - c. Resident Project Representative (RPR).
 - d. Engineer.
3. If Contractor desires to appeal Engineer's interpretation or clarification, comply with the appeals procedure set forth in the General Conditions, as may be modified by the Supplementary Conditions.
4. Written Clarifications that One or Both Parties Believes Entails a Change to the Contract:
 - a. If Contractor or Owner believe that a change in the Contract Price or Contract Times or other change to the Contract is required as a result of Engineer's written clarification, so advise Engineer in writing before proceeding with the Work associated with the written clarification.
 - b. If, after this initial communication, either Owner or Contractor believes that change in the Contract Price, Contract Times, both, or other relief with respect to the terms of the Contract is necessary, recourse shall be in accordance with the Contract Documents.
5. If Engineer's written clarification is unclear, prepare and transmit a request for interpretation in accordance with the Contract Documents.

1.5 MINOR CHANGES IN THE WORK AND FIELD ORDERS

A. General:

1. Field Orders, when required, will be initiated and issued by Engineer.
2. Field Orders authorize minor changes in the Work but do not change the Contract Price or Contract Times.
3. Field Orders will be in the form of Engineers Joint Contract Documents Committee document EJCDC C-942, "Field Order".
4. Engineer will maintain a log of Field Orders issued. Copy of Engineer's log of Field Orders will be transmitted to Contractor or Owner upon request.

B. Procedure:

1. Field Orders will be transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section. Each Field Order will include a separate letter of transmittal.
2. Each Field Order will be distributed to the following:
 - a. Contractor.

- b. Owner.
 - c. Resident Project Representative (RPR).
 - d. Engineer.
3. Field Orders that One or Both Parties Believes Entails a Change to the Contract Price or Contract Times:
 - a. If Contractor or Owner believes that a change in the Contract Price or Contract Times or other change to the Contract is required as a result of a Field Order, so advise Engineer in writing before proceeding with the Work associated with the Field Order.
 - b. If, after this initial communication, Contractor believes that change in Contract Price, Contract Times, both, or other relief with respect to the terms of the Contract is necessary, recourse shall be in accordance with the Contract Documents.
 4. If the Field Order is unclear, submit request for interpretation.
 5. If Owner disagrees with the Field Order, Engineer may issue a revised or amended Field Order, or a Change Order or Work Change Directive may be issued.

1.6 WORK CHANGE DIRECTIVES

A. General:

1. Work Change Directives, when issued, order additions, deletions, or revisions to the Work. When issued, Contractor shall promptly implement the changes ordered in the associated Work Change Directive.
2. Work Change Directives do not change the Contract Price or Contract Times but are evidence that the parties to the Contract expect that the change ordered or documented by the Work Change Directive will be incorporated in subsequently issued Change Order following agreement by the parties as to the Work Change Directive's effect, if any, on the Contract Price, Contract Times, or both.
3. Work Change Directives will be in the form of EJCDC C-940, "Work Change Directive".

B. Procedure.

1. Work Change Directives signed by Owner and Engineer will be transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section. Each Work Change Directive will include a separate letter of transmittal. Signed Work Change Directives will be transmitted to:
 - a. Contractor.
 - b. Owner.
 - c. Engineer.
 - d. Resident Project Representative.
2. Documentation of Costs:
 - a. Promptly following receipt of the Work Change Directive:
 - 1) Advise Engineer and Owner in writing of the anticipated quantity and types of construction equipment and machinery required or anticipated for the associated Work.
 - 2) Advise Engineer and Owner in writing of which construction equipment and machinery is owned by the Contractor or Subcontractor and which is, or will be, rented from an equipment rental firm.
 - 3) When construction equipment and machinery is rented from a rental firm, transmit to Engineer and Owner copy of the associated rental agreements(s) pertinent to the Work ordered by the Work Change Directive.
 - 4) For all construction equipment and machinery, indicate to Engineer and Owner whether each item is required only for the Work ordered by the Work Change Directive and whether each item is being, or will be, used for other Work on the Project or other projects for Owner.

- 5) Advise Engineer and Owner in writing of information on anticipated temporary materials (including items such as temporary support of excavations, scaffolding, temporary barriers, temporary plates covering excavations, and other temporary materials) to the same extent as that required for construction equipment and machinery.
- b. When basis of payment for Work ordered under a Work Change Directive will be paid as Cost of the Work plus a fee, or when otherwise required by Engineer, document for the Work performed under each separate Work Change Directive, for each day, the following:
 - 1) Number and labor classifications of workers employed and hours worked each day on the Work ordered via the Work Change Directive.
 - 2) Construction equipment used, including manufacturer, model, and year of manufacture, and number of hours such equipment was onsite and used each day for the Work under the Work Change Directive. Indicate where the equipment was used for other Work under the Contract and idle time.
 - 3) Temporary materials; furnish the same information as required for construction equipment and machinery. Where rental costs of such items approaches the purchase cost of such item, or when otherwise requested by Engineer, furnish evidence, satisfactory to Engineer, of the purchase price of such temporary materials.
 - 4) Consumables and similar materials used.
 - 5) Suppliers' receipts, bills, or invoices for and descriptions of materials and equipment incorporated into the Work.
 - 6) Invoices and labor and equipment breakdowns for Subcontractors.
 - 7) Other information required by Owner or Engineer.
 - 8) Transmit such documentation as a Change Proposal promptly after such documentation is available to Contractor. Actively pursue Subcontractors and Suppliers for required documentation to promptly furnish required documentation to Engineer.
- c. Separately track and document Work performed in accordance with each Work Change Directive and Work performed under stipulated price methods of compensation (including lump sums and Unit Price Work).
- d. Submit such information in a format acceptable to Engineer.
3. Documentation of Time:
 - a. General:
 - 1) Contractor will be entitled to change of Contract Times Work ordered by a Work Change Directive in accordance with the requirements of the General Conditions, as may be modified by the Supplementary Conditions.
 - 2) Contractor will be entitled to a change in Contract Times only when the Work ordered by the Work Change Directive is implemented promptly and affects the Contractor's ability to comply with the Contract Times.
 - b. Requirement Documentation: Submit the following as part of the Change Proposal documenting price-related impact of the Work ordered by the Work Change Directive:
 - 1) Statement on whether the subject Work affected Contractor's ability to comply with the Contract Times.
 - 2) If Contractor's ability to comply with the Contract Times was so affected, indicate the effect on each of the relevant Contract Times.
 - 3) Document that Contractor acted promptly and properly upon receipt of the Work Change Directive to promptly implement the Work ordered thereby.
 - 4) Time impact analysis for the affected Work, in accordance with Section 01 32 16 - Construction Progress Schedule.
 - 5) Other time-related documentation required by Engineer.

1.7 PROPOSAL REQUESTS

A. General:

1. Proposal Requests may be initiated by Engineer or Owner.
2. Proposal Requests are for requesting the effect on the Contract Price and the Contract Times and other information relative to contemplated changes in the Work. Proposal Requests do not authorize changes or variations in the Work, and do not change the Contract Price or Contract Times or terms of the Contract.
3. Proposal Requests will be furnished using the "Proposal Request" form included with this Specifications section.

B. Procedure:

1. Proposal Requests will be transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Section. Each Proposal Requests will include a separate letter of transmittal.
2. Each signed Proposal Request will be transmitted to the following:
 - a. Contractor.
 - b. Owner.
 - c. Resident Project Representative (RPR).
 - d. Engineer.
3. Transmit request for interpretation to obtain clarification of conflicts, errors, ambiguities, and discrepancies in Proposal Request.
4. Upon receipt of Proposal Request, Contractor shall prepare and transmit to Engineer a Change Proposal, in accordance with the Contract Documents, for the proposed Work described in the Proposal Request.

1.8 CHANGE PROPOSALS

A. General:

1. Prepare and transmit written Change Proposal to Engineer in response to each Proposal Request; or when Contractor believes a change in the Contract Price, Contract Times, both, or other change to the terms of the Contract is required; or to appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract.

B. Procedure:

1. Prepare and transmit Change Proposals within time limits indicated in the General Conditions, as may be modified by the Supplementary Conditions.
2. Submit only one Change Proposal for each change issue, unless Engineer requires additional information or clarification. Do not submit repeated Change Proposals for the same change issue. Rather, when Contractor is dissatisfied with Engineer's decision on a Change Proposal, recourse is set forth in the General Conditions, as may be modified by the Supplementary Conditions, and elsewhere in this Article.
3. Transmit Change Proposals in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section. Include with each Change Proposal all required supporting documentation and a separate letter of transmittal.
4. Engineer's Review and Requests for Additional Information:
 - a. Engineer will review and act on each Change Proposal in accordance with, and within the time limits indicated in, the General Conditions, as may be modified by the Supplementary Conditions.
 - b. When Engineer requests additional information to render a decision, submit required information within five days of receipt of Engineer's request, unless Engineer allows

more time. Submit the required information via correspondence that refers to the specific Change Proposal number.

- c. Owner shall transmit to Engineer such comments, if any, that Owner has on the Change Proposal, within 10 days of Owner's receipt of the Change Proposal.
 - d. Engineer will render a written decision on the Change Proposal or take other action in accordance with the General Conditions, as may be modified by the Supplementary Conditions.
 - e. Engineer's response to Change Proposals will be transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section, the General Conditions, and the Supplementary Conditions.
5. Engineer's response to each Change Proposal will be distributed to:
- a. Contractor.
 - b. Owner.
 - c. Resident Project Representative (RPR).
 - d. Engineer.
6. If Change Proposal is recommended for approval by Engineer and is approved by Owner, a Change Order will be issued or, when applicable, an appropriate use of an allowance (already included in the Contract Price) will be authorized by Owner.
7. If parties do not agree on terms for the change, Owner or Contractor may file a Claim against the other, in accordance with the General Conditions, as may be modified by the Supplementary Conditions.

C. Preparation of Change Proposals:

1. Each Change Proposal shall be submitted on the "Change Proposal" form included with this Specifications section, or other form acceptable to Engineer.
2. Number each Change Proposal as follows: Numbering system shall be the Contract number and designation followed by a hyphen and three-digit sequential number. Example: First Change Proposal for the general contract for project named "Contract No. 8" would be, "Change Proposal No. 8-GC-001".
3. In space provided on Change Proposal form:
 - a. Describe scope of each proposed change. Include text and sketches on additional sheets as required to provide detail sufficient for Engineer's review and response. If a change item is submitted in response to Proposal Request, write in as scope, "In accordance with Proposal Request No." followed by the Proposal Request number. Submit written clarifications, if any, to scope of change.
 - b. Submit justification for each proposed change. If change is in response to proposal request, write in as justification, "In accordance with Proposal Request No." followed by the Proposal Request number.
 - c. Indicate the total change in the Contract Price and Contract Times for each separate change item included in the Change Proposal.
4. Proposed Effect on Contract Price: Unless otherwise directed by Engineer, attach to the Change Proposal detailed breakdowns of pricing (Contractor's cost and Contractor's fee) including:
 - a. List of Work tasks to accomplish the change.
 - b. For each task, labor cost breakdown including labor classification, total hours per labor classification, and hourly cost rate for each labor classification. Where overtime is included, indicate the overtime hours, labor classifications, and associated overhead rates.
 - c. Construction equipment and machinery to be used, including manufacturer, model, and year of manufacture, and number of hours for each. Indicate whether the construction equipment or machinery is owned by Contractor, Subcontractor, or leased from a rental firm; if leased, include with the Change Proposal a copy of the rental agreement. Indicate whether the construction equipment and machinery is already onsite and used

for other activities, or whether it is required solely for the Work in the contemplated change. Indicate overtime hours budgeted, if any, and the associated cost rate for overtime compared with the straight-time rate.

- d. Indicate temporary materials required, including description of extent, scope, and quality, and associated cost. Temporary materials include items such as temporary sheeting for support of excavations, scaffolding, temporary plates to cover open excavations, temporary barriers, and other temporary items. Indicate ownership or source of such items. Include copy of rental agreement if rented from a third-party rental firm in which neither Contractor nor any Subcontractor has a financial interest. Indicate intended duration of use for such items and purchase cost of such items.
 - e. Detailed breakdown of cost of materials and equipment to be incorporated into the Work, including quantities, unit costs, and total cost, with Supplier's written quotations. When requested by Engineer, submit quotes by multiple prospective Suppliers.
 - f. Breakdowns of each Subcontractors' pricing, including labor, construction equipment and machinery, temporary materials, and materials and equipment incorporated into the Work, other costs, and Subcontractor fees (e.g., overhead and profit). Breakdown of Subcontractors' pricing shall be the same level of detail as that for Contractor.
 - g. Breakdown of other costs eligible, in accordance with the General Conditions and the Supplementary Conditions under "Cost of the Work" provisions.
 - h. Other information required by Engineer.
 - i. Contractor's fees (overhead and profit) applied to eligible Contractor costs and eligible Subcontractor costs.
5. Proposed Effect on Contract Times: Unless otherwise directed by Engineer, attach to the Change Proposal detailed information substantiating the proposed change in Contract Times, including:
- a. Time impact analysis required by Section 01 32 16 - Construction Progress Schedule.
 - b. Indication of whether the Work associated with the contemplated change will affect Contractor's ability to comply with the Contract Times.
 - c. Other time-related information requested by Engineer.

1.9 CHANGE ORDERS

A. General:

1. Change Orders will be recommended by Engineer (when required by the General Conditions) and will be signed by Owner and Contractor (subject to the General Conditions related to a party withholding its signature from a contractually-required Change Order)), to authorize additions, deletions, or revisions to the Work, changes to the Contract Price, changes in the or Contract Times, changes to the terms of the Contract, or a combination thereof.
2. Change Orders will be in the form of EJCDC C-941, "Change Order".

B. Procedure.

1. Change Orders for signature by Contractor will be transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols, and requirements of this Specifications section. Each Change Order will include a separate letter of transmittal. Contractor shall print three originals of Change Order for Contractor's signature.
2. Contractor shall promptly sign each original Change Order and, within five days of receipt, deliver all originals to Engineer.
3. Engineer will sign each original Change Order and forward them to Owner.
4. After approval and signature by Owner, original Change Orders will be distributed as indicated below.
5. Original, signed Change Orders will be distributed as follows:
 - a. Contractor: One original.
 - b. Owner: One original.

- c. Engineer: One original.
- d. Resident Project Representative (RPR): One copy.
- 6. Upon Contractor's receipt of the fully-signed Change Order, promptly perform the Work ordered thereby in accordance with the Contract Documents and the Progress Schedule accepted by Engineer.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. The forms listed below and bound following this Specifications section's "End of Section" designation, are part of this Specifications section:
 - 1. Request for Interpretation form (one page).
 - 2. Proposal Request form (one page).
 - 3. Change Proposal form (one page).

END OF SECTION

REQUEST FOR INTERPRETATION

Owner: _____ City of Hailey, Idaho

Project Name: _____ Woodside WRF – Headworks Improvements

Contractor: _____ RFI No. [_____]

Date Transmitted: _____ Date Received: [_____]

Date Response Requested: _____ Date Response Transmitted: [_____]

Subject: _____ [_____]

Specification Section and Paragraph: _____

Drawing References: _____

INTERPRETATION REQUESTED:

Signature: _____ Date: [_____]

ENGINEER'S RESPONSE:

Signature: _____ Date: [_____]

PROPOSAL REQUEST

Owner: _____ City of Hailey, Idaho

Project Name: _____ Woodside WRF – Headworks Improvements

Proposal Request No.: _____ Date: [_____]

Contract Name and No.: _____

Contractor: _____

Other Contracts Involved in Proposed Change: _____

TO CONTRACTOR: Please submit a complete Change Proposal for the proposed modifications described below. If the associated Change Proposal is approved, a Change Order or allowance authorization will be issued to authorize adjustment so the Contract. This Proposal Request is not a Change Order, Work Change Directive, Field Order, or an authorization to proceed with the proposed Work described below.

SCOPE OF PROPOSED CHANGE(S) IN THE WORK:

1. *[Title 1]:*
2. *[Title 2]:*
3. *[Title 3]:*

Attachments to this Proposal Request:

1. [None].

Proposal requested by: _____
HDR (Engineer)

Signature of Requestor: _____

CHANGE PROPOSAL

Owner: _____ City of Hailey, Idaho _____

Project Name: _____ Woodside WRF – Headworks Improvements _____

Change Proposal No.: _____ Date: [_____] _____

Submitted in Response to Proposal No.: _____

Contractor Name and No.: _____

Contractor: _____

Subject: _____

The following changes to the Contract are proposed:

SCOPE OF PROPOSED CHANGE TO CONTRACT: *(attach supporting information as required)*

1. [Title 1]:

2. [Title 2]:

JUSTIFICATION:

1. [Title 1]:

2. [Title 2]:

PROPOSED CHANGES IN CONTRACT PRICE AND CONTRACT TIMES:

We propose that the Contract Price and Contract Times be changed as follows:

For Contract Price, attach detailed cost breakdowns for Contractor and Subcontractors, Supplier quotations, and other information required.

For the Contract Times, state increase, decrease, or no change to Contract Times for Substantial Completion, readiness for final payment, and Milestones, if any. If increase or decrease, state specific number of days for changes to the Contract Times. Submit supporting data, including time impact analysis for the Progress Schedule.

Description	Amount	Contract Times (days)	
		Substantial	Final
1. [Title 1]	\$0.00	0	0
2. [Title 2]	\$0.00	0	0
Total This Change Proposal	\$0.00	0	0

Changes to Milestones, if any: [_____] [_____]

Contractor represents that supporting data attached to this Change Proposal are accurate and complete. The requested time or price adjustment indicated in this Change Proposal is the entire adjustment to which Contractor believes it is entitled as a result of the proposed change(s) indicated herein.

Change Proposal by: _____

Signature of Proposer: _____

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Requirements for the Schedule of values, including:
 - a. Applicability.
 - b. General provisions for Schedules of Values.
 - c. Format, organization, and content of Schedule of Values.
- B. Related Requirements: Include but are not necessarily limited to:
 - 1. Section 01 22 00 - Measurement and Payment.
 - 2. Section 01 29 76 - Progress Payment Procedures.

1.2 PRICE AND PAYMENT PROCEDURES

- A. Schedule of Values and Payment – General:
 - 1. Contractor shall prepare and submit to Engineer for acceptance Schedule of Values that presents (as applicable): (a) an appropriate, detailed breakdown of the price of lump sum bid/pay items, and (b) an appropriate, detailed breakdown of the price of Work compensated on the basis of Cost of the Work plus a fee, and (c) lists bid/pay items of Unit Price Work. The total of all Work among the various bid/pay items shall equal the Contract Price.
 - 2. For each item of lump sum Work and Work compensated on the basis of Cost of the Work plus a fee, the Schedule of Values shall, establish in detail the portion of the Contract Price allocated to each component of such Work.
 - 3. Upon request of Engineer, promptly furnish data and information that substantiates and supports the amounts indicated in the Schedule of Values.
 - 4. Submit preliminary Schedule of Values to Engineer for initial review. Contractor shall incorporate Engineer's comments into the Schedule of Values and resubmit to Engineer. Engineer may require corrections and re-submittals until Schedule of Values is acceptable.
 - 5. Schedule of Values may be used, where appropriate, as a basis for negotiating price of changes, if any, in the Work.
- B. Applicability:
 - 1. Lump Sum Work:
 - a. For Work paid on a lump sum basis, progress payments will be on the basis of Work performed in accordance with the Contract Documents, for each line item in the Schedule of Values, as recommended to Owner by Engineer.

1.3 ADMINISTRATIVE PROCEDURES

- A. General Provisions for Schedules of Values:
 - 1. This Section augments requirements for the Schedule of Values, indicated in the General Conditions, as may be augmented by the Supplementary Conditions.

1.4 SUBMITTALS

- A. Informational Submittals: Submit the following:
 - 1. Submit to Engineer the Schedule of Values in the form and quantity required in Section 01 33 00 - Submittals, and in accordance with Section 01 31 26 - Electronic Communication Protocols.

2. Content of Schedule of Values Submittals shall be in accordance with this Section.
3. Timing of Submittals:
 - a. Preliminary Schedule of Values:
 - 1) Submit preliminary Schedule of Values within time limit indicated in the General Conditions.
 - b. Initial Acceptable Schedule of Values:
 - 1) Revise the preliminary Schedule of Values in accordance with Engineer's comments.
 - 2) Contractor will not be eligible for progress payment until acceptable Schedule of Values is submitted in accordance with the Contract Documents.
 - 3) Submit the Schedule of Values acceptable to Engineer in accordance with the General Conditions.
 - c. Updates: Submit updated Schedule of Values when:
 - 1) The Contract Price has changed.
 - 2) Requested by Engineer

1.5 FORMAT, ORGANIZATION, AND CONTENT OF SCHEDULE OF VALUES

- A. Organization and Major Elements of Schedule of Values.
 1. Prepare Schedule of Values on the "progress estimate" or "continuation sheets", as applicable, of the Application for Payment form indicated in Section 01 29 76 - Progress Payment Procedures.
 2. Include in Schedule of Values itemized list of Work for each major work area included in the Work, for each lump sum payment item included in the Contract.
 3. In addition, list either in the Schedule of Values or on a separate worksheet included with Applications for Payment all Unit Price Work bid/pay items in the Contract. The balance of this Article applies to lump sum Work and Work compensated on the basis of Cost of the Work plus a fee.
 4. Organization in Accordance with Specification Sections:
 - a. Within each work area, organize the Schedule of Values by the various Specifications section numbers and titles included in the Contract Documents.
 - b. Label each row in the Schedule of Values with the appropriate Specifications section number. Include an amount for each row in the Schedule of Values.
 - c. List sub-items of major materials, equipment, or systems, as appropriate or when requested by Engineer.
- B. Requirements for both the preliminary Schedule of Values Submittal and the Schedule of Values Submittal for Engineer's acceptance are:
 1. Subcontracted Work:
 - a. Schedule of Values shall indicate division of Work between Contractor and each Subcontractor.
 - b. Line items for Work to be performed by each Subcontractor shall include the word, "(SUBCONTRACTED)" and the name of the Subcontractor once the associated subcontract is signed and effective.
 2. Apportionment between Materials and Equipment, and Installation: Schedule of Values shall include separate apportionment of costs for:
 - a. Cost of materials and equipment to be incorporated into the completed construction.
 - b. Cost of delivery, handling, and storage of materials and equipment to be incorporated into the completed construction.
 - c. Cost of temporary materials (such as excavation supports, scaffolding, and other temporary materials), and their associated delivery, handling, and storage costs, if any.

- d. Cost of rentals of construction equipment and machinery, whether owned by Contractor or Subcontractor or leased from a third-party equipment rental entity.
- e. Cost of installing materials and equipment.
- f. Travel and subsistence costs, if any.
- g. Other costs used in preparing the Bid by Contractor and each Subcontractor.
3. Sum of individual line item amounts indicated on the Schedule of Values shall equal the total of associated bid/pay item. Sum of bid/pay item totals in the Schedule of Values, plus the sum of any separate listing of Unit Price Work items, shall equal the total Contract Price.
4. Overhead and Profit:
 - a. Include in each line item a directly proportional amount of Contractor's overhead and profit in the Contract Price.
 - b. Do not include overhead and profit as separate line item(s).
5. Allowances: Include separate line item for each allowance.
6. Bonds and Insurance Costs:
 - a. Include line item for bonds and insurance in bid/pay item for , in amount not greater than 1.5 percent of the total Contract Price.
 - b. When greater than the amount stipulated immediately above is proposed by Contractor in the Schedule of Values, submit to Engineer documentation substantiating the proposed amounts. Submit to Engineer such documentation when otherwise requested by Engineer.
 - c. When Contractor has furnished performance and payment bonds and evidence of insurance acceptable to Owner and in accordance with the Contract Documents, entire amount for bonds and insurance may be applied for in the first Application for Payment.
7. Construction Support, Project Management, and Administrative Cost Elements:
 - a. Costs under this category are sometimes informally referred to as "field overhead", but are Project costs rather than costs related to Contractor's general business operations.
 - b. Include in the Schedule of Values relevant line items and amounts for work and services required by the General Conditions and specific Division 01 Specifications sections, such as:
 - 1) Project management costs.
 - 2) Onsite superintendence and supervision costs.
 - 3) Itemized list of Work by work area, as applicable, for costs associated with coordination with the Owner's operations, including required sequencing, as set forth in the Contract Documents.
 - 4) Updating the construction Progress Schedule, preparing time impact analyses, and preparing recovery schedules. Preparation of preliminary Progress Schedule and the initial ("baseline") Progress Schedule acceptable to Engineer are part of mobilization.
 - 5) Construction progress photographic documentation. Preconstruction photographic documentation and final photographic documentation are, respectively, part of mobilization and demobilization.
 - 6) Updates of the Schedule of Submittals.
 - 7) Contractor's safety representative and ongoing implementation of Contractor's Site-specific health and safety plan (SSHASP). Establishing the SSHASP is part of mobilization.
 - 8) Ongoing compliance with permits (when applicable). Contractor's securing of required work permits is part of mobilization.
 - 9) Ongoing cost for temporary utilities and temporary facilities. Establishing such services and facilities is part of mobilization.
 - 10) Ongoing costs for temporary security .

- 11) Field offices (monthly rental and maintenance) and storage facilities (excluding costs of establishment and removal, which are part of mobilization and demobilization).
- 12) Ongoing site maintenance, such as temporary controls (dust, air pollution, water pollution, solid waste control, pest and rodent control, temporary erosion and sediment controls, and others), snow and ice removal, and similar activities.
- 13) Field engineering and surveying.
- 14) Progress cleaning and cleaning for Substantial Completion.
- 15) Record documents (preparation, maintenance, and submittal).
 - a) If adequate record documents are maintained, up to 50 percent of the value of the record documents line item will be eligible for payment, spread evenly over those progress payments in which construction at the Site is performed.
 - b) Remainder of Project record documents line item will be eligible for payment when complete record documents are submitted in accordance with the Contract Documents.
 - c) If record documents submitted are unsatisfactory to Engineer, amount may be reduced via set-offs in accordance with the Contract Documents.
- 16) Other items required by Engineer.
- c. Include such items in Applications for Payment on payment schedule acceptable to Engineer.
- d. Such line items in the Schedule of Values shall exclude any and all costs associated with Contractor's permanent place(s) of business, personnel stationed at permanent office(s), salaries and bonuses of executive and administrative personnel not directly performing work on the Project, and general business expenses, all of which are part of Contractor's overhead costs.
8. Mobilization and Demobilization: In accordance with Section 01 71 14 - Mobilization and Demobilization.
9. Costs for Submittals, field quality control activities, and training of operations and maintenance personnel shall be as follows, unless otherwise accepted by Engineer:
 - a. Submittals: Up to 8.0 percent of cost (including all associated overhead and profit) of each equipment item, exclusive of transportation and installation costs associated therewith, may be allocated to preparation of Shop Drawings, Samples, and other Submittals required for release for purchase, fabrication, or delivery (as applicable) and may be included in the Application for Payment following Engineer's approval of Shop Drawings (and acceptance of other Submittals, as applicable) required for fabricating or purchasing for that item for the Work.
 - b. Field Quality Control: Up to 3.0 percent of total cost of each item (including all associated overhead and profit), including materials and equipment, and installation, may be apportioned to specified or required field quality control activities (including required testing and inspections) and included in the Application for Payment following Engineer's acceptance of the associated written field quality control report Submittal(s).
 - c. O&M Manual Submittals and Training: Up to a total of 4.0 percent of equipment cost (including all associated overhead and profit), exclusive of transportation and installation costs, may be apportioned to operations and maintenance manuals and training of operations and maintenance personnel, which may be included in the Application for Payment following completion of training for the associated item.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 29 76
PROGRESS PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for Contractor's progress payments.

B. Scope:

1. Contractor's requests for payment shall be in accordance with the Agreement, General Conditions and Supplementary Conditions, and the Specifications.
2. Form: Applications for Payment shall be the Engineers Joint Contract Documents Committee (EJCDC) document EJCDC C-620, "Contractor's Application for Payment" (2018 edition or later) or other form acceptable to the Owner and Engineer.

1.2 CONTENT AND PROCEDURE FOR REQUESTING PROGRESS PAYMENTS

A. Procedure:

1. Review with Resident Project Representative (RPR) quantities and the Work proposed for inclusion in each progress payment request. Application for Payment shall cover only the Work and quantities recommended by the RPR.
2. Submit to Engineer one (1) electronic copy in accordance with 01 31 26 - Electronic Communication Protocols, with Contractor's signature, of each complete Application for Payment and other documents to accompany the Application for Payment.
3. Engineer will act on request for payment in accordance with the General Conditions and Supplementary Conditions.

B. Content: Each request for payment shall include:

1. Completed Application for Payment form, including summary/signature page, progress estimate sheets, and stored materials summary. Progress estimate sheets shall have the same level of detail as the Schedule of Values.
2. Documentation for Stored Materials and Equipment:
 - a. For materials and equipment not incorporated in the Work but suitably stored, submit documentation in accordance with the General Conditions and Supplementary Conditions.
 - b. UCC-1 Financial Statement:
 - 1) For each lot or delivery of stored materials and equipment for which payment is requested prior to installation of the item(s) at the Site, complete UCC-1, "Financial Statement" form. On UCC-1 form, indicate Owner as "security party"; indicate Supplier as "debtor" when stored item(s) are in Supplier's custody, and indicate Contractor as "debtor" when stored item(s) are in Contractor's custody; and clearly indicate in detail all stored item(s) included in the filing as "collateral" on the form. Include attachments to the form when necessary to clearly and fully indicate in detail the associated "collateral".
 - 2) File completed UCC-1 form with the secretary of state in the state where the subject item(s) are stored.

- 3) Include with Application for Payment the completed UCC-1 form together with evidence of filing with the required state(s). Submit UCC-1 form and related documentation once for each lot or delivery of stored items.
 - c. Photographs of the stored items at the storage location, in accordance with requirements for progress photographs in Section 01 42 00 - References. Submit photographs sufficient to clearly indicate each stored item, clearly showing marking of Owner's property in accordance with Paragraph 1.3.C of this section. Such photographs do not count as photographs required under Section 01 42 00 - References. For each month that such item(s) are stored, take and submit monthly new photographs of each stored item, with date-stamp on each photograph.
 - d. Legibly indicate on invoice or bill of sale the specific stored materials or equipment included in the payment request and corresponding bid/payment item number for each and the Supplier price for each item.
3. For Payment on the Basis of Cost of the Work plus a Fee:
 - a. When Work included in an Application for Payment will be compensated on the basis of Cost of the Work plus a fee, whether when the entire Contract is compensated on the basis of Cost of the Work plus a fee or when the Application for Payment includes Change Order Work to be compensated on the basis of Cost of the Work plus a fee, the Application for Payment shall include documentation of the costs, including not less than the following:
 - 1) Number of and labor classifications of workers employed and hours worked. Separately indicate overtime and holiday hours, when applicable.
 - 2) Construction equipment used including manufacturer, model, and year of manufacture, and number of hours such equipment was onsite and used for the Work compensated on the basis of Cost of the Work. Where such equipment was used on overtime, separately indicate overtime hours.
 - 3) Consumables and similar materials used.
 - 4) Receipts, bills, or invoices for, and descriptions of, materials and equipment incorporated into the Work.
 - 5) Invoices and breakdowns of labor, construction equipment, and materials and equipment incorporated into the Work by Subcontractors, and Suppliers' onsite time, if any.
 - 6) Invoices or receipts for other expenses included in the Application for Payment, such as travel and subsistence expenses, costs for bonds and insurance, and all other eligible costs and expenses for which compensation is sought in the subject Application for Payment on the basis of Cost of the Work.
 - 7) Other information and documents required by Owner or Engineer,
 - b. Costs for which progress payment is requested on the basis of Cost of the Work plus a fee and for which documentation acceptable to Engineer is not submitted will not be eligible for payment.
4. Listing of Subcontractors and Suppliers:
 - a. In accordance with the General Conditions, submit not less than monthly updated listing of all Subcontractors and Suppliers known to Contractor, whether or not such entities have a contract directly with Contractor.
 - b. Submit complete information using the form attached to this Specifications section.
5. Allowance Work:

- a. For payment requests that include payment for Work under an allowance, include with the progress payment request copy of Owner's authorization of the associated allowance Work, in accordance with Section 01 21 00 - Allowances.
- 6. Partial Release or Reduction of Retainage:
 - a. For each Application for Payment where Contractor requests partial release or reduction of retainage in any amount (other than request for final payment), submit with associated progress payment request consent of surety to partial release or reduction of retainage, duly completed by Contractor and surety.
 - b. Acceptable form includes AIA G707A, "Consent of Surety to Reduction in or Partial Release of Retainage" (1994 or later edition), or other form acceptable to Owner.
 - c. For payment requests that include reduction in or payment of retainage in an amount greater than that required by the Contract Documents, obtain Owner's concurrence for partial release or reduction in retainage prior to submitting such Application for Payment.
- C. Final Payment:
 - 1. Requirements for request for final payment are in the General Conditions, as may be modified by the Supplementary Conditions, and Section 01 77 19 - Closeout Requirements.

1.3 ADDITIONAL PROCEDURES FOR PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Observation of Stored Materials and Equipment as Condition Precedent to Eligibility for Payment:
 - 1. General:
 - a. Prior to materials or equipment suitably stored but not yet incorporated into the Work can be eligible for payment, Engineer or Resident Project Representative (RPR) shall visit the storage location and verify the extent, condition, and storage environment of the stored items.
 - b. When the same material or equipment item is stored for more than two months, such visits to storage location shall be not less than once every two months.
 - 2. Cost Responsibility for Observations:
 - a. When storage location is less than 20 miles from the Site or less than 20 miles from Engineer's office, Contractor is not responsible for reimbursing Owner for cost of Engineer's time and expenses for observing stored materials and equipment.
 - b. When storage location is more than 20 miles from the Site and more than 20 miles from Engineer's office, Contractor shall reimburse Owner, via a set-off under the Contract Documents, for reasonable cost of Engineer's time and expenses, including travel time, to visit the storage location and observe the stored materials and equipment.
- B. Other Requirements for Stored Items: Regardless of storage location, perform the following for stored materials and equipment for which payment is sought:
 - 1. Clearly mark each stored container, crate, or item as follows: "Property of [____]" using permanent marking. Such marking shall not blemish or deface the finish of items that will be exposed to view after installation at the Site.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. The forms listed below, following this Specifications section's "End of Section" designation, are part of this Specifications section:
 - 1. List of Subcontractors and Suppliers form (two pages).

END OF SECTION

LIST OF SUBCONTRACTORS AND SUPPLIERS

Owner: City of Hailey

Project Name: Woodside WRF - Headworks Improvements

Contractor: _____ Date: [____]

Contract Designation: _____

Indicate below complete information for each Subcontractor and Supplier known to Contractor, regardless of whether the firm has a direct contract with Contractor. Include all lower-tier Subcontractors and associated Suppliers. Copy and paste the paragraphs below as required to indicate all Subcontractors and Suppliers.

SUBCONTRACTORS

1. Subcontractor Name:

- Address:
- Contact Person:
- Telephone No.:
- E-mail Address:
- Work Under Specifications Section Nos.:
- Brief Description of Work:
- Current Subcontract Price:
- Approximate Subcontract Start Date:
- Approximate Subcontract End Date:

2. Subcontractor Name:

- Address:
- Contact Person:
- Telephone No.:
- E-mail Address:
- Work Under Specifications Section Nos.:
- Brief Description of Work:
- Current Subcontract Price:
- Approximate Subcontract Start Date:
- Approximate Subcontract End Date:

3. Subcontractor Name:

- Address:
- Contact Person:
- Telephone No.:
- E-mail Address:
- Work Under Specifications Section Nos.:
- Brief Description of Work:
- Current Subcontract Price:
- Approximate Subcontract Start Date:
- Approximate Subcontract End Date:

Total of Subcontract Prices for all subcontracts equals approximately [____] percent of the Contract Price (Contractor to fill in blank monthly)

SUPPLIERS

1. Supplier Name:

- *Address:*
- *Contact Person:*
- *Telephone No.:*
- *E-mail Address:*
- *Furnishing Items Under Specifications Section Nos.:*
- *Brief Description of Items:*
- *Current Purchase Order Amount:*
- *Approximate Purchase Order Date:*
- *Approximate Purchase Order End Date:*

2. Supplier Name:

- *Address:*
- *Contact Person:*
- *Telephone No.:*
- *E-mail Address:*
- *Furnishing Items Under Specifications Section Nos.:*
- *Brief Description of Items:*
- *Current Purchase Order Amount:*
- *Approximate Purchase Order Date:*
- *Approximate Purchase Order End Date:*

3. Supplier Name:

- *Address:*
- *Contact Person:*
- *Telephone No.:*
- *E-mail Address:*
- *Furnishing Items Under Specifications Section Nos.:*
- *Brief Description of Items:*
- *Current Purchase Order Amount:*
- *Approximate Purchase Order Date:*
- *Approximate Purchase Order End Date:*

SECTION 01 31 13
PROJECT COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General requirements for:
 - a. Project coordination when the Project is implemented using a single prime construction Contract.
 - b. Coordination meetings.
 - c. Coordination drawings and layout drawings.

B. Scope:

1. Contractor shall coordinate the Work, whether performed by Contractor's employees or by Subcontractors, Suppliers, or others for whom Contractor is responsible, to provide Work in accordance with the Contract Documents.
2. Coordinate the Work with testing entities and inspectors (whether hired by Contractor, Owner, or others) employed on the Project, forces of Owner and facility manager (if other than Owner), and other contractors retained by Owner or facility manager, and other entities with which the Work needs to be coordinated.
3. Requirements for preconstruction meetings are in the General Conditions (as may be modified by the Supplementary Conditions) and Section 01 31 19 - Project Meetings.
4. Requirements for construction progress meetings are in Section 01 31 19 - Project Meetings.

C. Related Requirements:

1. Include, but are not necessarily limited to, the following:
 - a. Section 01 11 00 - Summary of Work.
 - b. Section 01 14 16 - Coordination with Owner's Operations.
 - c. Section 01 31 19 - Project Meetings.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordination – General:
 - a. In accordance with the General Conditions as may be modified by the Supplementary Conditions, and Section 01 11 00 - Summary of Work, Contractor shall coordinate the Work with, and cooperate with, other contractors, utility owners and their contractors, owners of transportation facilities and their contractors, Owner's and facility manager's workers at the Site, and other entities working at or adjacent to the Site.
 - b. Comply with Section 01 14 16 - Coordination with Owner's Operations.
2. Advise other contractors (if any) of schedule for the Work to allow other contractors sufficient time to perform their work that must be performed prior to the Work. Coordinate and communicate with other contractors and other entities when the Work must be performed prior to the work of others and make good-faith efforts to avoid delaying work of others.
3. Coordination, Inspection, and Observation to Ensure Quality:
 - a. Contractor shall continuously inspect the Work throughout the Project to ensure that the Work complies with the Contract Documents.
 - b. Inspect (including testing, where required or necessary) substrates and surfaces on which the Work will be constructed, applied, adhered, or attached, to ensure substrate

and surface conditions are appropriate for providing Work in accordance with the Contract Documents.

4. Contractor is not responsible for, or liable for, damage or loss unless damage or loss resulted from action, inaction, or negligence of Contractor, or Subcontractor(s), Supplier(s), or other entity for whom Contractor is responsible. This provision does not mitigate or reduce Contractor's responsibility for security for the Work, in accordance with the Contract.

B. Coordination Meetings:

1. Contractor's Coordination Meetings:

- a. Schedule, attend, chair, and actively participate in coordination meetings deemed appropriate by Contractor for purposes of coordinating the Work of Contractor's employees, Subcontractors, Suppliers, and others for whom Contractor is responsible.
- b. Frequency, location, date, time, and duration of Contractor's coordination meetings are at Contractor's discretion. Record and distribute to attendees and other members of Contractor's team a record of topics discussed, decisions made, and other relevant matters at Contractor's coordination meetings.
- c. Engineer, Resident Project Representative (if any), Owner, and Owner's Site Representative (if any) will not attend Contractor's coordination meetings.

2. Coordination Meetings with Other Contractors:

- a. When Section 01 11 00 - Summary of Work, indicates that others, whether or not under Owner's control, will be performing work at or adjacent to the Site, coordination meetings between the separate contractors may be necessary. When such meetings are deemed necessary by Owner, either Owner or Engineer will advise Contractor in writing of the location, date, time, duration, and frequency of such coordination meetings.
- b. Such coordination meetings, when held, are anticipated to be once per month or less-often, and held either at the Site or in reasonable proximity to the Site. During periods when increased coordination among the separate projects is necessary, such as when adjacent contractors are in close proximity to each other, the potential exists that more-frequent coordination meetings may be necessary, although such increased frequency is not anticipated to be for extended periods.
- c. Contractor's project manager and site superintendent shall attend such coordination meetings required by Owner.
- d. Purpose of such coordination meetings will be to discuss scheduling and coordination of work by separate contractors and others as appropriate, sharing of space at the Site, and other coordination matters.
- e. Owner and others deemed appropriate by Owner will attend such coordination meetings.
- f. Owner or others for whom Owner is responsible will chair the meetings and prepare and distribute to participants a record of the topics discussed and decisions made at such meetings.

C. Coordination Drawings and Layout Drawings:

1. Maintain sufficient, competent personnel; drafting implements; computer-aided drafting/design (CAD) or building information modeling (BIM) equipment, software, systems; and supplies at Contractor's office and at the Site (as deemed appropriate by Contractor) for preparing layout drawings and coordination drawings.
2. With the Contract Documents and Shop Drawings, use coordination drawings and layout drawings for coordinating the Work of various trades.
3. Where such coordination drawings or layout drawings are to be prepared by Subcontractors such as structural-architectural, fire suppression, plumbing, HVAC, civil-site, process-mechanical, or other Subcontractors, ensure that each such Subcontractor maintains required personnel, implements, equipment, and systems at Subcontractor's office and at the Site (as deemed appropriate by Contractor).

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Preconstruction, progress and other project meetings.
- B. Related Sections include but are not necessarily limited to:

1.2 PRECONSTRUCTION MEETING

- A. Meet with the Owner and Engineer for a pre-construction conference at a time mutually agreed upon after the contract is awarded, but before any work is performed,
- B. The Engineer will schedule a meeting of the Owner, Contractor, Contractor's Subcontractors, and their respective representatives.
 - 1. The purpose of the meeting will be to clarify construction contract administration procedures, to establish lines of authority and communication and identify duties and responsibilities of the parties.
 - 2. The construction Notice to Proceed will normally be issued at this meeting.
- C. The Engineer will schedule the pre-construction conference after receipt of the Contractor's draft proposed schedule.
- D. Agenda:
 - 1. Procedural and Administrative:
 - a. Personnel and Teams:
 - 1) Designation of roles and personnel.
 - 2) Limitations of authority of personnel, including personnel who will sign Contract modifications and make binding decisions.
 - 3) Subcontractors and Suppliers in attendance.
 - 4) Authorities having jurisdiction.
 - b. Procedures for communications and correspondence, including electronic communication protocols.
 - c. Copies of the Contract Documents and availability.
 - d. The Work and Scheduling:
 - 1) General scope of the Work.
 - 2) Contract Times, including Milestones (if any).
 - 3) Phasing and sequencing.
 - 4) Preliminary Progress Schedule.
 - 5) Critical path activities.
 - e. Safety:
 - 1) Responsibility for safety.
 - 2) Contractor's safety representative.
 - 3) Emergency procedures and accident reporting.
 - 4) Emergency contact information.
 - 5) Confined space entry permits.
 - 6) Hazardous materials communication program.
 - 7) Impact of Project on public safety.
 - f. Permits.

- g. Review of insurance requirements and insurance claims.
- h. Coordination:
 - 1) Coordination of Subcontractors and Suppliers.
 - 2) Construction coordinator (for projects with multiple prime construction contracts).
 - 3) Coordination with Owner's operations.
 - 4) Progress meetings – schedule and frequency.
 - 5) Coordination meetings.
- i. Submittals:
 - 1) Current critical Submittals:
 - a) Preliminary Schedule of Submittals.
 - b) Other schedules (Progress Schedule, Schedule of Values).
 - c) Preconstruction photographic documentation.
 - d) List of proposed Subcontractors and Suppliers.
 - e) List of emergency contact information.
 - f) Notice of elements of Contractor's safety program with which Owner and Engineer are to comply.
 - g) Site use plan.
 - h) Form of Contractor's site superintendent's daily reports.
 - 2) Work not eligible for payment without approved or accepted Submittals (as applicable).
 - 3) Submittal procedures.
 - a) Compliance with accepted Schedule of Submittals.
 - b) Actions required of Contractor prior to furnishing Shop Drawings and other Submittals.
 - c) Contractor's Submittal approval stamp required; Contractor's coordination of Submittals.
 - d) Furnishing of Submittals.
 - e) Submittal types and meaning of Engineer's action on each.
 - f) Resubmittals—responsibility for, limitations on quantity.
 - 4) Identification of initial, critical Shop Drawings and product data.
 - 5) Construction photographic documentation.
- j. Substitutes and "Or-Equals":
 - 1) Product options.
 - 2) Procedures for proposing "or-equals".
 - 3) Procedures for proposing substitutes.
- k. Contract Modification Procedures:
 - 1) Requests for interpretation.
 - 2) Written clarifications.
 - 3) Field Orders.
 - 4) Proposal Requests.
 - 5) Change Proposals.
 - 6) Work Change Directives.
 - 7) Change Orders.
 - 8) Differing site conditions or discovery of Hazardous Environmental Condition.
 - 9) Substantiating and documenting Change Proposals and Claims.
 - 10) Claims.
- l. Progress Payment:

- 1) Owner's Project financing and funding, as applicable.
- 2) Owner's tax-exempt status.
- 3) Preliminary Schedule of Values
- 4) Procedures for measuring for payment (Unit Price Work).
- 5) Retainage.
- 6) Progress payment procedures; documents to accompany Applications for Payment.
- 7) Payment for stored items not yet installed.
- 8) Date of Owner's payments; payment is due.
- m. Subcontractors and Suppliers:
 - 1) List of proposed Subcontractors and Suppliers; monthly updates.
 - 2) Coordination and management.
 - 3) Subcontracts and purchase orders.
- n. Testing and inspections:
 - 1) Owner-hired and contractor-hired.
 - 2) Identification of Owner-hired testing entity and special inspectors.
 - 3) Responsibility for advising testing entity and special inspectors of need for services.
 - 4) Results of code-required special inspections and tests.
 - 5) Prompt remedy of apparent defects.
 - 6) Notice of defective Work.
 - 7) Remedy of defective Work.
 - 8) Defective Work not eligible for payment.
 - 9) Covering up defective Work.
 - 10) Cost responsibility for defective Work and retesting/re-inspection.
- o. Disposal of demolition materials.
- p. Record documents.
- q. Preliminary discussion of Contract closeout:
 - 1) Procedures for Substantial Completion.
 - 2) Partial utilization procedures; property insurance.
 - 3) Contract closeout requirements.
 - 4) Correction period; duration of Contractor's general warranty and guarantee.
 - 5) Duration of bonds and insurance.
2. Authorities Having Jurisdiction (if not covered in a separate meeting):
 - a. Municipal licenses.
 - b. Municipal permits required.
 - 1) Permits required and status.
 - 2) Inspections for building code official.
 - 3) Code-required special inspections and tests (if not covered in Administrative and Procedures part of meeting).
 - c. Right-of-way work permits; status of occupancy permit(s).
 - d. Environmental permits:
 - 1) Storm water discharges during construction.
 - 2) Spill prevention control and countermeasures plan (40 CFR 112).
 - 3) Health department—potable water.
 - 4) Wastewater systems.
3. Site Mobilization (if not covered in a separate meeting):
 - a. Working days, working hours, and overtime.

- b. Use of Site and other areas; use of existing facilities.
- c. Field offices, storage trailers, and staging areas.
- d. Temporary facilities.
- e. Temporary utilities and limitations on utility use (where applicable).
- f. Utility company coordination (if not done as a separate meeting).
- g. Access to Site, access roads, and parking for construction vehicles.
- h. Traffic controls.
- i. Temporary controls:
 - 1) Erosion and sediment control; storm water pollution prevention plans.
 - 2) Dust control and air pollution control (including emissions control).
 - 3) Water control (storm water, surface water, groundwater).
 - 4) Water pollution control; spill prevention control and countermeasures plan.
 - 5) Solid waste control.
 - 6) Pest control.
 - 7) Other temporary controls.
- j. Security; temporary security fencing (where required).
- k. Storage of materials and equipment to be incorporated into the Work.
- l. Protection of the Work and property; protective barriers.
- m. Field engineering:
 - 1) Reference points and benchmarks.
 - 2) Surveys and layouts.
 - 3) Professional services for Contractor's means and methods (not delegated design).
 - 4) Contractor's site superintendent's daily records and submittal requirements.
- n. Site maintenance during the Project:
 - 1) Progress cleaning; removal of trash and debris.
 - 2) Snow and ice removal.
 - 3) Maintenance and cleaning of existing access roads and parking areas.
- o. Restoration.
- 4. Next meeting.
- 5. Site visit, as necessary.
- E. The Engineer will compile meeting minutes from the transcribed record of the meeting and electronically distribute copies to all participants.
- F. Pre-Construction Conference Submittals:
 - 1. The names and telephone numbers of Contractor's Superintendent and Office Manager.
 - 2. List of personnel authorized to sign change orders and receive progress payments.
 - 3. The name, address and telephone numbers of two or more persons employed by the Contractor who can be reached at any time of the day or night to handle emergency matters.
 - 4. A list of all subcontractors that will work on the project, a description of work they will perform, and a contact list for each subcontractor with phone numbers and address.
 - 5. A list of materials suppliers and products over \$2,500.
 - 6. A draft proposed Construction Schedule.
 - 7. Material Safety Data Sheets for all hazardous chemical products to be used by the Contractor on this project.
 - 8. Temporary Erosion and Sediment Controls Plan.
 - 9. Traffic Control Plan.

1.3 PROGRESS MEETINGS

- A. Bi-Weekly progress meetings will be held virtually by the Engineer, unless otherwise arranged.
- B. Attendees will include the Owner, Engineer, Contractor, subcontractors, and suppliers' representatives as may be needed, other Contractors working at the site, and other interested or affected parties.
- C. Preliminary Agenda: Be prepared to discuss in detail the topics indicated below. Revised agenda, if any, will be furnished to Contractor prior to associated progress meeting(s). Progress meeting agenda may be modified by Engineer during the Project as necessary.
 - 1. Review, comment, and amendment (if necessary) of minutes of previous progress meeting.
 - 2. Review of progress since the previous progress meeting.
 - 3. Planned progress through next progress meeting.
 - 4. Review of Progress Schedule:
 - a. Review of the Contract Times; Contractor's ability to comply with Contract Times.
 - b. Identification of critical path activities.
 - c. Schedules for fabrication and delivery of materials and equipment.
 - d. Corrective measures, if necessary, including recovery schedule(s).
 - 5. Submittals:
 - a. Review status of critical Submittals.
 - b. Review revisions to Schedule of Submittals.
 - 6. Contract Modifications:
 - a. Requests for interpretation.
 - b. Written clarifications.
 - c. Field Orders.
 - d. Proposal Requests.
 - e. Change Proposals.
 - f. Work Change Directives.
 - g. Change Orders.
 - h. Claims.
 - 7. Applications for progress payments:
 - a. Status and deadline for submittal.
 - b. Stored materials and equipment; observation by Engineer or RPR; documents required.
 - c. Set-offs to which Owner is entitled (as applicable).
 - d. Other matters related to progress payments.
 - 8. Problems, conflicts, and observations.
 - 9. Quality standards, testing, and inspections.
 - 10. Coordination between Project participants.
 - 11. Site management issues, including vehicular access and parking, traffic control, security, status of temporary controls and temporary utilities, site maintenance and cleaning, and other Site matters.
 - 12. Safety and protection.
 - 13. Permits.
 - 14. Construction photographic documentation.
 - 15. Record documents status.
 - 16. Completion matters (as appropriate):
 - a. Status of checkout, startup, field quality control activities.
 - b. Status of training of facility O&M personnel and O&M manuals.

- c. Partial utilization; inspection for Substantial Completion.
 - d. Punch list status (as applicable).
 - e. Other closeout matters (if any).
- 17. Other business.
- D. Bring a 30-day look ahead schedule to each meeting, including the following items:
 - 1. Contractor may use 4-week or 5-week look ahead schedules as an acceptable alternative format.
 - 2. Work completed last week.
 - 3. Work anticipated for the next two weeks ("Look Ahead").
 - 4. Subcontractors on site the prior week.
 - 5. Subcontractors scheduled on site for the next two weeks.
 - 6. Contract document deficiencies or questions noted during prior week.
 - 7. Anything that could impede the progress of the work or affect the critical path on the project schedule.
 - 8. Corrective measures and procedures planned to regain planned schedule, cost or quality assurance, if necessary.
 - 9. Report of any accidents, and any site safety issues that need to be addressed.
- E. Other Agenda items to be discussed:
 - 1. Review and revise as necessary and approve minutes of previous meetings.
 - 2. Status of submittals of equipment and shop drawings.
 - 3. Identify problems that impede planned progress.
 - 4. Other current business.
- F. Revision of Minutes:
 - 1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
 - 2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
 - 3. Challenge to minutes shall be settled as priority item of "old business" at the next regularly scheduled meeting.
- G. Minutes of Meeting:
 - 1. The Engineer will compile minutes of each project meeting and will furnish electronic copies to the Contractor.

1.4 OTHER MEETINGS

- A. Other meetings will be required to facilitate progress of the Work. These include, but are not limited to the following:
 - 1. Pre-Installation Conferences:
 - a. Coordinate and schedule with Engineer for each material, product or system specified.
 - 1) Conferences to be held prior to initiating installation, but not more than two weeks before scheduled initiation of installation.
 - 2) Conferences may be combined if installation schedule of multiple components occurs within the same two-week interval.
 - 3) Review manufacturers recommendations and Contract Documents Specification Sections.
 - 2. Facility Startup Planning and Coordination Meeting. See Section 01 75 00.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 31 26
ELECTRONIC COMMUNICATION PROTOCOLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Procedures with which Users will comply regarding transmission or exchange of Electronic Documents for the Project.
- B. Related Requirements:
 - 1. Refer to the General Conditions, as may be modified by the Supplementary Conditions, regarding transmitting Electronic Documents by Electronic Means.
 - 2. In addition to the requirements of this Specifications Section, comply with the requirements for Electronic Documents in the following Specifications:
 - a. Section 01 32 16 - Construction Progress Schedule.
 - b. Section 01 33 00 - Submittals.
 - c. Section 01 78 39 - Project Record Documents.

1.2 DEFINITIONS

- A. The following terms are defined for use in this Specifications Section and are indicated herein using initial capital letters. The terms have the associated meaning regardless of whether indicated in singular or plural.
 - 1. Electronic Documents Protocol (abbreviated as “EDP”): Procedures and requirements set forth in this Specifications Section for the exchange of Electronic Documents by Electronic Means.
 - 2. Project Website: An internet-based software platform, such as a website or other project management information system (PMIS) designated by Contract or mutual consent of Users as the means of exchanging Electronic Documents during the Project.
 - 3. System Infrastructure: Hardware, operating system(s) software, internet access, e-mail service and software, security software, and large-file transfer functions.
 - 4. Users: Owner, Contractor, Engineer, and others exchanging Electronic Documents on the Project in accordance with the EDP.

1.3 ADMINISTRATIVE REQUIREMENTS.

- A. Coordination:
 - 1. Contractor shall require all Subcontractors and Suppliers to comply with the EDP established in the Contract Documents.

1.4 GENERAL PROVISIONS OF ELECTRONIC DOCUMENT PROTOCOL

- A. EDP – General:
 - 1. To the fullest extent practical, Users agree to and will transmit and accept Electronic Documents transmitted by Electronic Means in accordance with the requirements of this Specifications Section. Use of the Electronic Documents and any information contained therein is subject to requirements of this Specifications Section and other provisions of the Contract Documents governing transmittal of Electronic Documents.
 - 2. Content of Electronic Documents will be the responsibility of transmitting User.
 - 3. Unless otherwise provided in: (1) the EDP, (2) elsewhere in the Contract Documents, or (3) or other agreement between two or more Users governing use of Electronic Documents, Electronic Documents exchanged in accordance with the Contract Documents may be used in the same manner as paper or other printed versions of the same documents exchanged

using other than Electronic Means, subject to the same governing requirements, limitations, and restrictions set forth in the Contract Documents.

4. Except as otherwise explicitly indicated in the EDP, the terms of this EDP will be incorporated into any other agreement or subcontract between a party and a third party for a portion of the Work or Project-related services, where such third party is, either directly or indirectly, required to exchange Electronic Documents with Owner, Contractor, or Engineer. Nothing in this EDP modifies the requirements of the Contract Documents regarding communications between and among Owner, Contractor, and Engineer Subcontractors, Suppliers, consultants, and others for which each is responsible.
5. When transmitting Electronic Documents, transmitting User makes no representations regarding long-term compatibility, usability, or readability of the items resulting from the receiving User's use of software applications or System Infrastructure differing from those established in this EDP.
6. This EDP does not negate or mitigate any obligation: (1) in the Contract Documents to create, provide, or maintain an original paper record version of Drawings and Specifications, signed and sealed in accordance with Laws or Regulations; (2) to comply with Laws and Regulations governing signing and sealing of design documents or signing and electronic transmission of other documents; or (3) to comply with notice requirements of the General Conditions (as. May be modified by the Supplementary Conditions).
7. Modifications to EDP:
 - a. When modifications to the EDP are necessary to address issues affecting System Infrastructure, Users shall cooperatively resolve the issues.
 - b. If resolution within a reasonable time is not achieved, Owner is empowered to require reasonable and necessary changes to the EDP consistent with the original intent of the EDP.
 - c. If such changes result in additional cost or delay to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in the Contract Price, Contract Times, or both in accordance with the Contract Documents.

B. System Infrastructure and Systems for Exchanging Electronic Document:

1. Each User will provide System Infrastructure (as defined in this EDP) at its own cost and sufficient for complying with EDP requirements. Except for minimum standards set forth in this EDP, it is the obligation of each User to determine, for itself, such User's own System Infrastructure.
 - a. Maximum size of e-mail file attachment under this EDP is 20 megabytes (MB). Attachments larger than the maximum size indicated in this paragraph shall be exchanged via secure electronic transfer using method mutually acceptable to Owner, Engineer, and Contractor.
 - b. Each entity transmitting or receiving Electronic Documents has full responsibility for its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, and otherwise enabling its System Infrastructure for use in accordance with this EDP.
 - c. Each User will provide its own printing facilities and will be responsible for its own costs of printing Electronic Documents.
2. Each User is responsible for its own system operations, security, back-up, archiving, audits, and other technology and resources for operations of its System Infrastructure during the Project, including coordination with the User's individual(s) or subcontractor(s) responsible for managing its System Infrastructure and capable of addressing communications and other technology issues affecting exchange of Electronic Documents.
3. Security:
 - a. Each User will operate and maintain industry-standard, industry-accepted, ISO standard, commercial-grade security software and systems to protect against threats including software viruses and other malicious software including worms, trojans, adware; data breaches; loss of confidentiality; and other threats in transmission to, or storage of, Electronic Documents from other Users, including transmission of Electronic

Documents by physical media including flash drives/thumb drives, hard drives, compact discs (CD), digital video discs (DVD), and other portable devices, whether connected physically or wirelessly.

- b. To the extent that a User maintains and operates such security software and appropriate System Infrastructure, such User will not be liable to other Users participating in the Project for breach of system security.
 4. Archiving and Electronic Document Backup:
 - a. Each User is responsible for its own back-up and archive of Electronic Documents and data transmitted and received during the Project, unless this EDP establishes a Project Electronic Document archive, either as a mandatory Project Website or other communications protocol, upon which Users may rely for Electronic Document archiving for the duration of the Project Website or archiving system established in this EDP.
 - b. Each User is solely responsible for its own post-Project back-up and archive of Electronic Documents after the Project is complete or after termination of the Project Website or other Project archive (as applicable), for the longer of: (1) required by the Contract Documents, (2) required by Laws and Regulations, and (3) as each User deems necessary for its purposes.
 5. Receipt of Damaged, Incomplete, or Corrupt Electronic Documents: When a receiving User receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving User will advise the transmitting User of the incomplete transmission and transmitting User will retransmit the Electronic Document.
 6. Completion of Transmittals: Users will bring non-conforming Electronic Documents into compliance with the EDP. Users will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the transfer of the Electronic Documents.
 7. Project Website:
 - a. Engineer will establish, operate, and maintain a Project Website (as defined in this EDP) for use of Owner, Engineer, Contractor, and other Users as appropriate during the Project, for exchanging and storing Project Electronic Documents.
 - b. Unless otherwise provided in the Contract Documents, use of Project Website by Owner, Contractor, and Engineer is mandatory for exchanging Project documents as set forth in the EDP.
 - c. Project Website Conditions and Standards:
 - 1) Software Platform: Contractor shall utilize Engineer's Newforma Info Exchange software platform .
 - 2) Duration of Project Website Availability and Reliance by Users: Duration of Contract Times.
 - 3) Services and Functions Available on Project Website: Project-related file transfer (such as distribution of Contract Modifications, site background information, meeting minutes, inspection notes, materials testing reports, etc.), RFIs, submittals.
 - d. Address of Project Website will be furnished to Contractor, and Project Website will be available to Contractor, within 10 days following the Effective Date of the Contract.
- C. General Requirements and Limitations for Software for Electronic Document Exchange:
 1. Software and file formats for exchange of Electronic Documents shall be as indicated in Article 1.5 of this Specifications Section.
 2. Software Versions:
 - a. Each User will acquire the software and associated licenses necessary to create, transmit, receive, read, and use Electronic Documents for the Project, using the software and file formats indicate in Article 1.5 of this Specifications Section.
 - b. Prior to using any updated version of the software required in the EDP for Electronic Document(s) transmitted to other User(s), the originating User will first notify and either

(1) receive concurrence from receiving User(s) for use of the updated version, or (2) adjust its transmission to comply with the EDP.

3. Preservation of Intellectual Property and Confidentiality of Electronic Documents:

- a. Users agree to not intentionally edit, reverse-engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes Electronic Documents, and information and data contained therein, transmitted in a file format, including portable document format (PDF), intended by transmitting User to not be modified, unless the receiving User (1) obtains permission from owner of the Electronic Document and intellectual property contained therein, or (2) is expressly allowed by the EDP to edit or modify the Electronic Document.
- b. Where modifying, editing, decryption, or reverse-engineering is allowed by the EDP, such use is conferred only for the Project.
- c. The EDP does not transfer any ownership or rights of any sort regarding use outside of the Project of Electronic Documents.
- d. Users shall not cite or quote excerpts of Electronic Documents for purposes outside of the Project unless required to do so by Laws and Regulations.

D. Contractor's Requests for Electronic Documents in Other Formats:

1. Release of Electronic Documents in format(s) other than those indicated in in Article 1.5 of this Specifications Section and elsewhere in the Contract Documents will be at the discretion of Owner and subject to terms and conditions required by the owner of such files and documents, and the provisions indicated below.
2. To extent determined by Owner, in its sole discretion, to be appropriate, release of Electronic Documents in alternative format(s) requested by Contractor ("Request") are subject to provisions of Owner's response to the Request and to the following:
 - a. Contractor's Request shall be in writing. Owner and others, as appropriate, will consider and respond to Request promptly, but neither Owner nor Engineer will be responsible for any time or cost impacts on Contractor associated with timing of the Request, or with Owner's decision associated therewith.
 - b. When Engineer is the owner of the Electronic Documents requested by Contractor in native format, prior to Engineer transmitting such Electronic Documents to Contractor, Contractor shall sign and deliver to Engineer, without modifying or amending, Engineer's "Electronic Media Release" agreement.
 - c. Content included in Electronic Documents created by Engineer and furnished in response to the Request was prepared by Engineer as an internal working document for Engineer's purposes solely and, when provided to Contractor, is on an "as-is" basis without warranties of any kind, including, but not limited to any implied warranties of fitness for purpose. Contractor acknowledges that content of Electronic Documents furnished in response to the Request may not be suitable for Contractor's purpose(s), or may require substantial modification and independent verification by Contractor. Content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other shown or indicated information that may affect subsequent use by Contractor or others for whom Contractor is responsible.
 - d. Electronic Documents containing text, graphics, metadata, or other types of data furnished by Engineer in response to the Request are only for Contractor's convenience and any and all conclusions or information obtained or derived from such Electronic Documents will be at Contractor's sole risk and expense. Contractor waives any and all claims against Engineer, Owner, or both arising from Contractor's use of Electronic Documents furnished in response to the Request.
 - e. Contractor shall indemnify and hold harmless Owner, Engineer, and their respective consultants and subconsultants from any and all claims, damages, losses, and expenses, including attorneys' fees and defense costs, fees and costs of engineers, architects, geologists, accountants, and other professionals, and any and all other

costs, direct and indirect, resulting from Contractor's use, adaptation, or distribution of Electronic Document(s) furnished in response to the Request.

- f. Contractor shall not sell, copy, transfer, forward, give away or otherwise distribute the Electronic Documents (in source format or modified file format) to any third party without direct written authorization of Engineer or other entity that owns the Electronic document(s), unless such distribution is specifically indicated in the Request and is limited to Subcontractors and Suppliers. Contractor warrants that subsequent use by Subcontractors and Suppliers complies with terms and conditions of the Contract Documents, Owner's response to the Request, and release agreement(s) (if any) by owner of the Electronic Documents (including Engineer, where applicable).
3. When the Request is for Electronic Documents in a format not other than that indicated in the Contract Documents, and Owner (and others, as applicable) decide to comply with the Request, and when the requested Electronic Documents are not easily available in the format(s) requested, Contractor shall reimburse Owner for costs incurred by Owner, either directly or indirectly, to furnish Electronic Documents in accordance with the Request at a rate of \$200 per labor-hour to furnish the requested format(s). In compensation, Owner may retain such amount(s) as set-off(s) under the Contract Documents.

1.5 EXCHANGE OF ELECTRONIC DOCUMENTS

- A. Comply with the Electronic Document formats, transmission methods, and permitted uses set forth in Table 01 31 26-A, Exchange of Electronic Documents, below, when transmitting or using Electronic Documents on the Project. Where a row in the table has no indicated means of transmitting Electronic Documents, use for such documents only paper copies transmitted to the receiving party via appropriate delivery method.

TABLE 01 31 26-A – EXCHANGE OF ELECTRONIC DOCUMENTS

Electronic Document Type	Format	Transmitting User	Transmission Method	Receiving User	Allowed Uses	Notes
1.5.A.1. Project communications						
General communications & correspondence	EM, PDF	O, E, C	EM, EMA	O, E, C	R	
Meeting notices and agendas	EM, PDF	E	PW	O, C	R	
Meeting minutes	PDF	E	PW	O, C	R	
1.5.A.2. Contractor's Submittals to Engineer						
Shop Drawings	PDF	C	PW	E	M (1)	(1)
Product data Submittals, delegated design Submittals, and other action Submittals (except Samples)	PDF	C	PW	E	M (1)	(1)
Informational and closeout Submittals:	PDF	C	PW	E	M (1)	(1) (6)
Documentation of delivery of maintenance materials Submittals	PDF	C	PW	E	M (1)	
1.5.A.3. Engineer's return of reviewed Submittals to Contractor						
Shop Drawings	PDF	E	PW	O., C	R	
Product data Submittals, delegated design Submittals, and other action Submittals	PDF	E	PW	O., C	R	
Informational and closeout submittals:	PDF	E	PW	O., C	R	(6)
Documentation of delivery of maintenance materials submittals	PDF	E	PW	O. C	R	

Electronic Document Type	Format	Transmitting User	Transmission Method	Receiving User	Allowed Uses	Notes
1.5.A.4. Contract Modifications Documents						
Requests for interpretation to Engineer	PDF	C., O	PW	E	M (1)	(1)
Engineer's interpretations (RFI responses)	PDF	E	PW	C, O	R	
Engineer's clarifications to Contractor	EM, PDF	E	PW	C, O	R	
Engineer's issuance of Field Orders	PDF	E	PW	C, O	R	
Proposal Requests	PDF	E, O	PW	C	R	
Change Proposals – submitted to Engineer	PDF	C	PW	O, E	S	
Change Proposals – Engineer's response	PDF	E	PW	C. O		
Work Change Directives (for Contractor signature)	PDF	E	PW	C	R	(2)
Change Orders (for Contractor signature)	PDF	E	PW	C	R	(2)
1.5.A.5. Applications for Payment						(3)
1.5.A.6. Claims and other notices						(4)
1.4.A.7. Closeout Documents						
Record drawings	DWG and PDF	C	PW	E, O	M (5)	(5)
Other record documents	PDF	C	PW	E. O	M (5)	(5)
Contract closeout documents						

1. Key to Table 01 31 26-A:

a. Data Format:

- 1) EM: .msg, .htm, .txt, .rtf, e-mail text.
- 2) W: .docx, Microsoft Word 2013 or later.
- 3) EX: .xlsx, Microsoft Excel 2013 or later.
- 4) PDF: .pdf. portable document format.
- 5) DWG: .dwg. Autodesk AutoCAD 2014 drawing.

b. Transmitting User:

- 1) O: Owner.
- 2) C: Contractor.
- 3) E: Engineer.

c. Transmission Method:

- 1) EM: Via e-mail.
- 2) EMA: Attachment to e-mail transmission.
- 3) PORT: Delivered via portable media such as flash drive/thumb drive, CD, or DVD
- 4) PW: Posted to Project Website.
- 5) FTP: FTP transfer to receiving FTP server.

d. Receiving User:

- 1) O: Owner.
- 2) C: Contractor.

- 3) E: Engineer.
- e. Permitted Uses:
 - 1) S: Store and view only.
 - 2) R: Reproduce and distribute.
 - 3) I: Integrate (incorporate additional electronic data without modifying data received)
 - 4) M: Modify as required to fulfill obligations for the Project.
- f. Notes:
 - 1) Modifications by Engineer to Contractor's Submittals and requests for interpretations are limited to printing, marking-up, and adding comment sheets.
 - 2) May be distributed only to affected Subcontractors and Suppliers. Print, sign document, and return signed paper originals to Engineer.
 - 3) Submit printed Applications for Payment with original ("wet") signatures.
 - 4) Submit notices, including Claims, in accordance with the notice provisions of the General Conditions, as may be modified by the Supplementary Conditions.
 - 5) Submit record drawings in native CAD format indicated when Contractor has signed Engineer's standard agreement for release of electronic media. In addition, always submit record drawings as PDF files. Comply with Contract Documents requirements for Project record documents.
 - 6) For operation and maintenance data, also submit paper copies as required by Section 01 78 23 - Operations and Maintenance Manuals.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for Contractor's construction Progress Schedules and related Submittals, including:
 - a. Administrative requirements regarding progress Schedules.
 - b. Qualifications of Progress Schedule preparer and related personnel.
 - c. Submittals of Progress Schedules and associated schedule-related Submittals.
 - d. Initial Progress Schedules.
 - e. Look-ahead schedules.
 - f. Progress Schedule updates.
 - g. Narrative reports.
 - h. Time impact analyses.
 - i. Recovery schedules.

B. Scope:

1. Contractor shall prepare and submit to Engineer required Progress Schedules and related Submittals, as required by this Section and elsewhere in the Contract Documents. Maintain and update Progress Schedules and related Submittals throughout the Project.
2. Owner, facility manager (if other than Owner), Engineer, and others involved with the Project have the right to rely on accuracy of Contractor-prepared Progress Schedule.
3. Engineer's review or acceptance of the Progress Schedule or related Submittals, and Engineer's comments on and expressed opinions concerning activities in the Progress Schedule and related Submittals, and progress of the Work, does not control Contractor's independent judgment concerning construction means, methods, techniques, sequences and procedures, unless the associated means, method, technique, sequence, or procedure is required by the Contract Documents. Contractor is solely responsible for complying with the Contract Times.

C. Related Requirements: Include, but are not necessarily limited to:

1. Section 01 11 00 - Summary of Work.
2. Section 01 13 13 - Milestones.
3. Section 01 14 16 - Coordination with Owner's Operations.
4. Section 01 26 00 - Contract Modification Procedures.
5. Section 01 31 19 - Project Meetings.

1.2 REFERENCES.

A. Defined Terms and Terminology:

1. Defined terms, indicated with initial capital letters, are indicated in the General Conditions, as may be modified by the Supplementary Conditions.
2. Terminology: The following are not defined terms and are not indicated with initial capital letters but, when used in this Section, have the meaning indicated below, whether applied to the singular or plural thereof.
 - a. "Activity" is an element of the Work that has the following specific characteristics: consumes time, requires resources, has a definable start and finish, is assignable, and is measurable.

- b. "Baseline Progress Schedule" means, in addition to the General Conditions' definition of "Progress Schedule", the version of the Progress Schedule (for the entire Project) initially accepted by the Engineer. In the event of subsequent modifications to the Project, Contractor and Engineer may mutually agree that a subsequent revision of the Progress Schedule constitutes a new baseline Progress Schedule that supersedes the prior baseline Progress Schedule.
- c. "Constraint" means an imposed date on the Progress Schedule or an imposed time between activities. The Contract Times are constraints.
- d. "CPM Progress Schedule" means, in addition to the General Conditions' definition of "Progress Schedule", a computerized Progress Schedule in critical path method (CPM) format, for the entire Work, indicating interrelationships between elements of the Work; indicates sequences, dates, and durations for Work performed to date; indicates sequences, dates, and duration for incomplete Work yet to be performed; indicates constraints; and indicates the critical path for the Work.
- e. "Critical path" is the continuous chain of activities, from start to completion of the Work, with the longest duration for completion within the Contract Times.
- f. "Early finish" means the earliest date an activity can finish according to the assigned relationships among the activities in the Progress Schedule.
- g. "Early start" means the earliest possible date an activity can start according to the assigned relationships among activities in the Progress Schedule.
- h. "Float" means the time difference between the calculated duration of an activity chain on the Progress Schedule and the critical path.
- i. "Late finish" means the latest date an activity on the Progress Schedule can finish without extending the Contract Times.
- j. "Late start" means the latest date an activity on the Progress Schedule can start without extending the Contract Times.
- k. "Network diagram" means a time-scaled logic diagram showing the durations and relationships of the activities on the Progress Schedule.
- l. "Schedule date" (and similar terms, whether used in this Section or Project communications related to Progress Schedules) mean the "early start" and "early finish" date for the associated activity. "Late start" and "late finish" dates are for determining float and do not represent the schedule dates.
- m. "Total float" means the total number of days an activity (or chain of activities) on the Progress Schedule can be delayed without affecting the Contract Times.
- n. "Work areas" and "work system" means a logical breakdown of the Work elements or a group of activities which, when collectively assembled, are readily identifiable on the Project (for example: yard piping, a structure or building, a treatment process, or other logical grouping).

1.3 ADMINISTRATIVE REQUIREMENTS

A. General Provisions on Progress Schedules:

1. This Section augments requirements for the Progress Schedule, and Contractor's control of the Work, indicated in the General Conditions, as may be augmented by the Supplementary Conditions.

B. Use of Float:

1. Float belongs to the Project and may be used by Contractor or Owner to accommodate changes in the Work, or to mitigate the effect of events delaying the Work or compliance with the Contract Times.
2. Changes or delays that influence activities that have float and do not extend the critical path do not justify changes in the Contract Times.
3. Float Suppression: Pursuant to float sharing requirements of this Section, use of float suppression techniques in Progress Schedules, such as preferential sequencing logic, special lead/lag logic restraints, and extended activity durations are unacceptable.

C. Factors Affecting the Progress Schedule:

1. In preparing and updating the Progress Schedule, take into consideration: preparing and signing subcontracts and purchase orders, complying with Submittal requirements and Submittal review times, fabricating materials and equipment, source quality control (including required shop tests and inspections), shipping and deliveries, field quality control (including required field tests and inspections at the Site), Work by Subcontractors, coordination with others (such as other contractors including those indicated in Section 01 11 00 – Summary of Work, utility owners, and owners of transportation facilities), compliance with Laws and Regulations and permits, availability of construction equipment and machinery, abilities of workers, weather conditions, condition of the Site, seasonal restrictions, restrictions in operations at the Site and coordination with Owner's (or facility manager's) operations, training of facility operation and maintenance personnel, checkout, startup, adjusting and balancing, and other factors that have the potential to affect completion of the Work within the Contract Times.
2. Comply with sequencing requirements including:
 - a. Section 01 13 13 - Milestones.
 - b. Section 01 14 16 - Coordination with Owner's Operations.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Progress Schedule Preparer.
 - a. Contractor shall retain services of a scheduling consultant to, or shall self-perform, preparation and updating of the Progress Schedule using qualified personnel experienced in: (1) construction scheduling, (2) the scheduling software required for the Project, and (3) serving as Progress Schedule preparer on construction projects of similar type, size, and complexity as the Project.
 - b. Progress Schedule preparer shall have not less than five years' experience using the required schedule software on construction projects of similar type, size, and complexity as the Project.
 - c. Prior to engaging a scheduling consultant or using a qualified, experienced employee, submit to Engineer the following qualifications information:
 - 1) Name, employer, and business address of proposed Progress Schedule preparer and names, employer(s), and business address(es) of personnel who will be assigned to assist the preparer in developing and updating the Progress Schedule.
 - 2) Information sufficient to demonstrate that proposed Progress Schedule preparer and scheduling assistant personnel possess qualifications complying with this Section. For each person assigned, submit list of similar type, size, complexity, and construction contract amount for each project, together with project name, owner, location, and dates, and name(s) of scheduling personnel involved.
 - d. Engineer's Review of Qualifications:
 - 1) Engineer will complete review of Progress Schedule preparer qualifications within three days of Engineer's receipt of such qualifications.
 - 2) If qualifications are unacceptable, submit qualifications of acceptable personnel within three days of Contractor's receipt of Engineer's non-acceptance.
 - 3) Engineer's acceptance or non-acceptance of qualifications does not reduce or mitigate Contractor's obligations under the Contract Documents.
 - e. If Contractor intends to replace any Progress Schedule preparer personnel previously acceptable to Engineer, submit qualifications of proposed replacement(s) in accordance with this Article.

1.5 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Qualifications Statements:

- a. Submit qualifications of Progress Schedule preparer, and other personnel that will assist Progress Schedule preparer in preparing and updating the Progress Schedule.
 - b. Obtain Engineer's acceptance of qualifications prior to starting preparation of preliminary Progress Schedule.
2. Planned Work Schedule:
 - a. Submit initial and updated (as necessary) planned work schedule, in accordance with this Section's "Progress Schedule" Article.
3. Progress Schedule:
 - a. Preliminary Progress Schedule with associated narrative report.
 - b. Acceptable Progress Schedule ("baseline Progress Schedule") with associated narrative report.
4. Look-Ahead Schedules:
 - a. Submit 30-day look-ahead schedule at each construction progress meeting, in accordance with this Section's "Look-Ahead Schedules" Article.
 - 1) Contractor may use 4-week or 5-week look-ahead schedules as an acceptable alternative format.
5. Progress Schedule Updates:
 - a. Progress Schedule updates shall comply with requirements of this Section, and shall include updated Progress Schedule and narrative report.
 - b. Submit updated Progress Schedule prior to each associated construction progress meeting. When a Progress Schedule remains unchanged from one construction progress meeting to the next, submit written statement expressly so stating. In addition to monthly Progress Schedule update Submittals, also bring to construction progress meetings the number of paper copies of the updated Progress Schedule indicated in Section 01 31 19 - Project Meetings.
6. Time Impact Analyses: Submit in accordance with this Section.
7. Recovery Schedules: Submit in accordance with this Section.

1.6 INITIAL PROGRESS SCHEDULES

- A. Applicability of this Article:
 1. This Article addresses the initial Progress Schedules and selected, related Submittals required at the outset of the Project's construction phase, through Engineer's acceptance of the Progress Schedule and its related Submittals.
 2. Subsequent Progress Schedule Submittals, including Progress Schedule updates, recovery schedules, and other schedule-related Submittals, shall comply with software, type, organization, content, and similar requirements of this Article.
- B. Type and Organization of Progress Schedules:
 1. Prepare Progress Schedules using Oracle Primavera P6 software, unless other scheduling software is acceptable to Engineer.
 2. Sheet Size: 22 inches by 34 inches or 11 inches by 17 inches.
 3. Time Scale: Indicate first date of each work week.
 4. Activity Assignments and Designations:
 - a. Limit activities, where possible, excluding fabrication of materials and equipment, to durations not longer than 20 days. Activities shall be definable and measurable. For example, an activity described only as "Concrete" will likely be unacceptable.
 - b. Assign to each activity an appropriate, unique numerical designation and description.
 - c. Numerical designation shall incorporate the associated Specifications section number.
 - d. Activity description shall include sufficient detail to clearly communicate the intended activity. Descriptions shall include identifiers for physical locations of work area or work system, such as (where appropriate): column lines, stationing (for linear projects), and elevations. Indicate unique description for each activity.

- e. Group deliveries of materials and equipment into a separate sub-schedule that is part of the Progress Schedule.
 - f. Group construction into work area sub-schedules (that are part of the Progress Schedule) by activity.
 - g. Clearly indicate, as activities separate from installation, necessary and required curing periods.
5. Organization of Progress Schedules:
- a. Indicate interfaces and dependencies with preceding, concurrent, and follow-on activities, including those associated with the Work, other contractors at the Site, Owner and facility manager, Owner's consultants (including Engineer), authorities having jurisdiction, and others as appropriate. Clearly indicate activities not under Contractor's control.
 - b. Progress Schedules shall be CPM Progress Schedules.
 - c. Indicate on the separate Schedule of Submittals dates for submitting and reviewing Shop Drawings, product data Submittals, Samples, and other required Submittals. Coordinate Progress Schedule with the Schedule of Submittals.
 - d. Clearly indicate the critical path on the Progress Schedule.
- C. Planned Work Schedule:
- 1. Within 30 days of the Effective Date of the Contract, indicate to Engineer the work days and hours proposed by Contractor. Also indicate planned non-work days, such as Contractor's holidays, weekends, and the like.
 - 2. Enforce Subcontractors' and Suppliers' (when at the Site) compliance with Contractor's work schedule submitted to Engineer.
 - 3. In the event of changes, submit to Engineer revised work schedule. Furnish such Submittal not less than three days prior to changing Contractor's work schedule, except in event of unanticipated emergency.
- D. Preliminary Progress Schedule:
- 1. Within 20 days after the Contract Times commence running, Contractor shall submit to Engineer the preliminary Progress Schedule covering the entire Project, with associated schedule-related Submittals required in this Section's "Submittals" Article.
 - 2. Submit preliminary Progress Schedule in accordance with Section 01 31 26 - Electronic Communication Protocols and Section 01 33 00 - Submittal Procedures. Also submit preliminary Progress Schedule in its native (executable) format generated by the scheduling software, transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols.
 - 3. Engineer will perform timely review of the preliminary Progress Schedule.
 - 4. Preliminary Progress Schedule shall comply with the Contract Documents relative to Progress Schedules.
- E. Initial Acceptance of Progress Schedule:
- 1. Not less than 10 days before submission of the first Application for Payment, a scheduling conference attended by Contractor, Progress Schedule preparer, Engineer, and others as appropriate will be held virtually to review for acceptability to Engineer the preliminary Progress Schedule and associated schedule-related Submittals. Following the scheduling conference, Contractor shall have five days to make corrections and adjustments and to complete and resubmit the Progress Schedule and associated schedule-related Submittals. Contractor will not be eligible for first progress payment until acceptable Progress Schedule and associated schedule-related Submittals are submitted to Engineer and are acceptable to Engineer.
 - 2. Submit acceptable Progress Schedule, together with associated schedule-related Submittals in accordance with this Section's "Submittals" Article, Section 01 31 26 – Electronic Communication Protocols, and Section 01 33 00 - Submittal Procedures. Also

submit acceptable form of Progress Schedule in its native (executable) format generated by the scheduling software, transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols.

3. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times, in accordance with the Contract Documents.
4. Initially-accepted Progress Schedule shall be identified as the baseline Progress Schedule.

F. Planned Completion Different from the Contract Times:

1. If the Progress Schedule accepted by Engineer indicates completion date(s) different than the Contract Times, the Contract Times are not thereby changed.
2. Where the Progress Schedule accepted by Engineer indicates date(s) by which the Work, or designated portion thereof, will (a) achieve a Contractually stipulated Milestone, or (b) be substantially complete, or (c) all the Work will be complete and ready for final payment, earlier than the Contract Times ("early completion date"), Contractor shall, not less than 180 days prior to the associated Contract Time, prepare and submit a Change Proposal setting forth Contractor's request to modify the Contract Times to an earlier date, which may or may not be the same as the scheduled early completion date. The Contract Times can be modified only via a Change Order.
3. In the event the Progress Schedule accepted by Engineer indicates one or more early completion dates and the Contract Times have not been reduced, Owner may, at Owner's option, use available float without Owner being liable for Contractor's costs to remain onsite, mobilized, and working (whether on the original scope of the Work or for modified Work) beyond the scheduled early completion date(s), as long as the Work will be completed within the Contract Times.
4. When the Work will not be completed within the Contract Times, the Contract Documents' provisions concerning delays and changes in the Contract Times govern.

1.7 LOOK-AHEAD SCHEDULES

A. Look-Ahead Schedules – General:

1. Look-ahead schedules are short-duration, often more-detailed, time-based schedules for the Work to be performed during the coming month or other required span of the look-ahead schedule.
2. Purpose of look-ahead schedules is to present , for Project stakeholders, including Owner, facility manager (if other than Owner), Engineer, Owner-hired testing and inspection entities, other contractors working at or adjacent to the Site, utility owners, transportation facility owners, and others as necessary, Contractor's detailed, time-based plan for performing the Work during the period covered by the timespan of the look-ahead schedule.
3. This Section's "Submittals" Article indicates the required span and frequency of look-ahead schedules.
4. Each look-ahead schedule shall be fully coordinated and consistent with the current Progress Schedule update.
5. Submit look-ahead schedules concurrent with construction progress meetings, in accordance with Section 01 31 26 - Electronic Communication Protocols, and Section 01 33 00 - Submittal Procedures. Also submit look-ahead schedules in native (executable) format, in accordance with Section 01 31 26 - Electronic Communication Protocols.
6. As handouts, bring to each construction progress meeting the quantity of paper copies of the new look-ahead schedule indicated in Section 01 31 19 - Project Meetings. If quantity is not indicated in Section 01 31 19 - Project Meetings, furnish quantity equal to typical number of attendees of progress meetings.

B. Organization and Content of Look-Ahead Schedules:

1. Look-ahead schedules shall be prepared from the current Progress Schedule update, of the same type, using the same software, content, and organization required in this Section for initial Progress Schedules.

2. Activity designations on look-ahead schedules shall incorporate the associated activity designations from the Progress Schedule.
3. Sheet Size: Format look-ahead schedules to sheet size of 11 inches by 17 inches, unless other sheet size is acceptable to Engineer.
4. Look-ahead schedules should generally be more-detailed than the Progress Schedule. Activity durations on look-ahead schedules should not exceed five days.

1.8 PROGRESS SCHEDULE UPDATES

A. Updates – General:

1. Update the Progress Schedule not less-often than once per month. If during progress of the Work events develop that necessitate changes in the initially accepted Progress Schedule (baseline Progress Schedule), identify updated Progress Schedules sequentially as “Progress Schedule Revision “1”, “2”, “3”, and continuing in sequence as required. Number the Progress Schedule submittals in accordance with Section 01 33 00 - Submittal Procedures.
2. Progress Schedule updates shall comply with this Section’s requirements for initial progress Schedule, relative to type, required software, organization, content, and related matters.
3. Starting with first Progress Schedule update, and continuing with each subsequent update, indicate on the Progress Schedule the actual start and finish dates of each activity that is completed or is currently underway. Inaccurate representation of completed or in-progress activities will be grounds for Engineer’s non-acceptance of the Progress Schedule update.
4. Contractor’s Progress Schedule update shall include a narrative report in accordance with this Section. Narrative report shall include description of: progress achieved to date and status of each work area of the Project, planned progress for the upcoming period, identification of the critical path, current or potential delays, Change Orders (pending and approved since the previous Progress Schedule update), and other problems associated with performing the Work in accordance with the baseline Progress Schedule and complying with the Contract Documents, including the Contract Times. Indicate in the narrative report delays that have occurred since the previous updated Progress Schedule.
5. The update to the Progress Schedule shall be based on retained logic. Progress override logic is not allowed.
6. Submit to Engineer updated Progress Schedule, together with associated schedule-related Submittals, in accordance with this Section’s “Submittals” Article, Section 01 31 26 - Electronic Communication Protocols, and Section 01 33 00 - Submittal Procedures. Also submit updated Progress Schedule in its native (executable) format generated by the scheduling software, transmitted in accordance with Section 01 31 26 - Electronic Communication Protocols.

B. Monthly Schedule Meeting:

1. During the month, utilizing the previous month’s look-ahead schedule. Contractor shall record the percent complete, start and finish dates of each scheduled activity with the remaining duration for each activity started but not completed, including activities associated with procurement of materials and equipment.
2. On the same day each month, not less than one week prior to a progress meeting, Contractor, Progress Schedule preparer, Engineer (or Resident Project Representative), and others as appropriate shall meet at the Site to tour the Work to review and recommend updates to the Progress Schedule and progress information gathered by Contractor during the month. After discussion of Contractor’s current progress information and attendees’ review of the current status of the Work, Progress Schedule preparer shall appropriately and accurately update the Progress Schedule.

1.9 NARRATIVE REPORTS

A. Narrative Reports – General:

1. Prepare and include with the preliminary Progress Schedule Submittal and each subsequent Progress Schedule Submittal, written narrative report describing the schedule-

related constraints required by the Contract Documents and Contractor's plan and schedule for complying with such requirements. Narrative reports shall also include required content indicated above in this Section's "Progress Schedule Updates" Article.

2. Narrative report shall describe the methods of sequencing and operation, resources to be employed, time frames for the construction of each of the major work area or work system on the Project, and time frames for complying with the Contract Times and Contractor's interim schedule milestones.
3. Prepare narrative reports on Contractor's company letterhead and clearly indicate the Progress Schedule revision and date associated with the narrative report.
4. Narrative reports shall be written in English and typed. Use clear, concise, complete, and accurate language in narrative reports. Clearly indicate in narrative report the name of person preparing the narrative report and date of preparation
5. Narrative report Submittals do not constitute contractual Change Proposals, nor are they notice of a Claim.
6. Engineer's receipt, review, and acceptance of narrative reports does not mitigate or reduce Contractor's obligations to furnish contractually required notices.

1.10 TIME IMPACT ANALYSIS

A. Time Impact Analyses – General:

1. Prepare and submit time impact analysis when one or more of the following occurs: (a) Change Proposal is prepared; (b) Work Change Directive is issued that will affect the Progress Schedule; or (c) when delays occur.
2. Time impact analysis shall illustrate influence of each Change Order, Work Change Directive, allowance authorization, or delay, as applicable, on Contractor's ability to comply with the Contract Times and Progress Schedule constraints.
3. In performing time impact analysis, use Progress Schedule having revision date closest to and prior to the event giving rise to the delay or other change in the Work.
4. Indicate in time impact analysis activities on the Project's critical path prior to the event giving rise to the delay or other Change in the Work; activities added, extended, or deleted as a result of the delay or change in the Work; and impact of such changes on the Project's critical path activities.
5. Indicate in time impact analysis activities not within Contractor's control.
6. Time impact analysis shall demonstrate the time impact, based on date the Change Order, Work Change Directive, or allowance authorization was given to Contractor or, as applicable, date the delay started to occur; the status of the Work at that time; and activity duration of affected activities. Activity duration used in time impact analysis shall be those included in most recent Progress Schedule update accepted by Engineer, closest to start of the delay or start of the Change Order, Work Change Directive, or allowance authorization as adjusted by mutual, written agreement of the parties and Engineer.
7. Timing of Time Impact Analysis:
 - a. Submit time impact analysis with Change Proposal, in accordance with Section 01 26 00 - Contract Modification procedures.
 - b. When time impact analysis is not part of a Change Proposal, submit each time impact analysis within 15 days after the following, as applicable:
 - 1) Start of the delay.
 - 2) After Contractor's receipt of Work Change Directive.
 - c. When Contractor does not submit time impact analysis for a specific change or delay, within the specified period for such submittal, such non-submittal will indicate extension of the Contract Times is not needed.

B. Evaluation by Engineer and Acceptance:

1. Engineer's evaluation of each time impact analysis comprised of complete information will be completed in timely manner (in accordance with the Contract Documents) after Engineer's receipt.
2. When time impact analysis is incomplete or otherwise inappropriate, Engineer will furnish comments to Contractor. When time impact analysis is complete and apparently appropriate, its acceptability will be indicated by associated Contract modification or allowance authorization.
3. Changes in the Contract Times will be made only by Change Order.
4. When mutual agreement is reached between the parties on effect of the change or delay in the Project, incorporate into the next Progress Schedule update the associated fragnets illustrating the influence of changes and delays.

1.11 RECOVERY SCHEDULES

A. Recovery Schedules – General:

1. When updated Progress Schedule indicates the ability to comply with the Contract Times falls 14 days or more behind schedule, and there is no excusable delay, Change Order, or Work Change Directive to support an extension of the Contract Times, Contractor shall prepare and submit to Engineer Contractor's recovery schedule.
2. Recovery schedule is a Progress Schedule demonstrating Contractor's plan to accelerate the Work to achieve compliance with the Contract Times. If achieving the Contract Times is not feasible, Contractor's recovery schedule shall indicate Contractor's plan to recover as much of the lost time as possible to complete the Work as close as possible to the Contract Times.
3. Submit recovery schedule within 10 days after submittal of updated Progress Schedule where need for recovery schedule is indicated.

B. Recovery Schedule Report:

1. With each recovery schedule Submittal, include recovery schedule narrative report, manually prepared by Contractor, on Contractor's company letterhead, indicating name of person responsible for preparing the recovery schedule and report.
2. Recovery schedule report shall verbally indicate Contractor's plan for accelerating the Work and recovering lost time, and shall indicate the total number of days expected to be recovered by Contractor's implementation of the recovery schedule. Clearly indicate how the intended actions will recover lost time.
3. Contractor is fully responsible for complying with the Contract Documents, including the contract Times.

C. Implementation of Recovery Schedule:

1. At no additional cost to Owner, do one or more of the following, as appropriate: (a) furnish additional labor, (b) provide additional construction equipment and machinery, (c) provide suitable materials to accelerate the Work, (d) employ additional work shifts, (e) expedite procurement of materials and equipment to be incorporated into the Work or otherwise expedite delivery of such items, (f) provide other needed resources, and (g) provide other measures necessary to complete the Work within the Contract Times.
2. Upon acceptance of recovery schedule by Engineer, incorporate recovery schedule into the next Progress Schedule update.

D. Contractor's Failure to Recover Lost Time:

1. Contractor's refusal, failure, or neglect to take appropriate measures to recover lost time, or to submit a recovery schedule, shall constitute reasonable evidence that Contractor is not prosecuting the Work, or designated part of the Work, with diligence to ensure completion in accordance with the Contract Times. Such action or inaction by Contractor shall constitute sufficient basis for Owner to exercise remedies available to Owner under the Contract Documents.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Definition of various types of Submittals.
2. Coordination requirements for Submittals.
3. General provisions concerning Submittals.
4. Schedule of Submittals.
5. Contractor's preparation of Submittals, including:
 - a. Numbering.
 - b. Marking.
 - c. Organization and content.
 - d. Proposed "or-equals", substitutes, and deviations from Contract requirements.
 - e. Electronic Documents Submittals.
 - f. Contractor's review and approval of each Submittal.
 - g. Resubmittals.
6. Contractor's transmittal of Submittals, including transmittal letters, transmittal and delivery method, and delivery of Samples, Closeout Submittals, and Maintenance Materials Submittals.
7. Engineer's review, including:
 - a. Timing.
 - b. Meaning of Engineer's Submittal action code(disposition) assigned.
 - c. Delivery of Engineer's responses on Submittals.

B. Scope:

1. Contractor shall provide all labor, materials, equipment, tools, services, incidentals, and other effort necessary to furnish Shop Drawings, product data Submittals, Samples, and other Submittals in accordance with the Contract Documents.
2. This Section's Article, "General Provisions Concerning Submittals" includes a summary of the Contract Documents' locations of Submittals requirements.
3. Shop Drawings, product data Submittals, Samples, and other Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Engineer's approval or acceptance, as applicable, of a Submittal does not alter or modify the Contract Documents.
4. Engineer and Owner have the right to rely on Contractor's representations and certifications made regarding each Submittal.

C. Related Requirements: Include but are not limited to:

1. Section 01 25 00 - Substitution Procedures.
2. Section 01 31 26 - Electronic Communication Protocols.
3. Section 01 32 16 - Construction Progress Schedule.
4. Section 01 35 73 - Delegated Design Procedures.
5. Section 01 62 00 - Product Options.

6. Section 01 78 23 - Operations and Maintenance Manuals.

1.2 REFERENCES

A. References – Introduction:

1. This Article presents definitions and terminology used in this Section and throughout the Contract Documents.
2. Applicability of the Term “Submittals”: Where reference is made to Shop Drawings, product data Submittals, Samples, or other Submittals in this Section and elsewhere in the Contract Documents, the term “Submittals”, as defined in the Contract Documents, is intended. The foregoing applies regardless of whether such term is indicated with an initial capital letter, unless context of the subject provision clearly indicates otherwise.
3. Types of Submittals:
 - a. Submittal types are classified as follows: (1) Action Submittals, (2) Informational Submittals, (3) Closeout Submittals, and (4) Maintenance Materials Submittals.
 - b. Type of each required Submittal is indicated in the associated Specifications section. When Submittal type is not clearly indicated in the associated Specifications section, Submittal will be classified as indicated in this Article. Submit request for interpretation when Contractor is uncertain of required Submittal type.

B. Action Submittals:

1. Action Submittals require an explicit, written approval or other appropriate action by Engineer (or other entity to whom the Submittal is required to be furnished, in accordance with the Contract Documents) before Contractor may release the associated item(s) for raw materials procurement, fabrication, production, and shipping.
2. Unless otherwise indicated in the Contract Documents, Action Submittals include the following:
 - a. Shop Drawings.
 - b. Product data.
 - c. Samples.
 - d. Testing plans for quality control activities required by the Contract Documents.
 - e. Delegated Designs: Delegated design professional's “instruments of service” Submittals required by the Contract Documents, as further described in Section 01 35 73 – Delegated Design Procedures.
3. General Conditions’ requirements for Shop Drawings and Samples hereby apply to all Action Submittals.

C. Informational Submittals:

1. Informational Submittals are so indicated in the Contract Documents. Unless otherwise indicated, Informational Submittals include certifications, evaluation reports, results of source quality control activities, results of field quality control activities, Supplier instructions, reports of Suppliers’ visits to the Site, sustainable design Submittals (that are not Closeout Submittals), delegated design Submittals that are not “instruments of service” Submittals, qualifications statements, and others.
2. Informational Submittals, when submitted in accordance with the Contract and indicating full compliance with the Contract Documents, do not require explicit

response from Engineer (or other entity to whom the Submittal is to be delivered); Engineer's (or other entity's) acceptance thereof will be indicated in the Engineer's Submittals log. Copy of Engineer's Submittals log is available to Contractor upon Contractor's written request.

3. When Informational Submittal does not indicate full compliance with the Contract Documents, Engineer (or other entity to which Submittal is to be delivered) will indicate the non-compliance in a written response to Contractor.

D. Closeout Submittals:

1. Closeout Submittals are so indicated in the Contract Documents and are, in general, required before the associated Work is completed, unless earlier submittal is required by the Contract Documents.
2. Unless indicated otherwise in the Contract Documents, Closeout Submittals include maintenance contracts, operation and maintenance data, warranties, bonds (other than performance and payment bonds required prior to the start of construction), record documents, sustainable design closeout Submittals, software, keys, and others.
3. Closeout Submittals are processed in the same manner as described above for Informational Submittals.

E. Maintenance Materials Submittals:

1. Maintenance materials include spare parts, extra materials, tools, and similar items required to be furnished in accordance with the Contract Documents.
2. Furnish required physical maintenance materials, delivered to Owner or facility manager (if other than Owner), as applicable, at the location(s) indicated in the Contract Documents, for the corresponding required Maintenance Materials Submittals.
3. Maintenance Materials Submittals are documentation of delivery to Owner's or facility manager, and their acceptance of, required physical maintenance materials.
4. Maintenance Materials Submittals are processed in the same manner as described above for Informational Submittals.

F. Additional Terms:

1. The following terms have the meanings indicated below, regardless of whether such terms are indicated using initial capital letters, and apply to singular and plural of each:
 - a. "Product data" means illustrations, standard schedules, performance charts, Supplier's published instructions, brochures, diagrams, and other information furnished by Contractor to illustrate or describe materials or equipment for some portion of the Work. In general, product data are manufacturers' pre-published information on the items proposed to be incorporated into the Work. Product data includes manufacturer's catalog pages and similar documents with contractor-made markings and indications of proposed products and proposed options.
 - b. The term "Shop Drawings", defined in the General Conditions, is supplemented by the following: Shop Drawings include: (1) fabrication and assembly drawings, usually having a title block, or (2) schedules, prepared specifically for the Project. Here, "schedules" means a Project-specific summary of systems and components, such as a schedule of HVAC equipment, schedules of doors and door hardware, or windows, or a schedule of paint systems by room and surface, or other, similar Project information in a tabular format. In contrast,

construction Progress Schedules, Schedules of Submittals, and Schedules of Values are not Shop Drawings.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Furnish Submittals well in advance of need for the associated material or equipment, or procedure (as applicable), in the Work and with ample time necessary for delivery of materials and equipment and to implement procedures following Engineer's approval or acceptance of the associated Submittal.
2. Work covered by a Submittal will not be included in payments by Owner until approval or acceptance (as applicable) of related Submittals has been obtained in accordance with the Contract Documents.

1.4 GENERAL PROVISIONS CONCERNING SUBMITTALS

A. Locations of Requirements:

1. Requirements concerning Submittals are generally located as follows:
 - a. General Conditions, as may be modified by the Supplementary Conditions, applicable to the Project.
 - b. This Section, which presents general requirements for Submittals applicable to the Project.
 - c. Other Division 01 Specifications that include general requirements for certain types of Submittals, such as Section 01 31 26 - Electronic Communications Protocols, Section 01 78 23 - Operation and Maintenance Data, Section 01 35 73 - Delegated Design Procedures (when the Contract includes delegation of professional design services), and others.
 - d. The "Submittals" Article of the various Specifications sections, which indicates the required Submittals for the associated Work. Furnish all Submittals required by the Contract Documents regardless of whether explicitly indicated in the associated Specifications' "Submittals" Article.
- B. This Section augments and supplements the requirements of the General Conditions, as may be modified by the Supplementary Conditions, relative to Submittals.

1.5 SCHEDULE OF SUBMITTALS

A. Informational Submittals: Submit the following:

1. Schedule of Submittals:
 - a. Timing:
 - 1) Furnish Schedule of Submittals within time frames indicated in the General Conditions, as may be modified by the Supplementary Conditions.
 - 2) Submit updated Schedule of Submittals with each submittal of the updated Progress Schedule.
 - b. Content: In accordance with the General Conditions, as may be modified by the Supplementary Conditions, and this Section. Requirements for content of preliminary Schedule of Submittals and subsequent Submittals of the Schedule of Submittals are identical. Identify on Schedule of Submittals all Submittals required in the Contract Documents. Updates of Schedule of Submittals shall show scheduled dates and actual dates for completed tasks. Clearly indicate Submittals that are on the Project's critical path. Indicate the following for each Submittal:
 - 1) Date by which Submittal will be received by Engineer.

- 2) Whether Submittal will be for a substitution or “or-equal”.
- 3) Date by which Engineer’s response is required. Allow not less than 14 days for Engineer’s review, starting on Engineer’s actual receipt of each Submittal. Allow increased time for large or complex Submittals.
- 4) For Submittals for materials or equipment, date by which material or equipment must be at the Site to avoid delaying the Work and to avoid delaying the work of others (if any).
- c. Prepare Schedule of Submittals using same software, and in same format, specified for Progress Schedules in Section 01 32 16 - Construction Progress Schedule.
- d. Coordinate Schedule of Submittals with the Progress Schedule.
- e. Schedule of Submittals that is not compatible with the Progress Schedule, or that does not indicate Submittals on the Project’s critical path, or that places extraordinary demands on Engineer for time and resources, is unacceptable. Do not include Submittals not required by the Contract Documents.
- f. In preparing Schedule of Submittals:
 - 1) Considering the nature and complexity of each Submittal, allow sufficient time for reviews and revisions.
 - 2) Allow reasonable time for: Engineer’s review and processing of Submittals, for Submittals to be revised and resubmitted, and for returning Submittals to Contractor.
 - 3) Identify and accordingly schedule Submittals that are expected to have long anticipated review times.

1.6 PREPARATION OF SUBMITTALS

A. Prior to Submittal Preparation:

1. The General Conditions, as may be modified by the Supplementary Conditions, address Contractor’s responsibility for submitting for Owner’s acceptance identification of Subcontractors and Suppliers. Obtain Owner’s acceptance before entering into subcontracts and purchase orders for the Work.
2. Comply with the Contract Documents relative to terms and conditions of subcontracts and purchase orders for the Work.
3. Contractor’s responsibilities for the following are set forth in the General Conditions, as may be modified by the Supplementary Conditions, and as may be augmented elsewhere in the Contract Documents:
 - a. Obtaining field measurements and dimensions.
 - b. Determining and verifying required quantities.
 - c. Verifying compatibility of materials.
 - d. Apportioning the Work among Subcontractors, Suppliers, and Contractor.
 - e. Reconciling required materials, equipment, and other Contract requirements with Contractor’s means, methods, techniques, sequences, and procedures of construction and with Contractor’s safety and protection programs and precautions incident thereto.
 - f. Reviewing applicable provisions of the Contract Documents and obtaining from Engineer necessary interpretations or clarifications.

B. Submittal Identification:

1. Submittal Number: Shall be a unique number assigned to each individual Submittal. Assign Submittal numbers as follows:

- a. First part of Submittal number shall be the applicable Specifications section number, followed by a hyphen.
 - b. Second part of Submittal number shall be a three-digit number (sequentially numbered from 001 through 999) assigned to each separate Submittal furnished under the associated Specifications section.
 - c. Example: Submittal number for the third Submittal furnished for Section 10 14 00 - Signage, would be "10 14 00-003".
2. Review Cycle Number: Each resubmittal of a given Submittal shall be indicated with a lower-case letter designation:
- a. No letter designation for initial (first) submittal of the Submittal number.
 - b. "a" shall indicate first resubmittal of the Submittal number.
 - c. "b" shall indicate second resubmittal of the Submittal number.
3. Examples:

Example Description	Submittal Identification	
	Submittal No.	Review Cycle
Initial (first) review cycle of the third Submittal furnished under Section 10 14 00 – Signage	10 14 00-003-	
Second review cycle (first resubmittal) of third Submittal furnished under Section 10 14 00 - Signage	10 14 00-003-	a

C. Marking of Submittals:

1. Mark on each page of each Submittal and each individual component submitted with Submittal number and applicable Specifications paragraph.
2. Mark each page of each Submittal with the Submittal page number.
3. Each Shop Drawing sheet shall have title block with complete identifying information satisfactory to Engineer.
4. For product data Submittals, operation and maintenance data Submittals, and other Submittals:
 - a. Mark options to be furnished using broad, dark arrows or "clouds" clearly drawn around the relevant text or diagrams. Do not use highlighter for indicating options and features.
 - b. Indicate options and features not furnished using clear strikeouts through the text or diagrams.

D. Submittal Organization and Content – General:

1. Page or Sheet Size; Furnish Submittals with one or more of the following page or sheet sizes: (a) 8.5 inches by 11 inches; (b) 11 inches by 17 inches; (c) 22 inches by 34 inches; unless another sheet size is acceptable to Engineer.
2. Language: All parts of each Submittal shall be in the English language.
3. Units of Measurement: Clearly indicate units of measurement on Shop Drawings, product data Submittals, record documentation, and operation and maintenance data Submittals.
4. Organize each Submittal logically to facilitate ease of understanding and review.
5. To the extent practicable, arrange Submittal information in same order as requirements are written in the associated Specifications section.

6. Each Submittal shall cover Work under only one Specifications section.
7. To the extent practicable, package together Submittals for the same Specifications section. Do not furnish required information piecemeal.
8. For large or complex Submittals, include a title page and table of contents.
9. Include appropriately labeled fly sheets to separate distinct parts of each Submittal.
10. Ensure legibility of all pages in each Submittal.
11. Minimize extraneous and unnecessary information in Submittals for materials and equipment. Do not submit information not relevant to the Submittal and associated requirements of the Contract Documents.
12. Contractor's, Subcontractor's, and Supplier's written comments on Shop Drawings and product data diagrams shall be colored green.
13. Do not submit under Specifications sections with title that include "Basic Requirements", unless the subject material or equipment is specified, in total, in a Specifications section with the words, "Basic Requirements" in its title.

E. Electronic Documents Submittals:

1. Format: Electronic Documents Submittals shall be "portable document format" (.PDF) files unless expressly required otherwise by applicable provisions of the Contract Documents.
2. Electronic Documents Submittals must be electronically searchable when delivered to Engineer and other recipients.
3. Organization and Content:
 - a. Each Electronic Documents Submittal shall be one file; do not divide individual Submittals into multiple Electronic Documents files each unless file size will exceed 20 MB.
 - b. When Submittal is large or contains multiple parts, furnish PDF file with suitably titled electronic bookmark for each section of the Submittal.
 - c. Content shall be identical to paper or other original Submittal. First page of each Electronic Documents Submittal shall be transmittal letter required in this's Paragraph 1.7.A.
4. Quality and Legibility: Electronic Documents Submittal files shall be made from the original and shall be clear and legible. Markings applied by Contractor, Subcontractor, or Supplier shall be clear, distinct, and readily apparent. Electronic Documents file shall be full size of original documents. Properly orient all pages for convenient reading on a computer display; do not furnish pages sideways or upside-down.
5. Provide sufficient internet service, software, and systems for Contractor with capability appropriate for transmitting the necessary files and receiving responses from Engineer or other entities.
6. Check not less than once per day for distribution of Electronic Documents Submittals responses and related Electronic Documents correspondence.

F. Proposed "Or-Equals", Substitutes, and Deviations from Contract Requirements:

1. "Or-Equals":
 - a. The meaning of "or-equal" is addressed in Section 01 25 00 - Substitution Procedures.
 - b. Contractor's request for approval of "or-equals" is to be presented via the associated Action Submittal(s) and shall include the information required in provisions governing "or-equals" in Section 01 62 00 - Product Options.

- c. Expressly and prominently indicate, "Proposed Or-Equal" on the associated Action Submittals when Submittal is for an "or-equal".
 - d. Submittals requesting approval of an "or-equal" but not accompanied by the required, supplemental information will be deemed incomplete by Engineer and returned to Contractor without approval.
2. Substitutes:
- a. The meaning of "substitute" is indicated in Section 01 25 00 - Substitution Procedures.
 - b. Requests for approval of substitutes shall comply with Section 01 25 00 - Substitution procedures, and other relevant provisions of the Contract Documents.
 - c. Contractor's request for approval of substitute is separate from the associated Action Submittal(s). Action Submittals that request approval of a substitute when a separate, formal substitution request (furnished in accordance with the Contract Documents) was not previously furnished to Engineer, followed by formal approval in via an appropriate contract modification (typically either a Field Order or Change Order), will be deemed by Engineer as non-compliant with the Contract Documents and will be returned to Contractor without approval.
 - d. Contractor is solely responsible for delays incurred due to substitutes proposed via Submittals that have not been previously duly approved via an appropriate Contract modification.
 - e. Action Submittals for items or procedures approved via an appropriate Contract modification shall include a copy of the Contract modification in which the substitute was approved.
3. Submittals with Proposed Deviations from Contract Requirements:
- a. When Submittal proposes deviations from requirements of the Contract Documents, the Submittal shall clearly and expressly indicate each proposed deviation.
 - b. Also comply with this Section's provision, in the Article below, on Contractor's transmittal letter expressly alerting Engineer to the proposed deviations.
 - c. Comply with requirements of the Contract regarding substitutes and "or-equals".
 - d. When deviation is proposed, also appropriately revise text of Contractor's approval, from that required below in this Article.
 - e. When Submittal includes deviations from Contract requirements and either the Submittal itself, Contractor's transmittal letter, or both, do not comply fully with Contract requirements for indicating deviations in Submittals and giving separate written notice thereof, Engineer's approval of such deviations will be deemed null and void unless Engineer's written response to the Submittal has expressly acknowledged such deviation and indicated Engineer's approval thereof.
 - f. Contractor is solely responsible for delays and costs incurred due to any and all Submittals with deviations from Contract requirements that were not properly, expressly indicated and approved in accordance with the Contract Documents. Deviations not duly approved in accordance with the Contract Documents may be deemed defective Work. Contractor is solely responsible for remedying defective Work and all associated cost and time impacts.

G. Contractor's Approval of Submittals:

1. Contractor's Review: Before transmitting Submittals to Engineer, review each Submittal to:
 - a. Ensure proper coordination of the Work.
 - b. Determine that each Submittal is in accordance with Contractor's desires.
 - c. Verify that Submittal contains sufficient information for Engineer to determine compliance with the Contract Documents.
2. Incomplete or inadequate Submittals will be returned without detailed review by Engineer.
3. Contractor's Approval Stamp and Signature:
 - a. Each Submittal furnished shall bear Contractor's approval stamp (or facsimile thereof) and signature, as evidence that the Submittal has been reviewed and approved by Contractor and verified as complete and in accordance with the Contract Documents.
 - b. Submittals without Contractor's approval and signature (as required by the contract Documents) will be returned to Contractor without further review by Engineer and deemed incomplete.
 - c. Engineer reserves the right to reject as incomplete Submittals where Contractor's approval signature appears computer-generated or reproduced without the active involvement or review of Contractor's signatory.
 - d. Contractor's approval shall contain the following text:

Project Name: Woodside WRF – Headworks Improvements
 Contractor's Name: _____
 Contract Designation: _____
 Date: _____

----- *Reference* -----

Submittal Title: _____
 Specifications _____
 Section: _____
 Page No.: _____
 Paragraph No.: _____
 Drawing No.: [_____] of _____
 Location of Work: 4197 Glenbrook Drive, Hailey, Idaho 83333

Submittal No. and Review Cycle: _____
 Coordinated by Contractor with Submittal Nos.: _____

I hereby certify that Contractor has satisfied Contractor's obligations under the Contract Documents relative to Contractor's review and approval of this Submittal, including: (1) reviewed and coordinated the Submittal with other Submittals and with the requirements of the Work and the Contract Documents; (2) determined and verified all: field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal, (b) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work, and (c) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; (3) confirmed the Submittal is complete with respect to all related data included in the Submittal; and (4) clearly and expressly indicated all proposed deviations (if any) from

the requirements of the Contract Documents both in the Submittal itself and in the Submittal's transmittal letter. Accordingly, this Submittal is hereby approved for Contractor by:

Approved for Contractor by: _____

H. Resubmittals:

1. Refer to the General Conditions, as may be modified by the Supplementary Conditions, for requirements regarding resubmitting required Submittals.
2. In addition to limits on the quantity of resubmittals, as indicated in the General Conditions, Contractor shall furnish Submittals with such completeness, accuracy, and compliance with the Contract Documents to obtain Engineer's approval or acceptance, as applicable, without the total quantity of Submittals furnished, including all initial Submittals and all resubmittals, exceeding 125% of the number of Submittals indicated on the Schedule of Submittals initially accepted by Engineer, plus a corresponding percentage of the quantity of Submittals required by Change Orders, Work Change Directives, and Field Orders.
3. Do not increase the scope of prior review cycle of the same Submittal.
4. Indicate on Contractor's transmittal letter how Submittal was revised from previous review cycle of the Submittal and where the revisions or corrections are located within the resubmittal.
5. Expressly address and provide response for all components previously transmitted by Engineer on prior review cycles of the subject Submittal. Where resubmittal lacks complete response to Engineer's prior comments, Engineer may deem such resubmittal as incomplete and return it to Contractor without further review.
6. Where part of the Submittal's prior review cycle was expressly approved or accepted, as applicable, by Engineer, do not include such items in subsequent resubmittals.
7. Indicate, "Not Yet Resolved—To Be Resubmitted at a Later Date" for any items not approved in prior review cycle of the Submittal for items not included in the subject resubmittal. Engineer reserves the right to deem incomplete Submittals "Not Approved" or "Revise and Resubmit". Furnishing incomplete or partial resubmittals is discouraged.
8. Resubmittal of Previously Approved or Accepted Items:
 - a. Do not resubmit on a given item previously approved or accepted, as applicable, by Engineer, without Engineer's advance consent. Consent will be given for bona-fide unavailability of a previously approved or accepted item where Contractor has acted in good faith in a timely manner with due diligence to comply with the Contract Times.
 - b. Destroy or conspicuously mark "SUPERSEDED" on all documents having previously received Engineer's approval or acceptance, as applicable, that are superseded by a resubmittal.

1.7 TRANSMITTAL OF SUBMITTALS BY CONTRACTOR

A. Contractor's Transmittal Letters for Submittals:

1. Furnish separate transmittal letter with each Submittal. Use transmittal form attached to this Section (as Exhibit 01 33 00-A) unless other transmittal form is acceptable to Engineer at the start of the Project's construction.
2. When transmittal form other than this Section's Exhibit 01 33 00-A is acceptable to Engineer, at beginning of each transmittal, include a reference heading indicating:

Contractor's name, Owner's name, Project designation, Contract designation, transmittal number, and Submittal number (with review cycle).

3. "Or-Equals": When the Submittal is proposing an "or-equal", expressly so indicate on transmittal form submitted by Contractor.
4. Proposed Deviations from Contract Requirements: When the Submittal proposes deviations from requirements of the Contract Documents, transmittal letter shall specifically describe each proposed deviation.

B. Submittal Delivery Method:

1. This provision presents general requirements for delivery of all Submittals unless otherwise required elsewhere in the Contract Documents.
2. Furnish Submittals as Electronic Documents delivered in accordance with Section 01 31 26 – Electronic Communication Protocols.
3. Furnish Submittals to Engineer and each other entity indicated in the Contract Documents as receiving a Submittal directly from Contractor.
4. Address Submittals to Engineer as follows: HDR, indicate complete physical address of Engineer's project office suitable for delivery of packages, to attention of Brad Bjerke, brad.bjerke@hdrinc.com.
5. Preliminary Copy for Engineer's Field Office: Simultaneously with delivering Electronic Documents Submittal to Engineer, also deliver:
 - a. Electronic Documents Submittal to Resident Project Representative.
 - b. One paper copy of complete Submittal delivered to Engineer's field office at the Site.

C. Samples - Transmittal and Delivery:

1. Labeling and Tagging Samples:
 - a. Securely label or tag each Sample with Submittal identification number.
 - b. Label or tag shall include clear space at least 4 inches by 4 inches in size for affixing Engineer's review stamp indicating disposition assigned by Engineer.
 - c. Label or tag shall not cover, conceal, or alter Sample's appearance or features.
 - d. Label or tag shall not be separated from the Sample.
2. Timing: Deliver required Samples concurrently with other Action Submittals required for the same element of the Work, unless other delivery time frame is indicated in the Schedule of Submittals accepted by Engineer.
3. Quantity Required:
 - a. Where the Contract Documents require a Sample as a field mock-up, provide Sample at the Site or in the Work at location acceptable to Engineer. Provide the quantity of field mock-ups required by the contract Documents; if not otherwise shown or specified, provide one of each required field mock-up. .
 - b. For reasonably portable Samples, deliver the quantity of Samples required in the associated Specifications. If quantity of Samples is not indicated in the associated Specifications section, deliver to Engineer not less than three identical Samples of each item for which Sample is required.
 - c. Samples will not be returned to Contractor. If Contractor requires Sample(s) for Contractor's use, so advise Engineer in writing and furnish additional copies of the Sample. Contractor is responsible for furnishing, shipping, and transporting additional Samples.
4. Locations for Delivery of Reasonably Portable Samples for Review:
 - a. Deliver one physical Sample to Engineer's field office at the Site.

- b. Deliver balance of required physical Samples to Engineer at address indicated in this Article for receipt of Submittals, unless otherwise directed by Engineer.

D. Closeout Submittals –Transmittal and Delivery:

1. Furnish the following Closeout Submittals in accordance with general requirements for transmitting and delivering Submittals, indicated above in this Article: maintenance contracts; warranty bonds (when required) and other bonds required for specific materials, equipment, or systems; warranty documentation; and sustainable design closeout documentation (when required). On documents such as maintenance contracts and bonds, include on each document furnished original (“wet”) signature of entity issuing said document. When original “wet” signatures are required, furnish such Submittals to Engineer both on original paper and as Electronic Documents, and to other entities furnish as indicated above in this Article for general requirements for Submittals.
2. Operations and Maintenance Manuals: Submit in accordance with Section 01 78 23 - Operation and Maintenance Data.
3. Record Documents: Submit in accordance with Section 01 78 39 - Project Record Documents.
4. Software: In addition to software installed on Owner’s computer system, furnish number of copies of software required in the Specifications section where the software is specified. Preferred means of transmittal is via secure file transfer directly to Owner (or facility manager, if other than Owner) via secure file transfer method mutually acceptable to software developer and the receiving entity. When secure file transfer is used, submit to Engineer documentation signed or electronically acknowledged by Owner that the files were received. Where such software is available only on the software developer's portable media, furnish such software on software developer's original, portable media, sealed in software developer's original, unopened, clearly labeled packaging.

E. Maintenance Materials Submittals – Delivery:

1. Deliver physical maintenance materials required by the Contract Documents in accordance with applicable provisions of the Contract.
2. Submit documentation of delivery of (Maintenance Materials Submittals) in accordance with general requirements for Submittals as indicated in this Section.

1.8 ENGINEER’S REVIEW OF SUBMITTALS

- A. This Article applies to review of all Submittals by Engineer or other entity to whom the Contract Documents require such Submittal be furnished.
- B. Timing:
 1. Timing of Engineer’s review will be in accordance with the Schedule of Submittals accepted by Engineer.
 2. When Submittal is delivered to Engineer on a date other than that indicated in the Schedule of Submittals accepted by Engineer, duration of Engineer’s review may differ from that indicated in the Schedule of Submittals, based on Engineer’s availability and resources. Engineer will make good-faith effort to furnish responses to Submittals in a timely manner.
 3. Contractor is responsible for communicating to Engineer when a Submittal is on the Project’s critical path.
- C. Engineer’s Review:
 1. Markings:

- a. Comments or responses marked directly on Submittal by Engineer (or other entity reviewing Submittal) will be colored red.
 - b. Engineer may also present narrative comments on a comment sheet inserted by Engineer into the Submittal or included on Engineer's transmittal letter for the Submittal. Such comments will be in black text. When a separate comment sheet is included by Engineer, such sheet will be clearly identified as Engineer's comments.
 - 2. Engineer's review and disposition assigned to Submittal are subject to the following:
 - a. Submittal disposition is subject to: Engineer's comments on the Submittal; disclaimer language on Engineer's Submittal transmittal letter; Engineer's Submittal review stamp (when used) or equivalent (when used); and this provision.
 - b. Engineer's review is only for general compatibility with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, and for general compliance with the information given in the Contract Documents.
 - c. Contractor shall be solely responsible for complying with the Contract Documents, as well as with Supplier instructions consistent with the Contract Documents, Owner's directions, and Laws and Regulations. Contractor is solely responsible for obtaining, correlating, confirming, and correcting dimensions at the Site; quantities; information and choices pertaining to fabrication processes; means, methods, sequences, procedures, and techniques of construction; safety precautions and programs incident thereto; and for coordinating the work of all trades.
 - d. Engineer is not responsible for resubmittals not yet furnished by Contractor or tracking Contractor's progress on resubmittals.
 - 3. Documents not required by the Contract Documents but nonetheless furnished by Contractor as submittals will not be reviewed by Engineer.
- D. Meaning of Submittal disposition Assigned by Engineer:
- 1. Action Submittals:
 - a. "Approved" (Action Code A): Upon return of Submittal marked "Approved", order, ship, or fabricate materials and equipment included in the Submittal (pending Engineer's approval or acceptance, as applicable, of production-related qualifications statements and certifications, and required source quality control Submittals) or otherwise proceed with the Work in accordance with the Submittal and the Contract Documents.
 - b. "Approved as Noted" (Action Code B): Upon return of Submittal marked "Approved as Noted", order, ship, or fabricate materials and equipment included in the Submittal (pending Engineer's approval or acceptance, as applicable, of production-related qualifications statements and certifications, and required source quality control Submittals) or otherwise proceed with the Work in accordance with the Submittal and the Contract Documents, and in accordance with Engineer's comments and notes indicated in Engineer's Submittal response
 - c. "Revise and Resubmit" (Action Code C): Upon return of Submittal marked "Revise and Resubmit", make the revisions necessary and indicated and resubmit to Engineer for approval.
 - d. "Not Approved" (Action Code D): This disposition indicates material or equipment that cannot be approved. "Not Approved" disposition may also be applied to Submittals that are incomplete. Upon return of Submittal marked

“Not Approved”, repeat initial submittal procedure utilizing approvable material or equipment, with a complete Submittal clearly indicating all information required.

2. Informational, Closeout, and Maintenance Materials Submittals:
 - a. “Accepted” (Action Code F): Information included in Submittal complies with the applicable requirements of the Contract Documents and is acceptable. No further action by Contractor is required relative to such Submittal, and the Work covered by the Submittal may proceed. Materials and equipment with Submittals with this disposition may be shipped or operated, as applicable. Submittals assigned “Accepted” by Engineer (or other reviewing entity) does not indicate Engineer’s acceptance of the associated Work, which is indicated only as set forth in the General Conditions and Section 01 77 19 – Closeout Requirements.
 - b. “Not Acceptable” (Action Code G): Submittal, or part thereof, does not indicate full compliance with applicable requirements of the Contract Documents and is not acceptable. Provide labor, materials, equipment, services, and incidentals necessary to properly and accurately revise Submittal and resubmit to indicate acceptability and compliance with the Contract Documents
3. Other:
 - a. “Submittal Not Reviewed” (Action Code E): Documents so marked by Engineer are not required by the Contract Documents. Submittals may also be marked with this disposition when information in the document was previously reviewed and approved or accepted by Engineer, as applicable.

E. Distribution of Engineer’s Responses:

1. Unless otherwise indicated in the Contract Documents, Engineer will distribute written responses (as Electronic Documents) to Submittals to the following:
 - a. Contractor.
 - b. Owner.
 - c. Owner’s Site Representative.
 - d. Resident Project Representative.
 - e. Engineer’s file.
2. Engineer’s acceptance of Informational Submittals, Closeout Submittals, and Maintenance Materials Submittals will be recorded in Engineer’s Submittal log. Copy of Engineer’s Submittals log is available from Engineer upon written request of Owner or Contractor. If no such request is received by Engineer, Engineer will distribute copy of Engineer’s Submittals log once per month (when Submittals have been received or acted on by Engineer). Engineer may distribute copy of Engineer’s Submittals log as an Electronic Document or as handout at construction progress meetings.
3. Paper copies of Engineer’s Submittal responses will not be distributed unless otherwise required by the Contract Documents or otherwise agreed to by Engineer.
4. Contractor is responsible for forwarding Engineer’s Submittals responses to Subcontractors and Suppliers as appropriate, and for coordinating the Work of all trades.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. The documents listed below, following this Section's "End of Section" designation, are part of this Specifications Section:
 - 1. "Exhibit 01 33 00-A – Transmittal for Submittal No. [____]" (one page).

END OF SECTION

Transmittal for Submittal No. []-[]

Project Name: Woodside WRF – Headworks Improvements					Date Received:	
Project Owner: City of Hailey, Idaho					Checked By:	
Contractor:			HDR Engineering, Inc.		Log Page:	
Address:			Address: 412 East Parkcenter Boulevard, Suite 100 Boise, Idaho 83706		HDR No.:	
					Spec Section:	
					Drawing/Detail No.:	
Attn (Contractor):			Attn (HDR): Brad Bjerke		Review Cycle	
Date Transmitted by Contractor:			Date of Engineer's Response Transmittal:			
Item No.	Submittal No.	Description (indicate number of copies where paper copies of physical Samples are returned)	Manufacturer	Supplier Dwg or Data No.	Engineer's Disposition (Action Code) *	
1						
2						
3						
4						
Contractor's Remarks (insert text):						
Engineer's Remarks (insert text): :						
* Legend for Action Code indicated above, assigned by Engineer:						
Action Submittal: A – Approved B – Approved as Noted C – Revise and Resubmit D – Not Approved			E – Submittal Not Reviewed Informational, Closeout, or Maintenance Materials Submittal: F – Accepted (this code normally recorded in Engineer's Submittals log). G – Not Acceptable			
Engineer's Disclaimer (for Submittals that do <u>not</u> involve delegated design):						
a. Submittal action code is subject to: Engineer's comments on the Submittal, comment sheets (if any), and this transmittal letter; disclaimer language on Engineer's Submittal review stamp or equivalent; and Specifications Section 01 33 00 – Submittal Procedures.						
b. Engineer's review is only for general compatibility with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, and for general compliance with the information given in the Contract Documents.						
c. Contractor shall be solely responsible for complying with the Contract Documents, as well as with Supplier instructions consistent with the Contract Documents, Owner's directions, and Laws and Regulations. Contractor is solely responsible for obtaining, correlating, confirming, and correcting dimensions at the Site; quantities; information and choices pertaining to fabrication processes; means, methods, sequences, procedures, and techniques of construction; safety precautions and programs incident thereto; and for coordinating the work of all trades.						
Reviewed for HDR by:					Date of Engineer's Review:	
Distribution:		Contractor	File	Field	Owner	Other

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SECTION 01 35 43.13
ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General responsibilities and enforcement concerning Constituents of Concern at the Site.
2. Notifying Owner of Constituents of Concern at the Site.
3. Hazard communication plan.
4. Emergency/spill response plan.
5. Storage of materials containing Constituents of Concern and storage of non-hazardous materials.
6. Area for storing materials containing Constituent(s) of Concern.
7. Verification of compliance.

B. Scope:

1. Contractor's responsibilities for remediating a known Hazardous Environmental Condition, if any, at the Site are set forth in the Specifications of Division 02 – Existing Conditions.
2. Contractor shall provide all labor, materials, equipment, tools, services, and incidentals necessary and required to comply with requirements of this Section and related provisions of the General Conditions, as may be modified by the Supplementary Conditions.
3. In this Section's title, "hazardous materials" means "Constituents of Concern" as defined in the General Conditions.

1.2 BASIC RESPONSIBILITIES AND ENFORCEMENT REGARDING CONSTITUENTS OF CONCERN AT THE SITE

A. Scope – Basic Responsibilities:

1. Contractor shall develop, implement, and maintain throughout the Project a hazardous materials management program (HMMP) in accordance with Laws and Regulations and the Contract Documents.
2. Constituents of Concern Brought to Site by Contractor:
 - a. Transport, handle, store, label, use, and dispose of materials containing Constituents of Concern in accordance with this Section, other applicable provisions of the Contract Documents, and Laws and Regulations.
3. Constituents of Concern Generated by Contractor:
 - a. Materials containing Constituents of Concern shall be properly handled, stored, labeled, transported and disposed of by Contractor in accordance with Laws and Regulations, and this Section.
 - b. If Contractor will generate or has generated materials containing Constituents of Concern at the Site or adjacent areas, obtain a USEPA identification number listing Contractor's name and address of the Site as generator of the Constituents of Concern. Obtain identification number from state environmental agency or other authority having jurisdiction at the Site. Submit identification number within time limit indicated in this Section's "Submittals" Article.
 - c. Contractor is responsible for identifying, analyzing, characterizing, labeling, storing, transporting, and disposing of Constituents of Concern generated by Contractor.
4. Cost Responsibility:
 - a. Fines and civil penalties imposed on Owner or facility manager (if other than Owner) for Contractor's violations, whether at the Site or other locations, and other costs incurred

by Owner and facility manager associated with cleanup of a Hazardous Environmental Condition created or exacerbated by Contractor shall be paid by Contractor.

- b. If Contractor has exacerbated a Hazardous Environmental Condition existing at the Site prior to the start of the Work, Contractor shall pay Contractor's appropriate share of costs associated with fines, civil penalties, and cleanup costs in proportion equal to the extent of costs for which Contractor caused or exacerbated the Hazardous Environmental Condition and fines and civil penalties associated therewith.
- c. If Contractor fails or refuses to pay such costs, Owner may pay the costs and deduct from payments due Contractor a reasonable set-off.

B. Owner's Environmental Representative:

1. Owner's environmental representative is: Bryson Ellsworth, Wastewater Division Manager.

C. Enforcement of Laws and Regulations Regarding Constituents of Concern and Hazardous Environmental Conditions:

1. To extent practicable, avoid creating or exacerbating situations causing or contributing to injury to persons, spills and emissions of Constituents of Concern, contamination of the Site and other areas, and damage (to property and the environment) caused by Hazardous Environmental Conditions.
2. When Owner or facility manager (if other than Owner) is aware of or suspects violations may have occurred or may occur, Owner or facility manager will notify Contractor, and authorities having jurisdiction, when Owner or facility manager reasonably believes doing so is necessary or appropriate. However, no such right of Owner, facility manager, or any entity for whom Owner or facility manager is responsible, including Engineer (or its consultants and subcontractors), is for benefit of Contractor. Owner, facility manager, and any entity for whom Owner or facility manager is responsible, including Engineer, are not obligated to monitor presence of, use of, storage or handling of, Constituents of Concern at the Site or other areas, or present of a potential Hazardous Environmental Condition, or to act on behalf of Contractor or anyone for whom Contractor is responsible.
3. Responsibilities regarding Laws and Regulations shall be in accordance with the General Conditions, as may be modified by the Supplementary Conditions.

1.3 SUBMITTALS

A. Informational Submittals: Submit the following to the entity(ies) indicated for each:

1. Indication of Constituents of Concern (including Chemicals) Proposed for Use at the Site:
 - a. Submit to Owner's environmental representative; do not submit to Engineer. Engineer will not accept, review, or retain such information or Submittals in Engineer's files.
 - b. Submit the information required in sufficient time for Owner's review and acceptance not later than three days before bringing associated Constituent of Concern to the Site.
 - c. Submittal Content:
 - 1) Current (dated within the past two years) safety data sheets (SDS, formerly "material safety data sheets") in accordance with 29 CFR 1910.1200 (OSHA Hazard Communication Standard).
 - 2) Manufacturer of material or equipment containing such substance.
 - 3) Supplier (if other than manufacturer).
 - 4) Container sizes and number of containers proposed to be at the Site.
 - 5) Minimum and maximum volume of material intended to be stored at the Site.
 - 6) Description of process or procedures in which Constituent(s) of Concern will be used at the Site.
2. Material Containing Constituents of Concern Generated at the Site:
 - a. Submit to Owner's environmental representative; do not submit to Engineer. Engineer will not accept, review, or retain such information or Submittals in Engineer's files.

- b. Submit the information required prior to generating each associated Constituent of Concern at the Site or adjacent areas. Submit within not less than 48 hours after Contractor's receipt of associated analytical results.
 - c. Submittal Content:
 - 1) For each Constituent of Concern generated at the Site or adjacent areas:
 - a) USEPA identification number.
 - b) Laboratory analysis results.
 - c) Quantity, size, and location of storage containers at the Site or adjacent areas.
- 3. Permits:
 - a. Submit to Owner's environmental representative; do not submit to Engineer. Engineer will not accept, review, or retain such information or Submittals in Engineer's files.
 - b. Submit within 48 hours of obtaining each associated permit.
 - c. Submittal Content:
 - 1) Copies of each permit obtained for storing, handling, using, transporting, and disposing of materials containing Constituents of Concern, obtained from authorities having jurisdiction.
- 4. Other Documents Required for the HMMP:
 - a. Submit to Owner's environmental representative; do not submit to Engineer. Engineer will not accept, review, or retain such information or Submittals in Engineer's files.
 - b. Submit requested documents within 72 hours of Contractor's receipt of such request.
 - c. Submittal Content:
 - 1) Submit requested HMMP documents, which may include emergency/spill response plan, communication plan, and other documents.

1.4 HAZARDOUS MATERIALS MANAGEMENT

- A. Obtain Owner's environmental representative's acceptance before bringing to the Site each material containing a Constituent of Concern.
- B. Hazard Communication Plan:
 - 1. Develop and implement a communication plan relative to materials containing one or more Constituents of Concern.
 - 2. Safety Data Sheet (SDS) Notebooks:
 - a. Maintain at the Site not less than two notebooks containing:
 - 1) Inventory of materials containing a Constituent of Concern (including all chemicals).
 - 2) Current (dated within the past two years) SDS for all materials being used to accomplish the Work, whether or not defined as a Constituent of Concern.
 - b. Keep one notebook in Contractor's field office at the Site; keep second notebook at location acceptable to Owner's environmental representative.
 - c. Keep notebooks up-to-date as materials are brought to and removed from the Site.
- C. Emergency/Spill Response Plans:
 - 1. Develop, implement, and maintain an emergency/spill response plan, for each Constituent of Concern or each class or group of material containing a Constituent(s) of Concern, as applicable.
 - 2. Response plan shall include not less than the following:
 - a. Description of materials and equipment available at the Site to contain or respond to emergencies related to or spills of the materials containing one or more Constituents of Concern.
 - b. Procedures for notifying, and contact information for:
 - 1) Authorities having jurisdiction.
 - 2) Emergency responders.

- 3) Owner.
 - 4) Engineer.
 - 5) Resident Project Representative (RPR) and Owner's Site Representative (OSR).
 - 6) The public, as applicable.
 - 7) Other entities as necessary or required.
 - c. Response coordination procedures between Contractor, Owner or facility manager (if other than Owner), and others as appropriate.
 - d. Site plan showing proposed locations of Constituents of Concern storage areas and location of spill containment/response materials and equipment, and location of storm water drainage inlets, catch basins, and drainage routes, including storm sewers, ditches and swales, and surface waters.
 - e. Description of Constituent of Concern handling and emergency/spill response training provided to Contractor's and Subcontractors' workers, in accordance with 29 CFR 1926.21(b) ("Employer Responsibility") and other Laws and Regulations.
- D. Storage of Materials Containing Constituents of Concern and Storage of Non-Hazardous Materials:
1. Vessels containing materials with a Constituent of Concern shall bear applicable, clearly visible NFPA hazard diamonds.
 2. Container Labeling:
 - a. Properly label each container of combustible materials, whether or not classified as containing a Constituent of Concern.
 - b. Stencil Contractor's name and, as applicable, Subcontractor's name, on:
 - 1) Each vessel containing a Constituent of Concern; and
 - 2) For non-hazardous materials, on each container over five-gallon capacity.
 - c. Each container shall have securely-attached label clearly identifying contents. Also label containers that are filled from larger containers.
 - d. If Owner or facility manager (if other than Owner) becomes aware of unlabeled containers at the Site, Owner's environmental representative will so advise Contractor, although Owner's and facility manager's personnel are not obligated to do so. Properly label each containers within one hour of receipt of such notice from Owner or facility manager, or remove container from the Site and adjacent areas.
 - e. Properly dispose of materials containing Constituents of Concern, in accordance with Laws and Regulations, at a location other than the Site and adjacent areas.
 3. To greatest extent possible, store at offsite location materials containing a Constituent of Concern until required for use in the Work.
- E. Area for Storing Materials Containing Constituent(s) of Concern:
1. Maintain designated storage area for materials containing one or more Constituents of Concern. Storage area shall include secondary containment to prevent release of spilled or leaking substances. Storage area shall include barriers to prevent vehicles from colliding with storage containers, and shall include protection from environmental effects such as elements, temperature, sunlight, and other environmental effects.
 2. Provide signage in accordance with Laws and Regulations, clearly identifying the storage area.
- F. Verification of Compliance:
1. Not less than monthly, Contractor's safety representative shall meet with Owner's environmental representative at the Site to:
 - a. Review Contractor's HMMP documents.
 - b. Review HMMP procedures.
 - c. Inspect storage areas and the Site in general, to verify compliance with this Section.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 35 73

DELEGATED DESIGN PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General provisions for delegated design services.
2. Coordination of delegated designs with other Work.
3. Qualifications requirements for delegated design professionals.
4. Limitations on Engineer's review of delegated design Submittals.
5. Responsibilities of delegated design professionals.

B. Scope:

1. Where delegated design is specifically Contractor's responsibility in accordance with the Contract Documents, Contractor shall provide labor, services, other effort, and pay all costs necessary and required to perform delegated design services for Work that will be part of the completed Project as a functioning whole.
2. Perform delegated design Work in accordance with the Contract Documents, delegated design Action Submittals approved by Engineer, and Shop Drawings, product data Submittals, and Samples approved by the associated delegated design professional.
3. Contractor's correction period, general warranty and guarantee, and obligations for safety and protection apply to delegated design Work to the same extent such provisions apply to all other Work under the Contract.
4. Specifications requiring delegated design services include, but are not necessarily limited to, the following:
 - a. Section 03 15 19 - Anchorage to Concrete.
 - b. Section 03 41 33 - Precast and Prestressed Concrete.
 - c. Section 05 50 00 - Metal Fabrications.
 - d. Section 40 05 07 - Pipe Support Systems.
5. Not Delegated Design: The following are not delegated design and are not covered by this Section:
 - a. Contractor's use of design professionals for: (1) temporary construction or temporary facilities not part of the completed Project as a functioning whole, or (2) Contractor's means, methods, procedures, techniques, and sequences of construction and safety and protection measures incident thereto.
 - b. Certain final designs that, in accordance with commonly accepted practice, are typically prepared by unlicensed, unregistered individuals, including for manufactured or fabricated systems, components or assemblies, not acting under the supervisory control of the design professional in responsible charge, but who commonly possess appropriate certification from a relevant industry organization, together with appropriate training and experience.

C. Related Requirements:

1. Sections of Divisions 02-49 where delegated design Work is required.

1.2 REFERENCES

A. Terminology:

1. Terminology indicated below are not defined terms and are not indicated with initial capital letters but, when used in this Section and Specifications of Division 02-49 where delegated design Work is required, have the meaning indicated below:

- a. "Delegated design" means preparing the final design of part of the completed, permanent Work by one or more delegated design professionals, in accordance with the Contract Documents. The terms "delegated design", "delegated design services", "delegation of design responsibility", and similar or derivative terms have the same meaning.
- b. "Delegated design professional" means the licensed and registered engineer, architect, geologist, or other design professional retained by or employed by Contractor, Subcontractor, or Supplier to perform delegated design services for delegated design Work and possessing appropriate experience and qualifications for such delegated design services.
- c. "Delegated design Work" means delegated design services, associated construction, and related Work.
- d. "Instruments of service", relative to delegated designs, means delegated design professional's: (1) certifications (including delegated design professional's certification of compliance, as required in this Section, and other certifications required of delegated design professional), (2) reports (where required), (3) design drawings, (4) design specifications, (5) other documents specifically indicated as delegated design professional's "instruments of service" in the Contract Documents, and (6) documents modifying a delegated design (after Engineer's approval of the original delegated design Submittals). "Instruments of service" are to be sealed, signed, and dated by delegated design professional and expressly required as Submittals. Shop Drawings sealed and signed by delegated design professional are delegated design professional's "instruments of service".

1.3 GENERAL PROVISIONS CONCERNING DELEGATED DESIGN SERVICES

A. Delegated Designs - General:

- 1. This Section augments the requirements of the General Conditions, as may be amended by the Supplementary Conditions, and other provisions of the Contract Documents regarding Contractor's responsibilities for delegated design Work.
- 2. Delegated design professionals or their employer shall furnish professional liability insurance. Provisions on professional liability insurance are set forth in the Supplementary Conditions. Submit through Contractor appropriate documentation of professional liability insurance.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

- 1. Coordination - General:
 - a. Contractor shall coordinate the services of delegated design professionals with all other elements of the Work.
 - b. Contractor has full responsibility for scheduling delegated designs and all related Work.
 - c. Allow sufficient time in Progress Schedule for performance of delegated design services, including requests for interpretation or clarification between delegated design professional and Contractor and between Contractor and Engineer.
- 2. Coordination of Delegated Design Work's Connections to Other Work:
 - a. Where delegated design Work connects to other Work designed by Engineer, existing construction, or both, the delegated design Work shall be consistent with the other Work and existing construction to which delegated design Work connects, and adjacent construction.
 - b. Submit details, loading, anchorage, and other coordinating information necessary for the delegated design Work to properly interface with Work designed by Engineer.
 - c. Changes in the Work, whether designed by Engineer, designed by delegated design professional, or existing construction, necessary as a result of the delegated design are ineligible for increase in Contract Price or Contract Times, unless: (1) otherwise agreed

- by both Engineer and Owner, or (2) expressly indicated otherwise elsewhere in the Contract Documents for the associated delegated design Work.
- d. Changes requiring extra compensation, time, or both arising from delegated design aspects needed for convenience of Contractor, Subcontractor, or Supplier, are not grounds for increase in Contract Price or Contract Times.
3. Coordination of Submittals, Fabrication, Production, and Shipment:
- a. Do not release for raw materials procurement, fabrication, production, and shipment to the Site materials, equipment, or systems designed by delegated design professional until the associated delegated design professional has reviewed and approved all associated Shop Drawings, product data, Samples, and (relative to shipment) source quality control Submittals, and such Submittals have been delivered to and accepted by Engineer.
 - 1) For delegated design systems that required reactions to be submitted to the Engineer. These submittals shall be submitted and approved first before approval is given for the delegated design submittal.
 - b. Allow sufficient time in the Progress Schedule for required Submittals and required actions by delegated design professionals and Engineer.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Delegated Design Professionals:
- a. Each delegated design professional shall possess not less than the minimum qualifications set forth in this provision. Where the Specifications for the associated delegated design Work establish more-stringent qualifications requirements, comply with the more-stringent requirements.
 - b. Each delegated design professional shall comply with all of the following:
 - 1) Legally qualified, as both an individual and as a business entity, to practice the associated design discipline(s) in the jurisdiction where the Site is located, including possessing current, valid license and registration for the design discipline(s) for which the delegated design professional will render its services on the Project.
 - 2) Possess not less than five years of experience in the subject design discipline(s).
 - 3) Served as design professional in responsible charge on not less than five other designs similar in scope and complexity to the Work for which delegated design professional is retained on the Project; construction of such prior projects shall be complete by the start of the Project's construction.
 - c. Summary of Qualifications: Submit to Engineer summary of delegated design professional's experience and qualifications, including:
 - 1) Evidence of coverage under appropriate professional liability insurance in accordance with the Contract Documents.
 - 2) Evidence of delegated design professional's ability to legally conduct business as a design professional in the same jurisdiction as the Site, as a business entity.
 - 3) Copy of delegated design professional's current, valid personal design professional license and registration for the same jurisdiction as the Site. Such documents shall indicate the individual's name, license or registration number, and dates for which the license or registration is valid.
 - 4) Other information reasonably requested by Engineer.

1.6 GENERAL PROVISIONS FOR DELEGATED DESIGN SUBMITTALS

- A. Under the Division 02-49 Specifications section(s) where delegated design Work is required, furnish to Engineer Submittals such as:
1. Action Submittals:
- a. Delegated design professional's instruments of service Submittals.

2. Informational Submittals:
 - a. When delivered to Engineer, the following must bear delegated design professional's Submittal approval stamp:
 - 1) Shop Drawings, product data Submittals, Samples, testing plans.
 - 2) Results of source quality control and field quality control activities.
 - b. Delegated design professional's calculations.
 - c. Other Informational Submittals required for the subject delegated design Work.
- B. Limitations of Engineer's Review of Delegated Design Submittals:
 1. Delegated Design Professional's Instruments of Service Submittals:
 - a. Engineer's review of delegated design instruments of service Submittals is for the limited purposes indicated in the General Conditions, as maybe modified by the Supplementary Conditions.
 - b. The following disclaimer applies to Engineer's responses to delegated design professional's instruments of service Submittals:
 - 1) Engineer's review and approval of delegated design instruments of service is only for the limited purpose of verifying that performance and design criteria given in the Contract were used in the delegated design, and checking for compliance with the Engineer's design concept expressed in the Contract Documents.
 - 2) Contractor is solely responsible for complying with: the Contract Documents, Subcontractor and Supplier instructions consistent with the Contract Documents, Owner's directions, and Laws and Regulations.
 - 3) Contractor is solely responsible for obtaining, correlating, confirming, and correcting dimensions at the Site; quantities; information and choices pertaining to fabrication processes; means, methods, sequences, procedures, and techniques of construction; safety precautions and programs incident thereto; and for coordinating the Work of all trades.
 - 4) Engineer is not responsible for the effects of resubmittals or tracking progress of resubmittals.
 2. Delegated Design Informational Submittals:
 - a. Other provisions of the Contract Documents notwithstanding, Engineer's review of delegated design Informational Submittals is limited to only:
 - 1) Verifying the Submittal was furnished as required; and
 - 2) Submittal generally appears complete (except for calculations); and
 - 3) Submittal bears delegated design professional's approval stamp; or, for calculations prepared by or for delegated design professional, that such calculations bear delegated design professional's seal, signature, and date; or, for delegated design professional's reports of visits to the Site, that such report is legible, and bears delegated design professional's signature with date.
 - b. Engineer receives such Submittals, including delegated design professional's calculations, on behalf of Owner, for Owner's records.
 - c. Engineer, Owner, and others involved in the Project have the right to rely on delegated design professional's approval stamp as meaning that the delegated design professional has performed and appropriate review of the Submittal and determined it to be complete, in accordance with delegated design professional's instruments of service approved by Engineer, in accordance with delegated design professional's design intent, and in accordance with the Contract Documents.
 3. Engineer's Other Comments on Delegated Design Submittals:
 - a. Despite the limitations of Engineer's review of Submittals for delegated design Work, should Engineer become aware of, or reasonably suspect existence of, potential of associated delegated design Work to adversely affect health, safety, or welfare of persons, or pose reasonable potential for damage to the Work, work of other

contractors, or adjacent property, Engineer will advise Contractor in writing of general nature of Engineer's concern.

- b. Such advisory by Engineer, if issued, is rendered in good faith and does not in any way constitute:
 - 1) Engineer's review of all aspects of the delegated design.
 - 2) Any sharing by Engineer of any of delegated design professional's responsibilities or professional liability.
 - 3) Any responsibility imposed, in any way, on Engineer for any aspect of the delegated design professional's services or design, beyond the limited purposes of Engineer's review as set forth in the Contract Documents. .
- c. Contractor and its Subcontractors and Suppliers, including delegated design professionals, shall immediately investigate Engineer's concern indicated in such advisory and remedy as necessary and required.
- d. Neither Engineer nor Owner, nor their respective consultants and subcontractors, is obligated to review any Submittal for delegated design Work beyond the limited review required by the Contract Documents. No such advisory, if issued, entitles Contractor, Subcontractor, or Supplier, including delegated design professionals, to rely on such advisory or to assume that any further such reviews or written or oral advisories are forthcoming.

1.7 RESPONSIBILITIES OF DELEGATED DESIGN PROFESSIONALS

A. Standard of Care:

- 1. Unless a higher standard of care is established by the Division 02-49 Specifications section where the associated delegated design Work is required, the delegated design services shall comply with the following standard of care:
 - a. Except as provided in the paragraph immediately above this, the standard of care for all delegated design professional services and related services performed or furnished by delegated design professionals for the Project will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality.

B. Responsibilities of delegated design professionals employed on the Work include, but are not necessarily limited to, the following, unless specifically indicated otherwise in the associated elements of the Contract Documents where the delegated design is required:

- 1. Ethical Conduct and Professionalism: Comply with Laws and Regulations and applicable standards and guidelines relevant design professional organizations for ethical conduct and professional practice.
- 2. Comply with Laws and Regulations and relevant design standards applicable to the subject delegated design Work.
- 3. Performance and Design Criteria Indicated in the Contract Documents and Other Information:
 - a. Review performance and design criteria, indicated in the Contract Documents, that the delegated design Work must satisfy.
 - b. Prepare written requests for interpretations or clarifications of performance or design criteria.
 - c. Review existing information about the Site that constitutes Technical Data (if any, applicable to the subject delegated design Work), as indicated in the Supplementary Conditions.
- 4. Site Information and Investigations: With Contractor, obtaining all other necessary dimensions, field information, and other information necessary for preparing delegated design Submittals.
- 5. Design and Other Professional Services: Personally perform and prepare, or actively exercise direct, personal, supervisory control over others performing or preparing:

- a. Necessary design professional evaluations of conditions, materials, and equipment.
 - b. Prepare the instruments of service Submittals and calculations Submittal for the subject delegated design Work, where required by the associated Division 02-49 Specifications and other, associated Contract Documents.
 - c. Assist Contractor with applying for and obtaining permits and approvals (not previously obtained by Owner or those for whom Owner is responsible) necessary for the delegated design Work.
 - d. Review and approve or take other appropriate action on Shop Drawings (unless such Shop Drawings are sealed and signed by delegated design professional), product data, Samples, and testing plans, and other Submittals associated with the delegated design Work.
 - e. Prepare modifications of the delegated design instruments of service as necessary.
6. Sealing and Signing:
- a. Seal, sign, and indicate date of sealing and signing, on all of the following when such Submittals are required by the Division 02-49 Specifications where the delegated design Work is required:
 - 1) Instruments of service Submittals, including certification of compliance required.
 - 2) Calculations.
 - 3) Modifications to the delegated design.
 - 4) Other documents required to be sealed and signed by Laws or Regulations or the Contract Documents.
 - b. Sealing and signing documents in accordance with Laws and Regulations and the Contract Documents, prior to submittal (through Contractor) to Engineer, and for submittal to authorities having jurisdiction to obtain necessary permits and approvals.
 - c. Sealing and signing shall be in accordance with Laws and Regulations.
7. Certification of Compliance by Delegated Design Professional:
- a. Schedule:
 - 1) Submit certification of compliance after Engineer's acceptance of delegated design professional's qualifications statement.
 - 2) Obtain Engineer's approval of certificate of compliance Submittal prior to furnishing other Submittals for delegated design Work under the same Specifications section, unless otherwise allowed by Engineer.
 - b. Through Contractor, submit to Engineer, delegated design professional's written certification indicating:
 - 1) General Information: (1) Project name and designation, (2) Contractor name and Contract designation, (3) Subcontractor or Supplier name (when applicable), (4) full name of delegated design professional's business entity under which the delegated design services were performed, (5) full name and license number of the individual sealing and signing the subject delegated design Work, (6) specific elements of delegated design Work to which the certification applies, and (7) delegated design professional's seal, signature, and date of signature.
 - c. Explicit certification that the subject delegated design complies with:
 - 1) All applicable performance and design criteria indicated in the Contract Documents. Expressly indicate on certification of compliance the specific performance and design criteria used in the delegated design, and reaction forces of the delegated design imparted to other Work and existing construction. Reaction forces imparted from the delegated design elements to the Engineer's designed system shall include the following:
 - a) Reaction forces imparted from the delegated design elements to the Engineer's designed system shall be presented as follows:
 - (1) Unfactored loads per category (dead, live, wind, seismic, etc.).

- (2) Load combinations presented in Load Factor Resistance Design (LRFD) format from each element transmitting load.
 - b) All Laws and Regulations.
 - c) Applicable design standards commonly applicable to such types of construction. Expressly indicate such design standards on the certification of compliance.
 - d) The applicable standard of care. Expressly indicate the applicable standard of care.
- 8. Approvals of Other Delegated Design Submittals:
 - a. Review and taking appropriate action on Submittals for delegated designs:
 - b. Such reviews and approvals or other appropriate action shall be to ascertain compliance with:
 - 1) Delegated design professional's design intent.
 - 2) Delegated design professional's instruments of service and calculations.
 - 3) Associated requirements of the Contract Documents.
 - c. Delegated design professional's review stamp or facsimile thereof, review action or disposition concerning the associated Submittal for the delegated design, date of review, and name of person performing the review shall be clearly legible on the associated Submittals (except for delegated design professional's own instruments of service Submittals, calculations, and reports of delegated design professional's visits to the Site). Prominently display delegated design professional's Submittal review stamp or facsimile thereof on: (1) each sheet of Shop Drawings, (2) each major section of product data Submittals, (3) each Sample, (4) each testing plan, and (5) each other Submittal associated with the delegated design for which such review stamp is required.
 - d. Do not apply delegated design professional's Submittal review stamp and comments, if any, over other text, tables, or graphics.
 - e. Where review stamp or facsimile thereof is required, submit to Engineer only those Submittals for delegated design Work that bear delegated design professional's explicit approval of the Submittal.
- 9. Respond promptly to requests for interpretation or clarification on delegated design professional's instruments of service and other Submittals for the delegated design Work.
- 10. Progress and Quality of Construction of Delegated Design Work:
 - a. Where appropriate for the subject delegated design Work, periodically visit the Site at appropriate intervals to observe the progress and quality of the subject delegated design Work.
 - b. Where delegated design professional does not visit the Site during construction, keep informed of the progress and quality of the subject delegated design Work via discussions with Contractor, Subcontractor, and Suppliers, via photographic documentation, and other means acceptable to delegated design professional.
 - c. Advise Contractor in writing when the subject delegated design Work is not in accordance with the delegated design professional's instruments of service (approved by Engineer) and related Submittals approved by delegated design professional.
 - d. Furnish to entity that retained delegated design professional copy of delegated design professional's written report of each visit to the Site.
- 11. Modifications to Design:
 - a. Design appropriate modifications to the delegated design Work, including preparing new or revised certifications, reports, design drawings, sketches, design specifications, and calculations, as appropriate.
 - b. Such instruments of service and calculations shall be submitted to Engineer through Contractor to same extent original instruments of service Submittals and calculations, if any, where required by the Contract Documents for the subject delegated design Work.

12. Other services, as mutually agreed upon by delegated design professional and its client, or as required elsewhere in the Contract Documents.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

SECTION 01 41 24

PERMIT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General requirements relative to permitting of which Owner and Engineer are aware that apply to the Work.
2. Required municipal permits and licenses of which Owner and Engineer are aware.
3. Erosion and sediment control permits.
4. Building permit.
5. Construction waste management plan.
6. Confined space entry permit.

B. Scope:

1. Contractor shall provide labor, materials, equipment, tools, and incidentals shown, specified, and required to obtain required permits and comply with required permits and licenses.
2. Obtain, pay for, and comply with required permits and licenses whether or not indicated in this Specifications section or elsewhere in the Contract Documents.

C. Related Requirements:

1. In addition to permits and licenses required under this Specifications section, obtain and comply with permits required under the following Specifications:
 - a. Section 01 35 43.13 - Environmental Procedures for Hazardous Materials.
 - b.
 - c. Section 01 41 28 - Confined Space Entry Permit.

1.2 DEFINITIONS

A. IDAPA: Idaho Administrative and Procedures Act.

B. IDOPL: Idaho Division of Occupational and Professional Licenses.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate compliance with permit and license requirements with Work under other Specifications sections and with other contractors, if any, working at the Site.
2. Coordinate with the Progress Schedule the time required to apply for and obtain required permits and licenses and to comply with requirements thereof. Changes in Contract Times or Contract Price will not be authorized because of timing and costs associated with obtaining permits and licenses required for the Work.

1.4 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Copy of each of the following permits, as applicable to the Work:
 - a. City of Hailey Building Permit.
 - b. State of Idaho Electrical Permit.
 - c. State of Idaho HVAC Permit.
 - d. State of Idaho Plumbing Permit.
 - e. Confined space entry permit.

2. Copy of each of the following licenses, as applicable to the Work:
 - a. State of Idaho Electrical Contractor License(s).
 - b. State of Idaho HVAC Contractor License(s).
 - c. State of Idaho Plumbing Contractor License(s).

1.5 MUNICIPAL PERMITS AND LICENSES

A. Permits:

1. The City of Hailey permits indicated below are required for the Project. Obtain required permits from the City's Building Services office and pay associated permit fees.
2. City of Hailey Building Permit:
 - a. City building permit is required for this Project and shall be obtained and paid for by Contractor.
 - b. Approximate Permit Fee: \$7,625.33 for the first \$1,000,000 of building valuation and \$4.33 for each additional \$1,000 of building valuation, or fraction thereof.
 - c. Procedure:
 - 1) Contractor shall submit two hard copies of the Contract Documents to City Building & Operations Coordinator and pay \$500 deposit and application fees for review and approval.
 - 2) City Building Services will deliver one stamped copy available to Contractor upon approval.
 - 3) Contractor shall pay the building permit fee with approved Documents to obtain the required permit.
 - 4) Obtain permit and submit copy to Engineer before starting the Work at the Site.
 - 5) Prior to eligibility for Substantial Completion, obtain certificate of occupancy from the City and submit copy to Engineer.
 - d. City of Hailey Construction Waste Management Plan:
 - 1) City requires a waste management plan as part of building permits and shall be obtained and paid for by Contractor.
3. State of Idaho Electrical Permit:
 - a. State of Idaho electrical contractor permit is required for this Project and shall be obtained and paid for by the Contractor.
 - b. Approximate Permit Fee: Based upon Wiring Cost in accordance with IDAPA 24.39.10.500.02.b schedule listed below.
 - 1) Wiring Cost up to \$10,000.00: $\text{Wiring Cost} \times 0.02 + \60.00 .
 - 2) Wiring Cost between \$10,000.00 and \$100,000.00: $(\text{Wiring Cost} - \$10,000.00) \times 0.01 + \260.00 .
 - 3) Wiring Cost \$100,001.00 and higher: $(\text{Wiring Cost} - \$100,000.00) \times 0.005 + \$1,160.00$.
 - c. Procedure:
 - 1) After obtaining Building Permit, Contractor (or electrical subcontractor) shall submit application for electrical contractor permit to the IDOPL.
 - 2) Obtain permit and submit copy to Engineer before starting the Work at the Site.
4. State of Idaho HVAC Permit:
 - a. State of Idaho HVAC contractor permit is required for this Project and shall be obtained and paid for by the Contractor.
 - b. Approximate Permit Fee: Based upon HVAC System Cost in accordance with IDAPA 24.39.70.500.02.c schedule listed below.
 - 1) HVAC System Cost up to \$10,000.00: $\text{HVAC System Cost} \times 0.02 + \60.00 .
 - 2) HVAC System Cost between \$10,000.00 and \$100,000.00: $(\text{HVAC System Cost} - \$10,000.00) \times 0.01 + \260.00 .

- 3) HVAC System Cost \$100,001.00 and higher: $(\text{HVAC System Cost} - \$100,000.00) \times 0.005 + \$1,160.00$.
- c. Procedure:
 - 1) After obtaining Building Permit, Contractor (or HVAC subcontractor) shall submit application for HVAC contractor permit to the IDOPL.
 - 2) Obtain permit and submit copy to Engineer before starting the Work at the Site.
5. State of Idaho Plumbing Permit:
 - a. State of Idaho plumbing contractor permit is required for this Project and shall be obtained and paid for by the Contractor.
 - b. Approximate Permit Fee: Based upon Plumbing System Cost in accordance with IDAPA 24.39.20.500.02.c schedule listed below.
 - 1) Plumbing System Cost up to \$10,000.00: $\text{Plumbing System Cost} \times 0.02 + \60.00 .
 - 2) Plumbing System Cost between \$10,000.00 and \$100,000.00: $(\text{Plumbing System Cost} - \$10,000.00) \times 0.01 + \260.00 .
 - 3) Plumbing System Cost \$100,001.00 and higher: $(\text{Plumbing System Cost} - \$100,000.00) \times 0.005 + \$1,160.00$.
 - c. Procedure:
 - 1) After obtaining Building Permit, Contractor (or plumbing subcontractor) shall submit application for plumbing contractor permit to the IDOPL.
 - 2) Obtain permit and submit copy to Engineer before starting the Work at the Site
- B. Licenses:
 - a. State licenses are required for electrical, HVAC, and plumbing construction. The State of Idaho licenses individuals, not firms. Obtain licenses from the relevant IDOPL board.
 - b. Work of an electrical, HVAC, or plumbing nature shall be performed under the supervision of a "Master Electrician", "Master of HVAC", or "Master Plumber", as applicable, possessing a current State license.
 - c. Contractor apprentices and journeymen shall be registered with IDOPL in accordance with the relevant IDAPA regulations.
 - d. Before starting the Work, submit copies of the applicable licenses required for the Project to Engineer.

1.6 CONFINED SPACE ENTRY PERMIT

- A. Coordinate compliance with confined space entry permit with requirements of Section 01 41 28 - Confined Space Entry Permit.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 41 28
CONFINED SPACE ENTRY PERMIT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. OWNER has determined that portions of the Site may constitute confined spaces or permit-required confined spaces, as defined in this Section.
2. CONTRACTOR shall provide appropriate measures, including labor, supervision, equipment, protective devices, and incidentals, to protect the health and safety of personnel at the Site relative to confined spaces, and who may be affected by the Work in confined spaces including, without limitation: employees and agents of CONTRACTOR, Subcontractors, Suppliers, OWNER, ENGINEER, and ENGINEER's consultants, while engaged in performance of their respective duties at Site.
3. Comply with requirements of OWNER's confined space entry permitting program, if any.

1.2 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:

1. "Confined spaces" are areas on or about the Site as defined in 29 CFR 1910.146(b), 29 CFR 1926.21(b)(6), and other Laws and Regulations. Confined spaces include, but are not limited to: storage tanks, process vessels, bins, boilers and similar spaces; ventilation or exhaust ducts and stacks; manholes, underground utility vaults and chambers, sewers, pipelines, tunnels; and open-topped spaces greater than four feet deep, such as pits, tubs, vaults, and vessels.
2. "Entry permit" means the written or printed document provided by the employer of personnel entering permit-required confined space, to allow and control entry into permit-required confined space and that contains the information specified in 29 CFR 1926.146(f), and other Laws and Regulations.
3. "Permit-required confined space" means confined space as defined in 29 CFR 1926.146(b) and other Laws and Regulations, and that has one or more of the following characteristics:
 - a. Contains or has potential to contain a hazardous atmosphere.
 - b. Contains material that has potential for engulfing an entrant.
 - c. Has internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or floors, or by floor that slopes downward and tapers to a smaller cross-section.
 - d. Contains other recognized serious safety or health hazard.
4. "Hot work permit" means the written authorization of employer of personnel entering a confined space to perform operations, such as riveting, welding, cutting, burning, and heating, capable of providing a source of ignition.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with Laws and Regulations related to protecting personnel working in or entering confined spaces, including:
 - 1. Code of Federal Regulations (CFR), Title 29, Part 1910, Occupational Safety and Health Standards.
 - 2. CFR, Title 29, Part 1926, Safety and Health Regulations for Construction.

1.4 SUBMITTALS

- A. Informational Submittals: If acceptable, written response for Informational Submittals required in this Section will not be returned to CONTRACTOR. Submit the following to OWNER; if submittals under this Section are furnished to ENGINEER, ENGINEER will forward all submittals under this Section to OWNER without review.
 - 1. Plan: Site-specific confined space entry plan, submitted upon request of OWNER.
 - 2. Permits and Reports: For each time personnel enter a confined space, copies of completed permits required for confined space entry, and completed confined space data sheets, submitted upon request of OWNER.

1.5 CONFINED SPACE ENTRY PLAN

- A. Prepare, maintain, and implement Site-specific confined space entry plan which shall be incorporated into CONTRACTOR's Site-specific health and safety plan. Maintain copy of the confined space entry plan at the Site for access by employees, OWNER, and authorities having jurisdiction. Confined space entry plan shall include:
 - 1. Results of CONTRACTOR's Site-specific hazard assessment to identify confined spaces that are permit-required confined spaces, including list of all such spaces that will be accessed for the Work. Update the list as required throughout the Project.
 - 2. Requirements for safeguarding access to, and restricting non-permitted personnel from accessing, permit-required confined spaces during the Project.
 - 3. Project-specific procedures to be followed when entering or accessing permit-required confined spaces.
 - 4. Documentation of training provided to each person that will enter, or work in conjunction with entry to, permit-required confined spaces.
 - 5. Update the plan by adding copies of permits issued and records of entry to permit-required confined spaces, as required in Article 1.6 of this Section.

1.6 CONFINED SPACE SAFETY

- A. Personnel entering confined space shall be trained in accordance with 29 CFR 1926.21 (b)(6), 29 CFR 1910.146(g), and other Laws and Regulations.
- B. Comply with 29 CFR 1910.146, other Laws and Regulations, and requirements of authorities having jurisdiction.
- C. Recordkeeping: Using the example forms attached to this Section, or other forms required by CONTRACTOR, OWNER, or authority having jurisdiction, issue for each instance of access to permit-required confined space, completed permit(s) and

complete associated data sheet. File completed permits and data sheets in the Site-specific confined space entry plan, and submit in accordance with Article 1.4 of this Section. Such permits and information shall include:

1. Permit for entry to permit-required confined space(s).
2. Permit for hot work in permit-required confined space(s).
3. Complete confined space data sheet.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SUPPLEMENTS

- A. The example forms listed below, following this Section's "End of Section" designation, are part of this Specifications Section:
 1. "Confined Space Data Sheet" (one page).
 2. "Confined Space Entry Permit (two pages).
 3. "Confined Space Hot Work Permit" (one page).

END OF SECTION

CONFINED SPACE DATA SHEET

Name of Confined Space Entered: _____

Location of Confined Space Entered: _____

Contractor/Subcontractor Accessing Confined Space: _____

PRE-ENTRY SYSTEM CONTROLS USED

Mechanical: Isolate, lockout and de-energize to zero potential energy.

Engulfment: Blank/block/cap/bleed off lines. Lock out gates, valves, pumps.

Electrical: Lockout/Tag-out

Inerting: Flush/Purge/Vent

Special Precautions: _____

Check

☐☐☐☐

ATMOSPHERE RESULTS

Date of Last-measured Values: _____

	Oxygen	Explosive	H ₂ S/Toxic	CO	Date/Time Completed	Initials
Permissible Range	19.5%-23.5%	< 10% LFL	< 10 ppm H ₂ S	< 35 ppm	--	--
Last Measured						
Values This Entry						

SITE AND PERSONNEL SAFETY (check if required, list type where applicable)

Personal Protective Equipment (PPE) Used:

Safety Harness ☐. Life Lines ☐. Hard Hats ☐. Fall Protection ☐. Retrieval ☐. Eye ☐. Ear ☐. Face ☐. Hand ☐.

Foot ☐. Respiratory ☐ (type) _____. Clothing ☐ (type) _____

Other: ☐ _____

Rescue and Emergency Equipment On-Hand/Used:

Retrieval Equipment ☐. Fire Extinguishers ☐. Radios/Telephone ☐. Ladder ☐. Other ☐ _____

Equipment on Standby for Rescue Personnel ☐ _____

Site Safety Equipment/Items On-Hand/Used:

Explosion-Proof Lighting ☐. Barriers/Shield/Barricades ☐ (type) _____. Postings/Flagging ☐.

Other ☐ _____

List specific equipment that was isolated, de-energized, and locked out.

CONFINED SPACE ENTRY PERMIT

ENTRY TEAM

Contractor/Subcontractor Accessing Confined Space: _____

Site or Facility: _____

Specific Confined Space to be Entered: _____

Purpose of Entry (describe the work to be performed): _____

Date: _____ Time: _____ Expected Job Duration (days/hours): _____

Entry Supervisor: _____ Designated Attendant: _____

Authorized/Qualified Entrants: _____

Entry Team Rotation:

Date: _____ Time: _____

Entry Supervisor: _____ Designated Attendant: _____

Authorized/Qualified Entrants: _____

Entry Team Rotation:

Date: _____ Time: _____

Entry Supervisor: _____ Designated Attendant: _____

Authorized/Qualified Entrants: _____

Communication Procedures:

Entry Team: _____

Standby/Rescue Personnel: _____

Sign-Offs:

Person Authorizing this Entry: _____

Entry Supervisor: _____

Person Terminating Permit: _____ Date: _____ Time: _____

Distribution to: _____

Attach to this permit a list of rescue and emergency services that can be summoned and the means (such as the equipment to use and the telephone numbers to call) for summoning such emergency services.

Confined Space Entry Permit (PAGE 2 of 2)

PRE-ENTRY SYSTEM CONTROL

Mechanical: Isolate, lockout and de-energize to zero potential energy.
Engulfment: Blank/block/cap/bleed off lines. Lock out gates, valves, pumps.
Electrical: Lockout/Tag-out
Inerting: Flush/Purge/Vent
Special Precautions: _____

Check	Date/Initials
Completed <input type="checkbox"/>	_____
Completed <input type="checkbox"/>	_____
Completed <input type="checkbox"/>	_____
Completed <input type="checkbox"/>	_____

ATMOSPHERE - Tested by portable atmospheric monitor with audible and visual alarms.

No one will enter a space with an unsafe atmosphere without approval from the Contractor Superintendent.

	Oxygen	Explosive	H ₂ S/Toxic	CO	Date/Time Completed	Initials
Permissible Range	19.5%-23.5%	< 10% LFL	< 10 ppm H ₂ S	< 35 ppm	--	--
Pre-Entry						
Post Ventilation						
Continuous						
Continuous						
Continuous						

Ventilation Used (circle one): Mechanical Natural

Special Precautions: (See Confined Space Data Sheet) _____

SITE AND PERSONNEL SAFETY (check if required, list type where applicable)

Personal Protective Equipment (PPE) Required:

Safety Harness ☐. Life Lines ☐. Hard Hats ☐. Fall Protection ☐. Retrieval ☐. Eye ☐. Ear ☐. Face ☐. Hand ☐. Foot ☐. Respiratory ☐ (type) _____. Clothing ☐ (type) _____.
Other: ☐ _____

Rescue and Emergency Equipment Required:

Retrieval Equipment ☐. Fire Extinguishers ☐. Radios/Telephone ☐. Other ☐ _____.
Equipment on Standby for Rescue Personnel ☐ _____

Site Safety Equipment/Items Required:

Explosion-Proof Lighting ☐. Barriers/Shield/Barricades ☐ (type) _____. Postings/Flagging ☐.
Other ☐ _____

List specific equipment to be isolated, de-energized, and locked out.

CONFINED SPACE HOT WORK PERMIT

Contractor/Subcontractor Accessing Confined Space for Hot Work: _____

Site or Facility: _____

Specific Confined Space to be Entered: _____

Date: _____ Time: _____

Expected Job Duration (days/hours): _____

Purpose of Entry (describe the work to be done): _____

Explain Why Work Cannot be Done Outside of the Confined Space: _____

Safety Equipment Required:

Fire Extinguishers: Yes _____ No _____ Number _____

 Type _____

Respirators: Yes _____ No _____ Number _____

 Type _____

Other Equipment: _____

Authorizing Supervisor:

Print Name _____

Signature _____

Date Signed _____

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SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Defined terms and terminology.
2. Construction Codes: Indication of applicable building code and other construction codes.
3. Referenced Standard Specifications and Construction Guidelines: Indication of Owner's or third-party specifications and construction standards applicable to one or more parts of the Work.
4. Abbreviations in general use in the Contract Documents.
5. Reference Standards: General requirements regarding reference standards, including a listing of reference standard-issuing organizations (and their acronyms) used in the Contract Documents.

1.2 REFERENCES

A. Contract Language Addressed to Contractor:

1. Unless expressly indicated otherwise, language of the Contract Documents addresses Contractor, and the Contract Documents show and indicate Contractor's obligations.
2. Unless indicated otherwise, expressions such as, "provide", "furnish", "install", "perform", "retain services of", "remove", "demolish", "replace", and the like refer to Contractor's obligations under the Contract.

B. Defined Terms:

1. Defined terms, indicated with initial capital letters or with all-capital letters, used in the Contract Documents, are indicated in the General Conditions, as may be modified by the Supplementary Conditions. Additional defined terms, if any, in general use in the Contract Documents are indicated below. Where used, such defined terms apply to the singular and plural thereof.
 - a. None.
2. Additional defined terms, applicable to the Work of a given Specifications Section, may be indicated in the associated Specifications Section.

C. Terminology:

1. Terminology, indicated without initial capital letters, used in the Contract Documents, are indicated in the General Conditions, as may be modified by the Supplementary Conditions. Additional terminology in general use in the Contract Documents are indicated below. Where used, such terminology applies to the singular and plural thereof.
 - a. "Shown" means information or requirements presented on the Drawings, in schedules, or in other types of graphic instruments.
 - b. "Indicated" means, as applicable: (1) graphic representations, notes, or schedules on the Drawings, or (2) other paragraphs, provisions, tables, or schedules in the Specifications and elsewhere in the Contract Documents.
 - c. "Specified", "noted", "scheduled", and similar terms, have the same meaning as "shown" and "indicated", as applicable, and are used to help the user locate the reference without limitation on the location.
 - d. "Installer", "applicator", or "erector" is Contractor's employees or Subcontractor, engaged to perform a specific construction activity, including installation, erection, application, or similar Work. Installers shall be experienced in the Work that installer is engaged to perform.

- e. “Experienced”, when used in conjunction with terms such as “installer”, “Subcontractor”, “Supplier”, “manufacturer”, and similar terms means (unless expressly indicated otherwise for the subject Work elsewhere in the Contract Documents) such person or entity, as applicable, has successfully completed not less than five previous projects similar in size, scope, and complexity to such person’s or entity’s work on this Project; being familiar with the special requirements indicated and required; being familiar with Laws and Regulations; and having complied with requirements of authorities having jurisdiction, and complying with written requirements of the Supplier of the material or equipment being installed.
 - f. “Assigned specialists” and similar terms: Certain Specifications require specific construction activities be performed by specialists with recognized, extensive experience in such operations. Engage said specialists for such activities, and their engagement is a requirement over which Contractor has no option. These requirements do not conflict with enforcement of building codes and other Laws and Regulations. Such requirements are not intended to interfere with local trade union jurisdictional settlements and similar conventions. Such assignments shall not relieve Contractor of responsibility for complying with the requirements of the Contract Documents.
 - g. Trades: Use of terms such as “carpentry” does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter”, unless otherwise indicated in the Contract Documents or required by Laws or Regulations, or required by an applicable project labor agreement. Such terminology also does not imply that indicated requirements apply exclusively to trade personnel of the corresponding generic name.
2. Additional terminology, applicable to the Work of a given Specifications Section, may be indicated in the associated Specifications Section.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:

- 1. References in the Contract Documents to local building and construction code(s) means the following:
 - a. City of Hailey, Idaho: The Hailey Municipal Code (Title 15 Building and Construction) contains regulations for Building, Electric, Fire, Property Maintenance, Mechanical, Plumbing, Residential, and Solar Energy. Such codes incorporate City of Hailey amendments, if any, to the corresponding State of Idaho construction codes and to the corresponding International Code Council construction codes.

1.4 REFERENCED STANDARD SPECIFICATIONS AND CONSTRUCTION GUIDELINES

- A. Except as otherwise shown or indicated in the Contract Documents, the Work shall comply with the Contract Documents and the following referenced specifications and construction guidelines:
 - 1. Municipal Code by City of Hailey, Idaho, which can be obtained at Hailey City Hall.
 - 2. Idaho Standards for Public Works Construction (IPSWC) Standard Specifications, 2020 Edition. IPSWC 2020 Edition can be purchased online on the Local Highway Technical Assistance Council (LHTAC) website at Contractor’s (non-compensable) cost. Standard Specifications’ bidding and contracting requirements do not apply to this Contract.
- B. Engineer is not the author of, is not responsible for, and did not seal and sign the referenced specifications and construction guidelines indicated above. Such referenced specifications and construction guidelines are not part of the Contract Documents. Where compliance with referenced specifications or construction guidelines is required by the Contract but requirements are unclear or conflict with requirements of the Contract Documents, submit to Engineer request for interpretation or clarification. .
- C. Maintain at the Site complete copy (in either paper or electronic form) of referenced specifications and construction guidelines indicated above. Make such copy available for

Engineer's, Resident Project Representative's (RPR), or Owner's Site Representative's (OSR) use in Contractor's field office at the Site.

1.5 ABBREVIATIONS.

A. Abbreviations - General:

1. Abbreviations commonly used in the Contract Documents are indicated in this Article or on the Drawings, except as further indicated in the following paragraphs, .
2. Additional abbreviations, specific to the Work of a given Specifications section, may be indicated in the associated Specifications.
3. Typical equipment abbreviations are indicated in Section 01 61 03 - Equipment - Basic Requirements.
4. Piping system abbreviations are indicated in Section 40 05 00 - Pipe and Pipe Fittings - Basic Requirements.

B. Common abbreviations that may be used in the Contract Documents are indicated below, alphabetically by their written-out meaning:

alternating current	AC
ampere	A, or amp
Americans with Disabilities Act	ADA
Americans with Disabilities Act Accessibility Guidelines	ADAAG
ante meridian	a.m.
Architectural Barriers Act	ABA
average	avg
biochemical oxygen demand	BOD
five-day biochemical oxygen demand	BOD ₅
brake horsepower	Bhp or BHP
British thermal unit	Btu
building information model	BIM
carbonaceous biochemical oxygen demand	CBOD
five-day carbonaceous biochemical oxygen demand	CBOD ₅
chemical oxygen demand	COD
Celsius (or Centigrade)	C
chlorinated polyvinyl chloride	CPVC
chlorofluorocarbons	CFC
Code of Federal Regulations	CFR
computer-aided drafting and design	CADD, or CAD
cubic inch	cu in, or CU IN, or in ³
cubic foot	cu ft, or CU FT, cf, CF, or ft ³
cubic yard	cu yd, or CU YD, or CY, or yd ³
cubic feet per minute	CFM, or cfm
cubic feet per second	CFS, or cfs

decibel	dB, dBA, or dBa
degree Celsius	degrees C, °C, or deg C
degrees Fahrenheit	degrees F, °F, or deg F
diameter	dia
direct current	DC
dollars	\$
each	ea
efficiency	eff
Fahrenheit	F
feet	ft or FT
feet per hour	FPH, or ft/hr
feet per minute	FPM or ft/min
feet per second	fps, or ft/s
figure	fig
flange	flg
foot-pound	ft-lb or FT-LB
gallon	gal or GAL
gallons per hour	GPH, gph, or gal/hr
gallons per minute	GPM, or gpm
gallons per second	GPS, or gps
gram	g
grams per liter	g/L
heating, ventilating, and air conditioning	HVAC
Hertz	Hz
horsepower	hp or HP
hour	hr or HR
human-machine interface	HMI
inch	in. or IN
inches of mercury	in. Hg
inches water gage	in. w.g.
inch-pound	in.-lb
inside diameter	ID
iron pipe size	IPS
thousand pounds	kips
thousand pounds per square inch	ksi or KSI
kilovolt-ampere	kva, or kVA
kilowatt	Kw, or

kilowatt-hour	Kwhr, kWhr, or kwh, kWh
linear foot	lin ft or LF
liter	L
Leadership in Energy and Environmental Design (USGBC)	LEED
maximum	max
mercury	Hg
mile	mi
miles per hour	mph or MPH
milligram	mg
milligrams per liter	mg/l or mg/L
milliliter	ml
millimeter	mm
million gallons per day	MGD or MGD
million gallon	MG
minimum	min
national pipe threads	NPT
net positive suction head	NPSH
net positive suction head available	NPSHA
net positive suction head required	NPSHR
nitrogen oxide (total concentration of mono-nitrogen oxides such as nitric oxide (NO) and nitrogen dioxide (NO ₂))	NOx
nominal pipe size	NPS
number	no. or #.
operator interface terminal	OIT
ounce	oz
ounce-force	ozf
outside diameter	OD
parts per hundred	PPH, or pph
parts per million	PPM, or ppm
parts per billion	PPB, or ppb
polychlorinated biphenyl	PCB
polyvinyl chloride	PVC
post meridian	p.m.
pound	lb, LB, lbs, or LBS
pounds per square inch	PSI, or psi
pounds per square inch absolute	PSIA, or psia
pounds per square inch gauge	PSIG, or psig

pounds per square foot	PSF, or psf
process control system	PCS
programmable logic controller	PLC
revolutions per minute	RPM, or rpm
second	sec, or s
specific gravity	sp gr, or SG
square	sq
square foot	sq ft, or SQ FT, or sf, or ft ²
square inch	sq in., or SQ IN, or in ²
square yard	sq yd, or SY, or yd ²
standard	std
standard cubic feet per minute	SCFM, or scfm
total dynamic head	TDH
totally-enclosed fan-cooled	TEFC, or tefc
volt	V
volts alternating current	VAC, or vac
volts direct current	VDC, or vdc
volatile organic compounds	VOC

1.6 REFERENCE STANDARDS AND ORGANIZATIONAL ACRONYMS

A. Reference Standards - General:

1. Each entity engaged in the Work, including Contractor, Subcontractors, and Suppliers, shall be familiar with reference standards applicable to its portion(s) of the Work. Comply with such reference standards when required by the Contract Documents or appropriate fabrication and construction practice, unless the Contract Documents requirements exceed those of the associated reference standard.
2. Refer to the General Conditions, as may be modified by the Supplementary Conditions, relative to reference standards and resolving discrepancies between reference standards and the Contract Documents.
3. Provisions of reference standards are in effect in accordance with the Specifications and other provisions of the Contract Documents where reference standards are cited.
4. Copies of applicable reference standards are not included in or bound with the Contract Documents. Where reference standards are needed for the Work, obtain such reference standards(s) from the publication source.

B. Organization Names and Acronyms:

1. Where reference standards, specifications, manuals, Laws or Regulations, or other published data of international, national, regional, or local organizations are cited in the Contract Documents, the organization issuing the standard (or other type of document) may be referred to by its acronym only.
2. The following acronyms that may appear in the Contract Documents shall have the meanings indicated below, unless expressly indicated otherwise in that part of the Contract Documents where such standard (or other document) is cited.
3. Listing is alphabetical by acronym.

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Bearing Manufacturers Association (formerly Anti-Friction Bearing Manufacturers Association (AFBMA))
ACI	American Concrete Institute
ACS	American Chemical Society
ADSC-IAFD	International Association of Foundation Drilling.
AEIC	Association of Edison Illuminating Companies
AF&PA	American Forest and Paper Association
AGI	American Geosciences Institute
AGMA	American Gear Manufacturers Association
AI	Asphalt Institute
AIA	American Institute of Architects
AIChE	American Institute of Chemical Engineers
AIPG	American Institute of Professional Geologists
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standards Committee
AMA	Acoustical Materials Association
AMCA	Air Movement and Control Association
AMP	National Association of Architectural Metal Manufacturers, Architectural Metal Products Division
AMPP	Association for Materials Protection and Performance
ANSI	American National Standards Institute
APA	The Engineered Wood Association
APHA	American Public Health Association
API	American Petroleum Institute
AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ARS	American Rail Standard
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society for Non-Destructive Testing

ASQ	American Society for Quality
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials
AWCI	Association of the Wall and Ceiling Industry
AWI	Architectural Woodwork Institute
AWPA	American Wood Protection Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association
CASE	Coalition of American Structural Engineers (part of the American Council of Engineering Companies (ACEC))
CBMA	Certified Ballast Manufacturers Association
CBP	United States Customs and Border Protection
CDA	Copper Development Association
CEMA	Conveyor Equipment Manufacturers Association
CGA	Compressed Gas Association
CISCA	Ceilings and Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CMAA	Crane Manufacturers Association of America
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
DBIA	Design-Build Institute of America
DHS	United States Department of Homeland Security
DIN	Deutsches Institut für Normung, eV (German Institute for Standardization)u
DIPRA	Ductile Iron Pipe Research Association
EJCDC	Engineers Joint Contract Documents Committee
EJMA	Expansion Joint Manufacturers Association, Inc.
ETL	Intertek Testing Services, Inc. (formerly ETL Testing Laboratories, Inc.)
FAA	Federal Aviation Administration (US Department of Transportation)
FCC	United States Federal Communications Commission
FEMA	Federal Emergency Management Agency (US Department of Homeland Security)
FHWA	Federal Highway Administration (US Department of Transportation)
FIDIC	International Federation of Consulting Engineers
FM	Factory Mutual (FM Global)

FRPI	Fiberglass Reinforced Plastics Institute
FS	Federal Specification
FTA	Federal Transit Administration, United States Department of Transportation
GA	Gypsum Association
GANA	Glass Association of North America
HEW	United States Department of Health, Education and Welfare
HI	Hydraulic Institute
HMI	Hoist Manufacturers Institute
HUD	United States Department of Housing and Urban Development
IBC	International Building Code
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IFI	Industrial Fasteners Institute
IRI	Industrial Risk Insurers
ISA	International Society of Automation
ISI	Institute for Sustainable Infrastructure
ISO	Insurance Services Office
ISO	International Organization for Standardization
LPI	Lightning Protection Institute
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association
MS	Military Specifications
MSS	Manufacturers' Standardization Society
MMA	Monorail Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NAPF	National Association of Pipe Fabricators, Inc.
NARUC	National Association of Regulatory Utilities Commissioners
NAVFAC	Naval Facilities Engineering Command (US Navy)
NBHA	National Builders Hardware Association
NBS	National Bureau of Standards (United States Department of Commerce)
NCMA	National Concrete Masonry Association
NEC	National Electric Code
NELMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act

NESC	National Electrical Safety Code
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NHPMA	Northern Hardwood and Pine Manufacturers Association
NICET	National Institute for Certification in Engineering Technologies
NIST	National Institute of Standards and Technology (United States Department of Commerce)
NLGA	National Lumber Grades Authority
NRC	United States Nuclear Regulatory Commission
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NSPE	National Society of Professional Engineers
NSSGA	National Stone, Sand, and Gravel Association
NTMA	National Terrazzo and Mosaic Association
OSHA	Occupational Safety and Health Administration, United States Department of Labor
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PEI	Porcelain Enamel Institute
PFI	Pipe Fabrication Institute
PPI	Plastics Pipe Institute
PGMC	Primary Glass Manufacturers Council
PS	Product Standards Section, United States Department of Commerce
RCSC	Research Council on Structural Connections (part of AISC)
RMA	Rubber Manufacturers Association
RUS	Rural Utility Service (division of Rural Development of the USDA)
SAE	Society of Automotive Engineers
SCAQMD	Southern California Air Quality Management District
SCPRF	Structural Clay Products Research Foundation
SCTE	Society of Cable Telecommunications Engineers
SDI	Steel Deck Institute
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturing Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association

SPI	Society of the Plastics Industry
SPIB	Southern Pine Inspection Bureau
SSPC	Society for Protective Coatings (formerly, Steel Structures Painting Council)
SWI	Steel Window Institute
TCNA	Tile Council of North America
TEMA	Tubular Exchanger Manufacturers Association
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance
TSA	Transportation Security Administration (United States Department of Homeland Security)
UCC	Uniform Commercial Code
UL	Underwriters Laboratories, Inc.
USAB	United States Access Board
USACE	United States Army Corps of Engineers (also abbreviated as COE or USACOE)
USDA	United States Department of Agriculture
USDOE	United States Department of Energy
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USGBC	United States Green Building Council
USGS	United States Geological Survey
USPHS	United States Public Health Service
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association
WCMA	Wood Component Manufacturers Association
WDMA	Window and Door Manufacturers Association
WEF	Water Environment Federation (formerly the Water Pollution Control Federation)
WWEMA	Water and Wastewater Equipment Manufacturers Association
WWPA	Western Wood Products Association

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 45 25
TESTING AND DISINFECTING HYDRAULIC STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Indication of specific hydraulic structures to which requirements of this Section apply, as indicated in the "Schedules" Article near the end of this Section.
 - 2. Water required for the Work of this Section.
 - 3. Preparation for testing.
 - 4. Hydrostatically testing hydraulic structures for leakage.
- B. Scope:
 - 1. Contractor shall perform testing of hydraulic structures indicated in the "Schedules" Article at the end of this Section. For such hydraulic structures, provide all labor, materials, equipment (whether temporary or permanent), tools, services, and incidentals necessary or required for the Work of this Section.
 - 2. Separately test each hydraulic structure.
 - a. Perform separate hydrostatic testing for each portion of the hydraulic structure that can be isolated upon Substantial Completion and used while adjacent portion of hydraulic structure is dry.
- C. Related Requirements: Include, but are not necessarily limited to, the following:
 - 1. Section 03 01 30 - Repair and Rehabilitation of Existing Construction.
 - 2. Section 03 31 30 - Concrete, Materials and Proportioning.
 - 3. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.

1.2 REFERENCES

- A. Terminology:
 - 1. Terminology indicated below are not defined terms and are not indicated with initial capital letters, but when used in this section have the meaning indicated below:
 - a. "Hydraulic structures" means those structures indicated in one or more of the schedules (tables) at the end of this Section.
- B. Reference Standards: Standards referenced in this section include, but are not necessarily limited to, the following:
 - 1. American Concrete Institute (ACI):
 - a. 350.1 - Specification for Tightness Testing of Environmental Engineering Concrete Containment Structures and Commentary.
 - 2. American Public Health Association (APHA), American Waterworks Association (AWWA), Water Environment Federation (WEF):
 - a. APHA/AWWA/WEF - Standard Methods for Examination of Water and Wastewater.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the Work of this Section with other Work, trades, and contractors (if any) to allow such entities to perform their responsibilities that must be performed or completed prior to the Work of this Section.

2. Completion of the Work of this Section and Engineer's acceptance of associated test results is required prior to Contractor requesting inspection for Substantial Completion of the associated Work.
- B. Scheduling and Sequencing:
1. Provide the Work via sequences and scheduling to minimize the impact of, and on, hydrostatic testing.
 2. For concrete hydraulic structures, prior to testing, verify required 28-day concrete strength has been achieved and concrete is fully cured.
 3. Prior to testing, the structure shall be complete, including the installation of all structural slabs, baffle walls, and connecting elements, unless allowed otherwise by the Contract Documents or the Engineer.
 4. Scheduling and interior coatings or finishing of hydraulic structures.
 - a. Provide required coatings and finishing of interior surfaces of hydraulic structures before performing testing.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
1. Testing plan:
 - a. In accordance with the "Testing Plan" Article in this Section.
 2. Leak Remediation Plan: Prior to commencing hydrostatic testing, furnish Submittal indicating the following:
 - a. Indication of each type of potential leak, including indication of construction materials for applicable hydraulic structures.
 - b. Proposed repair materials for each type of potential leak. For concrete hydraulic structures, repair material shall be in accordance with applicable Specifications of Division 03 - Concrete. For non-concrete hydraulic structures, repair materials shall be in accordance with Specifications for the associated hydraulic structure.
 - c. Proposed repair procedures for each type of potential leak. For concrete hydraulic structures, repair procedures shall be in accordance with applicable Specifications of Division 03 - Concrete. For non-concrete hydraulic structures, repair procedures shall be in accordance with Specifications for the associated hydraulic structure.
- B. Informational Submittals: Submit the following:
1. Test and Evaluation Reports:
 - a. Within 24 hours of completion of hydrostatic testing for each hydraulic structure, submit photographs of each leak and damp area prior to performing remedial work. Include distant photos and close-ups to document conditions. Include drawing or sketch showing locations of each leak, including key plan as necessary.
 2. Supplier's Instructions:
 - a. Supplier's repair procedures for remedying leaks in precast concrete or prestressed concrete.
 3. Field Quality Control Submittals:
 - a. Results of each hydrostatic test.
 - b. Results of water quality testing, including:
 - 1) Chain of custody documentation for samples obtained for testing.
 - 2) Laboratory results of water quality testing for each hydraulic structure disinfected.
 - 3) Certification by Contractor and testing laboratory that tests were performed in compliance with reference standards.

1.5 TESTING PLAN

A. Testing Plan - General:

1. Submit testing plan for the Work of this Section.
2. Obtain Engineer's approval of testing plan Submittal not later than 30 days prior to starting the Work for the first hydrostatic test.
3. Where necessary, obtain permits and approvals of authorities having jurisdiction before submitting the testing plan. Include such permits and approvals, where necessary, in the testing plan Submittal.
4. Engineer's approval (or other disposition assigned to testing plan Submittal) and comments in no way modifies Contractor's sole responsibility for means, methods, techniques, procedures, and sequences of construction or the associated safety and protection measures. Engineer's approval (or other disposition assigned) and comments are only to endeavor to determine compliance with the Contract Documents relative to judging the acceptability of the Work.

B. Required Content of Testing Plan Submittal:

1. Hydrostatic Testing:
 - a. Schedule (table) of hydraulic structures to be hydrostatically tested, indicating for each the structure's name, location, and proposed water surface elevation for the hydrostatic test.
 - b. Time-based schedule for required hydrostatic tests, coordinated with the current Progress Schedule accepted by Engineer. For each hydrostatic test, indicate planned dates for cleaning, observation by Engineer of cleaned hydraulic structure, completion of temporary bulkheading or other temporary facilities required or necessary, dates of filling the hydraulic structure, wetting period (if required) in accordance with the Contract Documents, testing period, drainage of hydraulic structure (if necessary), and submittal of written results of test.
 - c. Source of water for each hydrostatic test, including indication of whether source is potable or non-potable water.
 - d. For each test, provide brief, narrative description of how water will be conveyed to and, where necessary, from, the hydraulic structure, including indication of proposed rate of water withdrawal from source, proposed rate of water discharge from hydraulic structure after testing, and temporary equipment proposed for use. Where the Contract Documents establish maximum allowable flow rates, clearly indicate how monitoring such compliance will be performed. Where temporary flow meter is proposed or required, include in testing plan copy of current, valid calibration of each flow meter proposed for use.
 - e. Where potable water will be used for hydrostatic testing, include in testing plan written approval of owner of water utility for use of source and indication of whether water utility or Contractor will furnish and install temporary backflow preventers. Where temporary backflow preventers will be provided by Contractor, include copy of current, valid certification (by duly certified backflow preventer technician) for backflow preventer(s) proposed for use, including indication of specific, identification data for such equipment.
 - f. For hydraulic structures that will be open to the atmosphere, indicate, via brief narrative and appropriate drawings, sketches, or photographs, proposed means for monitoring evaporation and precipitation during testing, including indication of each location of such monitoring.
 - g. Proposed location and means of measuring water surface elevation at start and end of hydrostatic testing. Where necessary, include appropriate drawing, sketch, or photograph to indicate proposed location.
 - h. Proposed location(s) for discharge of test water, including copy of approval for such discharge from authority having jurisdiction, where applicable. Indication of acceptable leakage volume, in accordance with the allowable leakage rates indicated in the "Schedules" Article of this Section. Where necessary include calculation of volume of

hydraulic structures being tested and determination of allowable leakage, if any, allowed by the Contract Documents. Indicate plan and duration for repeating hydrostatic testing, if required, after leaks (if any) are remedied.

- i. Sample format for presenting written results of hydrostatic testing.

PART 2 - PRODUCTS

2.1 WATER

A. Water for Testing :

1. In addition to requirements of this Section, comply with Section 01 51 05 - Temporary Utilities. Among other requirements Section 01 51 05 - Temporary Utilities indicates responsibility for furnishing water necessary for testing and disinfecting.
2. Comply with ACI 350.1 for water for hydrostatic testing of concrete structures, unless otherwise indicated in the Contract Documents.
3. Sources - General:
 - a. Where hydraulic structures to be hydrostatically tested, do not require disinfection, and will not be used for storing chemicals, unless otherwise required, water for hydrostatic testing may be potable water or non-potable water.
 - 1) Non-potable water, when used, shall be one of the following: fresh (without brine) surface water, groundwater (where available in sufficient quantity), treated final effluent from a wastewater treatment facility or water reclamation facility, or other from source acceptable to Engineer (following Engineer's consultation with Owner or facility manager as applicable). Such water shall be of reasonable quality, free of debris and noticeable biological growth and materials. Water used for hydrostatic testing shall not contain Constituents of Concern in quantity that results in Hazardous Environmental Condition, permanent contamination of the hydraulic structure tested, or effect detrimental to the Work and operation and maintenance of the facility.
4. Project-Specific Water Source(s):
 - a. The following may be used as source of water for hydrostatic testing:
 - 1) Utility Water. Rate of water withdrawal shall not exceed 100 gallons per minute.
 - 2) Potable Water. Contractor shall utilize potable water provided through the Headworks Building backflow preventer to supplement Utility Water to ensure that the Utility Water system is not overstressed and impact other plant system utilizing the Utility Water.
 - b. Do not use water source not acceptable to Engineer (following Engineer's consultation with Owner or facility manager as applicable).
5. Limitations on Water Conveyance Rates:
 - a. In addition to limitation(s), if any, on rate of water withdrawal from source, indicated above, maximum rates of water conveyance through temporary equipment and materials shall:
 - 1) Not result in filling of hydraulic structure at rate greater than 4 vertical feet per hour.
 - 2) Not cause damage or erosion at point of discharge. Provide appropriate energy-dissipating materials as necessary.
 - 3) Not cause temporary equipment and materials used for conveyance to exhibit undue strain or movement during operation.
6. Temporary Equipment and Materials for Conveyance of Water for Testing :
 - a. Provide, operate, and maintain temporary equipment and materials necessary for conveying water used for testing, including conveyance to hydraulic structure and discharge from hydraulic structure.
 - b. Sizes, capacity, and materials of temporary equipment and materials shall be suitable for the intended purpose and Contractor's means, methods, procedures, techniques, and sequences of construction.

- c. Provide temporary piping, couplings, valves, pumps, and appurtenances necessary.

2.2 REPAIR MATERIALS

- A. This Article addresses materials required for repairing hydraulic structures that do not pass required hydrostatic testing or exhibit leakage.
- B. Materials for Repairing Cracks and Surface Defects in Concrete:
 - 1. Materials for repairing concrete shall be in accordance with the following:
 - a. Section 03 01 30 - Repair and Rehabilitation of Existing Construction.
 - b. Section 03 31 30 - Concrete, Materials and Proportioning.
 - c. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
 - 2. When the Contract Documents do not address materials for necessary repairs, submit request for interpretation or clarification and Engineer will furnish requirements.
 - 3. For precast concrete or prestressed concrete hydraulic structures, obtain from Supplier that furnished the associated precast or prestressed concrete (and submit to Engineer), Supplier's recommendations and procedures for remedial work. Where such recommendations conflict with Contract requirements or Engineer's direction regarding repair materials required, obtain written interpretation or clarification from Engineer.
 - 4. Provide repair materials, for concrete that does not pass hydrostatic testing or otherwise exhibit leakage, at no additional cost to Owner, unless such testing is performed on hydraulic structure that existed prior to the Effective Date of the Contract, and Contractor's action or inaction did not create or exacerbate cracks or other defects in concrete.
 - 5. Coatings shall not be used as a material for stopping leakage through cracks unless approved by the Engineer.
- C. Materials for Repairing Hydraulic Structures Fabricated of Materials Other than Concrete:
 - 1. Provide repair materials consistent with the materials to be repaired, that will not result in corrosion or reduction in the useful life of the hydraulic structure and its appurtenances.
 - 2. Provide repair materials in accordance with recommendations of Supplier of the hydraulic structure.
 - 3. Provide repair materials, for hydraulic structures that do not pass hydrostatic testing or otherwise exhibits leakage, at no additional cost to Owner, unless such testing is performed on hydraulic structure that existed prior to the Effective Date of the Contract, and Contractor's action or inaction did not create or exacerbate cracks or other defects in the associated hydraulic structure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Preparation – General:
 - 1. Prepare for hydrostatic testing of concrete hydraulic structures in accordance with ACI 350.1.
 - 2. Prepare for testing of hydraulic structures, regardless of materials of construction in accordance with the Contract Documents.
 - 3. Prior to performing hydrostatic testing, provide necessary materials, whether temporary or permanent, such as caps, blind flanges, watertight bulkheads, and the like.
 - 4. Each hydraulic structure shall be free of visible defects and apparent leakage. Repair leaks in accordance with the Contract Documents.
 - 5. When the hydraulic structure is fully or partially buried, prior to commencing hydrostatic testing, draw down groundwater surface elevation to below bottom of hydraulic structure's base slab or mat. Maintain such groundwater surface elevation throughout the hydrostatic test.
- B. Cleaning - General:

1. Prior to testing, remove all scaffolding, planking, tools, rags, dirt, debris, rubbish, foreign matter, and material not part of the permanent structure.
2. Thoroughly clean hydraulic structures' walls, floors, and operating equipment by sweeping, high-pressure wash, scrubbing, or other methods that will not injure the Work and existing facilities.
3. Remove from each hydraulic structure all water, dirt, and foreign material accumulated during cleaning. Provide temporary pumps, piping, and facilities as necessary to discharge water from the cleaning operation in manner acceptable to Engineer, compliant with Section 01 57 05 - Temporary Controls, and in accordance with Laws and Regulations.
4. Do not proceed with testing until Engineer has accepted results of cleaning, following either Engineer's observation of the cleaned hydraulic structure or Engineer's observation via digital means.
5. Comply with Section 01 74 00 - Cleaning, and this Section.

C. Other Testing Required for Tanks:

1. As required by reference standards indicated in this Section and in the Specifications for the associated tank, perform other testing indicated, in addition to testing required in this Section.
2. Submit written results of such required testing together with other test results required in this Section.

D. Patching and Finishing of Concrete Hydraulic Structures:

1. Prepare concrete surfaces in accordance with ACI 350.1 and Section 03 31 30 - Concrete, Materials and Proportioning, Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.

3.2 HYDROSTATIC TESTING

A. Prior to starting hydrostatic testing, perform the following:

1. Comply with "Scheduling and Sequencing" provision of this Section's "Administrative Requirements" Article.
2. Valves, gates, blind flanges, and items other than concrete that control the flow of or otherwise retain fluid in the hydraulic structure shall be watertight for the hydrostatic test.
3. Repair defective concrete.
4. Advise Engineer and Owner prior to commencing filling hydraulic structure for hydrostatic testing. Minimum time between notice and starting to fill for hydrostatic testing shall be three days.
5. Do not perform hydrostatic testing during period when ambient temperature is below 33 degrees F.
6. Cold Weather Hydrostatic Testing: Comply with the following when hydrostatic testing will be performed when ambient air temperature has fallen below 40 degrees F within 48 hours prior to testing, or is projected to fall below 40 degrees F during hydrostatic testing:
 - a. Cold Weather Requirements – General:
 - 1) Visible ice, snow, or other frozen material on outside surface of hydraulic structure or within hydraulic structure being tested is unacceptable.
 - 2) Results of hydrostatic testing will be unacceptable when these requirements for cold weather hydrostatic testing are not implemented as required unless otherwise acceptable to Engineer (following Engineer's consultation with Owner or facility manager as applicable).
 - b. Ambient Air Temperature: Measure and record ambient air temperature at location of hydrostatic testing each day during hydrostatic testing at approximately 8:00 o'clock am local time.
 - c. Temperature of Structure Surface and Water: Measure and record temperatures of exterior surface of hydraulic structure and water at start of hydrostatic testing, and once

per hour whenever ambient air temperature is less than recorded at start of day as follows:

- 1) Measure concrete surface temperatures every 300 square feet of wall of hydraulic structure being tested. Surface temperature shall not be less than 35 degrees F.
- 2) Measure temperature of water in hydraulic structure at location between each wall of hydraulic structure and not less than two feet below water surface elevation. Water temperature eight] hours or longer during any period 72 hours prior to scheduled hydrostatic testing, or at any point during the scheduled test period.
- d. Provide tenting or other temporary enclosures, together with temporary heating, for hydraulic structures being hydrostatically tested when ambient air temperature is predicted to fall below 32 degrees F for eight hours or longer within 72 hours immediately prior to hydrostatic testing, or at any time during the hydrostatic testing.
7. Hydraulic structures with interior, wetted concrete surfaces shall remain filled with water for an initial adsorption period of not less than 72 hours. Following this initial period, provide make-up water to fill the hydraulic structure to specified water surface test elevation.

B. Hydrostatic testing – General:

1. Perform hydrostatic testing in accordance with this Section, other applicable provisions of the Contract Documents and the following:
 - a. ACI 350.1, Sections 1 and 2 for concrete hydraulic structures.
2. In the event of conflicting requirements between the Contract Documents and reference standards indicated, obtain written interpretation or clarification from Engineer before proceeding with the associated Work.
3. Analysis of data from hydrostatic testing of hydraulic structures shall be by Contractor in accordance with ACI 350.1 and this Section.

C. Required Water Surface Elevation for Hydrostatic Testing:

1. Required water surface elevation for hydrostatic testing of each hydraulic structure is indicated in the appropriate table in the “Schedules” Article at the end of this Section.
2. Using the water source indicated in “Article 2.1” of this Section, fill hydraulic structures to indicated water surface test elevation.
3. Where test elevation is not indicated and fluid level in the structure will normally be controlled by a weir, fill structure to elevation 6 inches below the weir crest.
4. Where test elevation is not indicated and structure does not have a flow control weir, test elevation shall be two feet below top of structure.
5. Contractor shall utilize new slide gate to isolate sections of the hydraulic structures within the Headworks Building to achieve the required water surface elevation for hydrostatic testing.

D. Filling Hydraulic Structures with Water:

1. Fill hydraulic structure for hydrostatic testing at rate that does not exceed limitations indicated in Article 2.1 of this Section.

E. Visual Observation for Apparent Leakage:

1. When water has reached indicated test elevation and required wetting period has elapsed, inspect hydraulic structure’s exposed surfaces for leakage. Before starting hydrostatic testing, repair apparent leakage or weeping.
2. Apparent leakage is when one or more areas evidence visible flow or area where moisture can be picked up on a dry hand.
3. Provide proper remedy of apparent leaks independent of hydrostatic testing.
4. Successfully passing hydrostatic testing does not relieve Contractor from obligation to remedy all apparent leaks.

F. Duration of Hydrostatic Testing:

1. Hydrostatic test duration will be approved by Engineer in the required testing plan Submittal and shall not be less than the following:
 - a. Cast-in-place concrete hydraulic structures.
 - b. Hydraulic structures for which allowable leakage is zero: 72 hours.
 - 1) For hydraulic structures where allowable leakage is greater than zero: The theoretical time required for the water surface to decrease by 3/8-inch, at the maximum allowable leakage rate indicated in the schedules (tables) at the end of this Section, but in no event longer than 120 hours.
 - c. Other Types of Tanks with Non-Absorbant Surfaces: One hour.

G. Allowable Leakage:

1. Leakage during the test period for hydraulic structures with vertical walls is defined as the volume calculated using the difference in water surface elevations at the start and end of the test period adjusted by adding the volume of precipitation and subtracting the volume of evaporation measured during the test period, and accounting for the change (if any) of water volume resulting from temperature caused change in water density.
2. Leakage during the test period for hydraulic structures with sloping walls is the quantity of water that must be supplied to the hydraulic structure or section thereof to maintain the water level within three inches of specified water surface test elevation during the hydrostatic test, plus the volume of water required to fill the hydraulic structure to specified water surface test elevation at conclusion of hydrostatic test, plus precipitation, minus evaporation, and accounting for the change (if any) of water volume resulting from temperature caused change in water density.
3. Allowable leakage rate for each hydraulic structure to be hydrostatically tested is indicated in the "Schedules" Article at the end of this Section.

H. Measurement Locations:

1. For hydraulic structures or portions thereof (when entire hydraulic structure is not tested as a whole) that are equal to or less than 1,000 square feet in water surface area, measure water level at not less than two locations approximately 180 degrees apart.
2. For hydraulic structures or portions thereof (when entire hydraulic structure is not tested as a whole) that are greater than 1,000 square feet in water surface area, measure water level at not less than four locations approximately 90 degrees apart.
3. Each measurement location shall be marked and given distinct reference number. Mark reference point on face of wall above test water surface in manner that will prevent movement or deterioration of reference point mark during the test. Remove reference point mark upon completion of testing and acceptance of testing results by Engineer.
4. Position the measurement locations to minimize effects of wave action and wind.

I. Evaporation and Precipitation Measurement:

1. Evaporation and Precipitation Measurement Vessels:
 - a. In hydraulic structures open to atmosphere, whether or not fully or partially covered, a plastic, calibrated, open-topped container not less than 11-inch diameter and not less than 14-inches deep (for example, a five-gallon bucket) shall be provided at each measurement location.
 - b. Before starting test, fill with water to depth of six inches each evaporation-precipitation measurement vessel and float the vessel in the hydraulic structure, held in position near each measurement location.
 - c. Calibration increments in container shall be 1/16-inch or less.
2. Position evaporation-precipitation measurement vessels so that vessels are not shaded by hydraulic structure's walls, away from overhead items such as beams, pipes, and walkways.

J. Obtaining Test Measurements:

1. Do not start hydrostatic tests when severe weather conditions, such as heavy precipitation, high winds, change in average daily temperature of 35 degrees F or more, and other severe conditions are predicted for duration of test period.
 2. Record the following measurements at each test location at start of test period and at 12-hour intervals thereafter, to nearest 1/16-inch and nearest 0.1 degree F:
 - a. Distance from reference point elevation to actual water surface.
 - b. Depth of water in evaporation-precipitation containers.
 - c. Temperature of test water at point 18 inches below water surface.
 - d. Temperature of water in evaporation-precipitation measurement vessels at mid-depth.
 3. If actual water surface in hydraulic structure is subject to wave action at measurement location, record as data the average water surface elevation of wave oscillations. Contractor may desire to provide temporary baffling of appropriate material and dimensions to reduce wave oscillations in open-topped hydraulic structures.
 4. Change in the water surface elevation at each measurement location shall be averaged and adjusted as follows:
 - a. Total change in hydraulic structure's water surface elevation shall be adjusted by average change in water surface elevation in evaporation-precipitation measurement vessels.
 - b. Where averaged water temperature measurements vary by more than three degrees F from start to completion of test period, adjustment in test volume shall be determined by change of density of water resulting from change in the average water temperature.
 5. Determination of Leakage:
 - a. Hydraulic Structures with Vertical Walls: Leakage volume shall be the drop in water surface elevation measured during the test, averaged across all water level measurement locations, multiplied by water surface area of hydraulic structure tested.
 - b. Initial full volume shall include the volume of sloping tank bottoms, sump pits, and other features that contain water that is connected to the hydraulic structure during the hydrostatic test.
 - c. Allowable leakage shall be determined by multiplying the initial full volume by the daily leakage allowance and by the leakage test time period in days.
 - 1) Contractor shall deduct leakage through the slide gates from the overall structure leakage to determine hydraulic structure leakage.
- K. Criteria for Acceptance:
1. Hydrostatic test will pass if measured leakage is less than allowable leakage and the hydraulic structure does not evidence active leaks or weeping (where moisture can be picked up with a dry hand).
 2. If test becomes unreliable due to excessive precipitation, freezing, or other external factors, re-start and re-perform the test at no additional cost to Owner.
 3. If hydrostatic test fails, the hydraulic structure may be re-tested immediately without repairs. If subsequent hydrostatic test fails, repair probable areas of leakage and repeat the hydrostatic test.
 4. Re-test hydraulic structure until it meets criteria indicated for acceptance. Repair probable leakage areas before testing.
- L. Reuse and Disposal of Water Used in Hydrostatic Tests:
1. Obtain Engineer's acceptance before water used in one hydrostatic test is pumped to a different hydraulic structure for reuse in subsequent test.
- M. Unless otherwise indicated in the Contract Documents, hydraulic structure shall not be backfilled or have exterior coating applied (such as dampproofing) until Engineer accepts hydrostatic test results.

3.3 REPAIR

- A. This Article addresses repairing hydraulic structures that do not pass required hydrostatic testing or otherwise require repairs to eliminate apparent leakage. Repairs to remedy apparent leaks shall be performed independent of hydrostatic testing. Obtaining acceptable results from the hydrostatic test does not relieve Contractor from remedying running water leaks, seepage, or other apparent leaks.
- B. Repairing cracks and surface defects in concrete:
 - 1. Repairing of concrete shall be in accordance with the following:
 - a. Section 03 01 30 - Repair and Rehabilitation of Existing Construction.
 - b. Section 03 31 30 - Concrete, Materials and Proportioning.
 - c. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
 - 2. When the Contract Documents do not address providing necessary repairs, submit request for interpretation or clarification and Engineer will furnish requirements.
 - 3. For precast concrete or prestressed concrete hydraulic structures, also obtain recommended repair methods from Supplier that furnished the associated precast or prestressed concrete and submit to Engineer. Where such recommendations conflict with Contract requirements or Engineer's direction regarding repairs required, obtain written interpretation or clarification from Engineer.
 - 4. Perform repairs for concrete that does not pass hydrostatic testing or otherwise exhibits leakage, at no additional cost to Owner, unless such testing is performed on hydraulic structure that existed prior to the Effective Date of the Contract, and Contractor's action or inaction did not create or exacerbate cracks or other defects in concrete. Provide drawing(s) or sketch(es) showing locations of leaks, including key plan as necessary.
 - 5. Provide digital images (photographs) of each leak and damp area following implementation of remedy. Furnish distant photographic images and close-ups documenting conditions, keyed to Contractor-furnished drawing(s) or sketch(es), of leakage locations.
 - 6. Complete implementation of remedies of leakage independent of results of hydrostatic testing.
 - 7. Successful completion of hydrostatic testing does not relieve Contractor from remedying leakage.
- C. Repairing Hydraulic Structures Fabricated of Materials Other than Concrete:
 - 1. Perform repairs consistent with the materials to be repaired, that will not result in corrosion or reduction in the useful life of the hydraulic structure and its appurtenances.
 - 2. Perform repairs in accordance with recommendations of Supplier of the hydraulic structure and reference standards applicable to the type of hydraulic structure.
 - 3. Perform repairs for hydraulic structures that do not pass hydrostatic testing or otherwise exhibit leakage, at no additional cost to Owner, unless such testing is performed on hydraulic structure that existed prior to the Effective Date of the Contract, and Contractor's action or inaction did not create or exacerbate cracks or other defects in the associated hydraulic structure.

3.4 TESTING OF PIPING CONNECTED TO HYDRAULIC STRUCTURES

- A. Test piping connected to hydraulic structures in accordance with applicable requirements of the Contract Documents.

3.5 SCHEDULES

- A. Table 01 45 25-A - Hydraulic Structures Scheduled for Hydrostatic Testing Only: Clean and perform hydrostatic testing for the following:

Hydraulic Structure Number	Hydraulic Structure Service and Location	Water Surface Elevation for Hydrostatic Test (feet)	Allowable Leakage Rate (percentage of volume tested per 24-hour period)	Additional Notes
1.	Screen Influent Channel Headworks Building	5254.00	0.05	(1)
2.	Grit Weir	5251.30	0.05	(2)
3.	Grit Weir Box	5251.30	0.05	(3)
4.	Grit Chamber and Grit Channel Headworks Building	5253.50	0.05	(4)

- (1) Screen Influent Channel hydraulic testing consists of inlet channel from the pipe penetrations through outlet of the screens and shall be accomplished by closing GTE-02-07 and GTE-02-08.
- (2) Grit Weir hydraulic testing shall be accomplished by closing GTE-02-07, GTE-02-08, and GTE-02-12 and allowing the Grit Chamber and Grit Channel to fill to 0.1 feet below the top of the Grit Weir.
- (3) Grit Weir Box hydraulic testing shall be accomplished by temporarily plugging the 20"-DGS pipe.
- (4) Grit Chamber and Grit Channel hydraulic testing shall be accomplished by closing GTE-02-07, GTE-02-08, GTE-02-11, and GTE-02-12.

END OF SECTION

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SECTION 01 45 33
CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Contractor responsibilities for code-required Special Inspections and testing.
2. Special Inspection program and reporting requirements.
3. Attachment A to this Section includes requirements for submittal of Special Inspections.
4. Attachment B to this Section includes Special Inspector qualifications, reporting requirements, and material specific Special Inspections and tests.
 - a. Attachments A and B are for the Contractor's reference only and are not part of the Contract Documents.
 - b. Attachments A and B are included to assist Contractor in understanding the Owner-provided services so the effect of such services may be factored into the Contractor's pricing and Progress Schedule.
 - c. The Testing Agency and Special Inspector(s) performing the Owner-furnished services will be identified following the Effective Date of the Contract, unless otherwise identified in Section 01 11 00 - Summary of Work.

B. Purpose:

1. This Section and its attachments were developed to address the requirements of the 2018 edition of the International Building Code, IBC section 1704.1 and applicable amendments, if any, by authorities having jurisdiction.
 - a. One or more Special Inspectors will be retained by Owner or Owner's consultant to perform Special Inspections on the types of Work addressed by the applicable building code under Section 1704.
2. One or more Special Inspectors or Testing Agencies will be retained by Owner or Owner's consultant to perform Special Inspections and tests for the types of Work indicated in the building code.
3. A Statement of Special Inspections will be submitted to the Building Code Official as a condition for issuance of applicable permit. This statement is included as Attachment A to this Section. Attachment B indicates a complete list of materials and Work requiring Special Inspections, required Special Inspections and the minimum qualifications of the Testing Agencies and Special Inspectors.
4. Special Inspections performed by entities retained by Owner or and entity for whom Owner is responsible are for benefit of Owner, Engineer, RDPRC, and Building Code Official. Contractor, together with Subcontractors and Suppliers, are not intended beneficiary of Special Inspections.

C. Related Requirements: Include, but are not necessarily limited to, the following:

1. Section 03 15 19 - Anchorage to Concrete.
2. Section 03 41 33 – Precast and Prestressed Concrete.
3. Section 03 42 00 - Precast and Prestressed Concrete Building.
4. Section 04 22 00 - Concrete Masonry.
5. Section 05 12 00 - Structural Steel.
6. Section 05 50 00 - Metal Fabrications.
7. Section 07 24 13 - Polymer-Based Exterior Insulation and Finish System.
8. Section 07 81 00 - Fireproofing.
9. Section 13 34 19 - Metal Building Systems.

10. Section 22 05 48 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
11. Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.
12. Section 26 05 48 - Electrical Seismic Restraint Systems.
13. Section 31 48 23 - Foundation Push Piers.
14. Section 31 62 13.23 - Prestressed Concrete Piles.
15. Section 31 62 16.13 - Sheet Steel Piles.
16. Section 31 63 16 - Auger Cast Grout Piles.
17. Section 31 63 29 - Drilled Concrete Piers and Shafts.
18. Section 31 68 13 - Rock Foundation Anchors.
19. Section 40 05 96 - Seismic Controls for Process Piping.

1.2 REFERENCES

A. Definitions:

1. The following defined terms, indicated in this section with initial capital letters, have the meaning assigned below, which apply to the singular and plural thereof:
 - a. "Building Code Official" means officer (or their subordinate) having appropriate jurisdiction and authority charged with ministering and enforcing the building code in effect at the Site, or their duly authorized representative.
 - b. "Geotechnical Special Inspector or Consultant" or "Soils Consultant" means a Special Inspector engaged for the specific purpose of performing specialized Special Inspections relative to subgrade conditions, fill, special foundations, or a combination of these. "Geotechnical Special Inspector or Consultant" or "Soils Consultant", when used relative to Special Inspections, is an entity separate from Engineer. Relative to the Division 31 Specifications, for the purposes of Special Inspection, "Geotechnical Special Inspector or Consultant", "Soils Consultant," and "Special Inspector" have the same meaning.
 - c. "Registered Design Professional in Responsible Charge" (RDPRC) means the licensed and registered design professional who is responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the facility.
 - d. "Special Inspections" means inspection of specific elements of the Work requiring the expertise of an appropriate special inspector for compliance with the building code and the Contract Documents. Elements requiring special inspection are identified within this Section or elsewhere in the Contract Documents. Materials, mechanical, performance, and other testing required by the contract in other Specification sections, but not listed in this Section, are not part of the special inspections program.
 - e. "Special Inspector" means representative of Owner-approved inspection entity designated for that portion of the Work.
 - f. "Statement of Special Inspections" means document provided to Building Code Official outlining special inspections and tests to be done on the Project and frequency of required tests.
 - g. "Testing Agency" means appropriate entity, not affiliated with or hired by Contractor, and responsible for materials testing requirements of the Project including but not limited to concrete cylinder breaks, soils testing, and masonry materials testing. Testing Agency does not include any testing entity or laboratory retained by Contractor, Subcontractor, or Supplier either for tests that are Contractor's responsibility in accordance with the Contract Documents but are not required by the building code, or test performed for Contractor's convenience and information.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Meetings:

1. Attend and participate in preconstruction conference to review and coordinate responsibilities for inspection and testing procedures and requirements, as well as other

preconstruction conference topics indicated in Section 01 31 19 - Project Meetings. Relative to this Section, in addition to required attendees indicated in Section 01 31 19 - Project Meetings, required conference attendees include: [Owner], Testing Agency and Special Inspectors, [Building Code Official (when available)], Engineer, and Contractor, together with appropriate Subcontractors and Suppliers.

2. Attend and participate in construction progress meetings prepared to discuss matters related to coordination and cooperation with Testing Agency and Special Inspectors, defective Work, and other topics indicated for construction progress meetings in Section 01 31 19 - Project Meetings.

1.4 CONTRACTOR'S RESPONSIBILITIES REGARDING SPECIAL INSPECTIONS

A. Contractor's Responsibilities Regarding Special Inspections – General.

1. Coordinate and cooperate with Testing Agency personnel, Special Inspectors, and employees and agents of Building Code Official.
2. Provide storage facilities for testing agencies exclusive use as described in the Contract Documents.
3. Special Inspection is Owner's independent quality control. Special Inspections do not, in any way, reduce or mitigate Contractor's responsibilities for quality assurance, quality control, workmanship, complying with the Contract Documents, correction period or warranties. Contractor's own personnel shall review all Work requiring Special Inspections for compliance with the Contract prior to calling for the inspection.

B. Advising Testing Agency and Special Inspectors of Need for Services:

1. Not less than 24 hours prior to the need for Special Inspection or code-required testing or sampling, advise Testing Agency or Special Inspector, as applicable, in writing of Work for which Special Inspections or testing is required, indicating approximate time the Work will be ready for such inspection, testing, or sampling.
2. When Special Inspection, testing, or sampling is necessary on a Monday or day following a holiday, furnish such written advisory not later than the prior business day.

C. Work for which Special Inspections are required shall remain accessible and exposed for the purposes of Special Inspections until completion of required Special Inspections.

D. Work to be inspected shall be complete at time of Testing Agency's or Special Inspector's, as applicable, arrival at the Site.

E. Work that is defective shall be corrected and re-inspected. Such portions of the Work shall not be covered or concealed until authorized by Engineer.

F. Payment for Special Inspection services will be in accordance with the following:

1. Payment indicated below is for the Testing Agency and Special Inspector costs and does not include the Contractor's costs listed in Paragraph 1.4 A of this Section.
2. Work is Satisfactory: After Contractor notification of Testing Agency or Special Inspector, as applicable, inspector arrives at the Site and performs inspection within the timeframe indicated in Paragraph 1.4.F.4 below, and inspection reveals work is satisfactory, then Owner will pay for the associated Special Inspection. Contractor's eligibility for payment for the associated Work shall be in accordance with the Contract Documents.
3. Work initially defective but remedied in timely manner: After Contractor notification of Testing Agency or Special Inspector, as applicable, inspector arrives at the Site and performs inspection within the timeframe indicated in Paragraph 1.4.F.4 below, and inspection reveals work is defective, and the defective Work is remedied in accordance with the Contract within the period indicated in Paragraph 1.4.F.4, below, and the subject work is re-inspected and subsequently determined to be in accordance with the Contract, then Owner will pay for the associated Special Inspection. Contractor's eligibility for payment for the associated Work shall be in accordance with the Contract Documents.
4. Work not ready for inspection upon Special Inspector arrival: After Contractor notification of Testing Agency or Special Inspector, as applicable, inspector arrives at the Site and the

Work is not ready for the associated inspection when inspector arrives, then inspector will remain on-site for a maximum of [two] hours awaiting the completion of the Work. If the subject Work is not ready for inspection at the end of this period, inspector will be dismissed until Contractor requests re-inspection. All costs associated with this inspection trip, including onsite time and travel time and expenses, will be Contractor's responsibility. Owner may set-off such amounts from payments due Contractor under the Contract.

5. Work initially defective and attempted remedy is also defective: After Contractor notification of Testing Agency or Special Inspector, as applicable, inspector arrives at the Site and performs the inspection within the period indicated in Paragraph 1.4.F.4 of this Section, but inspection reveals defective Work, and Contractor attempts remedy and requests re-inspection within [two] hours, and the reinspection also reveals defective Work, inspector will be dismissed until Contractor requests re-inspection. All costs associated with this inspection trip, including onsite time and travel time and expenses, will be Contractor's responsibility. Owner may set-off such amounts from payments due Contractor under the Contract.
6. Work determined to be defective is ineligible for payment by Owner. Contractor is fully responsible for costs and time impacts of performing remedies so that the Work complies with the Contract Documents. Unless otherwise indicated in the Contract Documents, when re-inspection is necessary, Contractor is responsible for re-inspection costs, including onsite time, travel time and expenses, and other associated costs, if any. Owner may set-off such amounts from payments due Contractor under the Contract.

1.5 REPORTING DUTIES AND AUTHORITY

A. Reporting:

1. Testing Agency and Special Inspectors will furnish to RDPRC and Engineer written results of Special Inspections promptly after performance of such tests and inspections. When acceptable results are indicated, Contractor may obtain copies thereof from Engineer.
2. Reporting of Defective Work:
 - a. Testing Agency and Special Inspectors will report defective Work to Contractor, Engineer, and RDPRC promptly.
 - b. Defective Work that has been covered up or concealed prior to re-inspection will be reported by RDPRC to Engineer and Building Code Official.

B. Limitations on Authority of Special Inspectors and Testing Agencies:

1. Special Inspector and Testing Agencies expressly do not have authority for:
 - a. Ordering, stopping, or suspending the Work.
 - b. Modifying the requirements of the Contract Documents.
 - c. Accepting defective Work.
 - d. Directing the Contractor's, means, methods, techniques, sequences, or procedures of construction.
 - e. Directing or advising on Contractor's safety programs or measures for safety and protection.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. Attachments: The following, bound after this Section's "End of Section" designation, are furnished for Contractor's reference but are expressly not part of the Contract Documents.
 1. Attachment A - Submittal of Special Inspections, ([one] page).
 2. Attachment B - Special Inspections, Inspector Qualifications and Reporting Requirements, ([five] pages).

END OF SECTION

**ATTACHMENT A TO SECTION 01 45 33
SUBMITTAL OF SPECIAL INSPECTIONS**

Statement Date: [_____]

Project Name: [_____]

Site Address: [_____]

Owner: [_____]

Registered Design Professional in Responsible Charge (RDPRC): [_____]

The Statement of Special Inspections (Statement) is submitted as a condition for permit issuance in accordance with the Special Inspection requirements of the building code. The Special Inspection program is outlined in Specifications Section 01 45 33 – Code-Required Special Inspections and Procedures, including its Attachments A and B. A detailed explanation of the requirements for Special Inspections and Testing are indicated in Specifications Section 01 45 33 in conjunction with Specifications for each material and construction work result governed by the applicable building code.

[Bi-weekly] [Monthly] Special Inspection reports will be submitted to the RDPRC and the Building Code Official. Apparent defective Work will be brought to the immediate attention of the Contractor for correction. If the defective Work is not corrected, the defective Work will be brought to the attention of the RDPRC and Engineer. Only documents that are prepared and signed or sealed by the Special Inspectors (SI) are valid.

The SI is responsible for verifying all information on each document prior to signing or sealing and directly forwarding it to the RDPRC and Engineer. The RDPRC will furnish to Building Code Official results of Special Inspections indicating acceptable results, unless Building Code Official directs that reports indicating unacceptable results also be furnished to the Building Code Official. The SI is responsible for verifying all inspectors under its supervision maintain current, valid certifications for the duration of the Project's construction. At the conclusion of each individual Special Inspection type, the SI will complete a Final Report.

The Special Inspection program does not relieve the Contractor or any other entity of any contractual duties, including quality control, quality assurance, or safety and protection. The Contractor is solely responsible for construction means, methods, techniques, procedures and sequences and associated safety and protection, and for complying with the Contract Documents. Failure to comply with the SI program as outlined herein may result in a stop work notice being issued by the Building Code Official.

Respectfully submitted,
Design Professional in Responsible Charge,

Type or Print Name

[_____]License # [_____]

Expires: [_____]

Signature

Date

END OF ATTACHMENT A

ATTACHMENT B TO SECTION 01 45 33
SPECIAL INSPECTIONS, INSPECTOR QUALIFICATIONS AND REPORTING
REQUIREMENTS

PART 1 - GENERAL

1.1 QUALIFICATIONS

- A. Qualifications stated here are the minimum recommended by the RDPRC. If the Building Code Official has more stringent qualifications, the more stringent qualifications will take precedence.
- B. All Special Inspections and testing will be done under the direction of a professional engineer or registered architect licensed and registered in the [indicate jurisdiction] herein referred to as Registered Professional for Special Inspections (RPSI), who will be employed by or retained by Testing Agency or other entity furnishing Special Inspectors.
- C. Soil, concrete, masonry, mortar, grout, steel and aluminum related testing.
 - 1. The Testing Agency shall have a minimum of 10 years experience in the testing of the materials indicated.
 - 2. The Testing Agency's technician(s) performing such testing:
 - a. Shall have a minimum of five years experience in the testing of soil, concrete, mortar, grout, steel and aluminum as appropriate.
 - 3. Concrete Related Work:
 - a. International Code Council certification for Reinforced Concrete and American Concrete Institute Concrete Field Testing Technician – Grade 1.
- D. Structural Special Inspections:
 - 1. Professional engineers or architects, licensed and registered in the [indicate jurisdiction], may perform Special Inspections in accordance with their licensure.
 - 2. Other individuals, working under the direct supervision of a licensed, registered, professional engineer or architect and possessing the following qualifications, may perform Special Inspections.
 - 3. Soils Related Work:
 - a. NICET Level II Certification in geotechnical engineering technology/construction; or
 - b. Professional geologist licensed and registered in the same jurisdiction as the Site; or
 - c. Engineer intern, also known as an Engineer in Training (EIT) (i.e., a person who has successfully passed the EIT exam that is part of the overall process of becoming a licensed, registered professional engineer, serving under the direct supervision of professional engineer licensed and registered in the same jurisdiction as the Site).
 - 4. Concrete Related Work:
 - a. International Code Council certification for Reinforced Concrete Special Inspector or American Concrete Institute Concrete Construction Special Inspector.
 - b. Alternatively, may be an engineer intern/EIT under the direct supervision of a professional engineer licensed and registered in the same jurisdiction as the Site.
 - 5. Precast Concrete Erection Related Work:
 - a. Engineer intern/EIT under the direct supervision of a professional engineer licensed and registered in the same jurisdiction as the Site.
 - b. Welding:
 - 1) American Welding Society Certified Welding Inspector; or
 - 2) International Code Council Structural Steel and Welding Certification and American Welding Society-qualified, and one year of related experience; or
 - 3) Non-Destructive Testing (NDT) Level II or III Certificate (for non-destructive testing only).
 - 6. Masonry Related Work:

- a. Certified by International Code Council or American Concrete Institute for structural masonry and possess not less than one year of related experience.
 - b. Alternatively, may be an engineer intern/EIT possessing not less than two years' of appropriate training, relevant experience, or a combination thereof.
7. Steel and Aluminum Related Work:
- a. Frame and material verification [Section 1705.2 of the applicable building code, and AISC 360 Chapter N].
 - b. Welding:
 - 1) American Welding Society Certified Welding Inspector; or
 - 2) International Code Council Structural Steel and Welding Certification and American Welding Society-qualified, and possessing not less than one year of related experience; or
 - 3) Non-Destructive Testing (NDT) Level II or III Certificate (for non-destructive testing only).
 - c. High strength bolting:
 - 1) International Code Council Structural Steel and Welding Certification, and possessing not less than one year of related experience.
 - 2) Alternatively, may be an engineer intern/EIT with appropriate training and experience.
8. Fire Resistive Coating (Intumescent Paint) Related Work:
- a. International Code Council Spray-Applied Fireproofing Certification, and possessing not less than three years of related experience; or
 - b. International Code Council Fire Inspector 1 Certification, and possessing not less than three years of related experience.
9. Firestopping Related Work:
- a. International Firestop Council Certification, and possessing not less than two years of related experience; or
 - b. International Code Council Certification, and possessing not less than two years of related experience; or
 - c. Intertek's Qualified Personnel (IQP) Program, and possessing not less than two years of related experience.
10. Other equivalent certifications are unacceptable unless approved by Engineer.

1.2 REPORTING DUTIES AND AUTHORITY

- A. Reporting requirements for Special Inspector in accordance with the applicable building code for Building System Related Work.
 - 1. Comply with requirements of [applicable building code Section 1704.2.4].
 - 2. Provide written documentation of all inspections and testing, including results, performed by Testing Agency and Special Inspectors.
 - a. Indicate exact location of the subject Work.
 - b. If testing of specimens is performed, include detailed information on storage and curing of specimens prior to testing.
 - 3. Furnish inspection and test reports to Contractor, RDPRC, and Engineer.
 - a. Expressly indicate whether the Work inspected was performed in accordance with the Contract Documents.
 - b. Immediately report defective Work to Contractor, RDPRC, and Engineer.
 - c. If the defective Work is not remedied promptly, notify RDPRC and Engineer.
 - 4. Issue a report, as an Electronic Document, summarizing all inspections, corrective action notifications and resolution of defective Work every 14 days.
 - a. Furnish reports to:

- 1) Engineer's project manager.
 - 2) Owner.
 - 3) Building Code Official.
 - 4) Contractor.
5. Prior to requesting inspection for Substantial Completion, the RDPRC shall compile all test reports for each inspected material and work result for each Special Inspector and summarize in a single Electronic Document (as a PDF file) and submit to Engineer and Building Code Official.
- a. Final summary report shall be sealed and signed by the RDPRC, who shall be licensed and registered in the same jurisdiction as the Site, for Special Inspections, stating:
 - 1) The required Special Inspections have been performed.
 - 2) All defective Work has been remedied to comply with the Contract Documents except as specifically indicated in the summary report.
- B. Special Inspector shall report all defective Work to Contractor, RDPRC, and Engineer promptly.
1. Defective Work that has been covered up or concealed prior to re-inspection shall be reported to Engineer and RDPRC.
- C. Special Inspector does not have authority to order stopping or suspending the Work or modify the requirements of the Contract Documents.

1.3 MATERIAL SPECIFIC SPECIAL INSPECTIONS AND TESTS

- A. Material specific requirements for Special Inspection and testing are indicated in the Specifications listed below. Special Inspection and testing requirements are indicated in the associated Specifications section under "Source Quality Control", "Field Quality Control" or "Quality Assurance" as appropriate for each material.

1.4 SOILS

- A. Special Inspections will be performed in accordance with applicable building code Section 1705.6 as required to determine that subgrades were prepared in accordance with the Contract Documents, and to verify the allowable soil bearing pressure, materials, compaction densities, trenching and backfill and compliance with the Contract Documents.
- B. Inspection and testing requirements are indicated separately in the Division 31 Specifications and are indicated as being performed by the Geotechnical Special Inspector or Consultant (which may potentially not be indicated using initial capital letters in the referenced Specifications), Testing Agency, or Special Inspector.

1.5 CONCRETE

- A. Special Inspection and testing will be performed in accordance with applicable building code [Table 1705.3]. Inspection is required for material verification, reinforcing steel size and layout, reinforcing steel mechanical splices, embedded bolts, concrete tests, concrete placement and curing, and waterstop installation.
1. Inspections of welding of reinforcing shall be in accordance with AWS D1.4 and special inspector shall be qualified under AWS D1.4.
- B. Inspection and testing requirements are indicated in Specifications Section [03 00 05 - Concrete] [03 05 05 - Concrete Testing and Inspection, and Specifications Section 03 31 31 - Concrete Mixing, Jointing, Placing and Curing], and are indicated as services to be performed by the Special Inspector or Testing Agency.

1.6 PRECAST CONCRETE

- A. Special Inspections and testing will be performed in accordance with applicable building code [Table 1705.3 Item 10]. Inspection and testing is required for connection embedments and placement, connection welding, and proper panel detailing prior to installation.

- B. Inspection requirements are indicated in Specifications Section [03 41 33 - Precast and Prestressed Concrete] [03 42 00 - Precast and Prestressed Concrete Building], and are indicated as the responsibility of the Special Inspector.

1.7 MASONRY

- A. Special Inspections and testing will be performed in accordance with applicable building code [Table 1705.4 and TMS 402/602 Table 3.1 (Level [1][2][3])]. Inspection is required for material tests and verification, reinforcing steel, embedded bolts and anchorages, grouting, and welding of reinforcing.
- B. Inspection and testing requirements are indicated in Specifications Section 04 22 00 - Concrete Masonry, and are indicated as the responsibility of the Special Inspector.

1.8 STEEL, STAINLESS STEEL, AND ALUMINUM

- A. Special Inspections will be performed for structural steel and aluminum in accordance with applicable building code [Section 1705.2 and AISC 360 Chapter N and Aluminum Design Manual Chapter N]. Inspection is required for material verification, high-strength bolting, welding and other Work shown or indicated in the Contract Documents.
- B. Inspection and testing requirements are indicated in Specifications Section 05 12 00 - Structural Steel and Section 05 50 00 - Metal Fabrications, and are indicated as the responsibility of the Special Inspector. Inspection requirements are applicable to aluminum, stainless steel, and structural steel.
- C. Inspection and testing requirements of cold-formed steel are required only when connections are made by welding.
- D. Inspection of erection and permanent bracing is required only for cold formed trusses spanning greater than 60 feet.

1.9 EXTERIOR FINISH AND INSULATION SYSTEM (EIFS)

- A. Special Inspections will be performed in accordance with applicable building code [Section 1705.16].
- B. Inspection requirements are indicated in Specifications Section 07 24 13 - Polymer-Based Exterior Insulation and Finish System, and are indicated as the responsibility of the Special Inspector

1.10 MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS

- A. Special Inspection will be performed in accordance with applicable building code [Section 1705.15] as required to determine mastic and intumescent fire-resistant coatings were installed in accordance with the Contract Documents.
- B. Inspection requirements are indicated in Specifications Section 07 81 00 - Fireproofing, and are indicated as responsibility of the Special Inspector.

1.11 FIRESTOPPING (FIRE-RESISTIVE PENETRATIONS AND JOINTS)

- A. Special Inspection will be performed in accordance with applicable building code [Section 1705.17] as required to verify that through-penetration firestopping and joint firestopping were installed in accordance with the Contract Documents.
- B. Inspection requirements are indicated in Specifications Section 07 84 00 – Firestopping, and are the responsibility of the Special Inspector.

END OF ATTACHMENT B

SECTION 01 51 05
TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Temporary electricity.
2. Temporary lighting.
3. Temporary communications.
4. Temporary heating, cooling, ventilating, and temporary enclosures.
5. Temporary water supply.
6. Temporary sanitary facilities.
7. Temporary first-aid facilities.
8. Temporary fire protection.

B. Scope:

1. Contractor shall provide all temporary utilities and temporary facilities required for the Project, including those indicated in this Specifications section.
2. Make all arrangements with utility owners for temporary utilities and with others as appropriate for temporary facilities. Obtain required permits and approvals for temporary utilities and temporary facilities.
3. Pay all service costs for utilities and facilities indicated in this Specifications section as Contractor's responsibility, including cost of electricity, water, fuel, and other utility services and temporary facilities required for the Work.
4. Continuously maintain adequate temporary utilities and temporary facilities for all purposes for the Project, until removal of temporary utilities and temporary facilities. At minimum, provide and maintain temporary utilities and temporary facilities through Substantial Completion and removal of temporary field offices and sheds unless otherwise approved in writing by Engineer.
5. Should Owner occupy part of the Work prior to Substantial Completion of the entire Work, cost of utilities consumed via temporary utilities serving the portion occupied by Owner will be shared proportionately by Owner and Contractor as mutually agreed to by the parties.
6. Maintain, including cleaning, temporary utilities and temporary facilities, and continuously provide consumables as necessary.
7. Temporary utilities and temporary facilities shall be adequate for personnel using the Site and the needs of the Project.
8. Provide temporary utilities and temporary facilities in compliance with Laws and Regulations and requirements of authorities having jurisdiction and, when applicable, requirements of utility owners.

1.2 REQUIREMENTS FOR TEMPORARY UTILITIES AND TEMPORARY FACILITIES

A. Temporary Electricity:

1. Provide temporary electric service necessary for the Work, including continuous power for temporary field offices and sheds. Provide temporary outlets with circuit breaker protection and ground fault protection.

B. Temporary Lighting:

1. Provide temporary lighting at the Site of not less than the greater of (1) Laws and Regulations, and (2) the following:
 - a. Five foot-candles for open areas, 10 foot-candles for shops 25 foot-candles for stairs.

- b. Provide not less than one, 300 W lamp every 15 feet in indoor work areas.
 - c. Where temporary lighting is required in office or laboratory areas occupied by Owner: 40 foot-candles at a height of 2.5 feet above the finished floor.
 - d. Night Security Lighting: Five foot-candles within 50 feet of all parts of the Site during hours of darkness, controlled by photocell.
- 2. Do not work in areas with insufficient lighting. Where lighting is insufficient for the work activities to be performed, provide additional temporary lighting.
- 3. Provide temporary lighting sufficient for observation of the Work by Engineer and inspection by Contractor, entities performing code-required tests and special inspections, and authorities having jurisdiction. Where required by Engineer, provide additional temporary lighting.
- 4. Provide temporary lighting for Engineer's field office.
- C. Temporary Communications:
 - 1. Provide temporary telephone service and communications necessary for Contractor's operations at the Site and for summoning emergency medical assistance and other first-responders as necessary.
 - 1.
- D. Temporary Heating, Cooling, Ventilating, and Enclosures:
 - 1. Provide sufficient temporary heating, cooling, and ventilating and temporary enclosures to ensure safe working conditions and prevent damage to existing property and the Work.
 - 2. Except where otherwise specified, temporary heating shall maintain temperature of the space served between 50 degrees F and maximum design temperature of building or facility and its contents.
 - 3. Maintain temperature of areas occupied by Owner's personnel or electronic equipment, including offices, lunch rooms, locker rooms, toilet rooms, and rooms containing computers, microprocessors, and control equipment, between 65 degrees F and 75 DEGF with relative humidity less than 65%.
 - 4. Required temperature range for storage areas and certain elements of the Work, including preparation of materials and surfaces, installation or application, and curing as applicable, shall be in accordance with the Contract Documents for the associated Work and the Supplier's recommended temperature and humidity ranges for storage, application, or installation, as appropriate.
 - 5. Provide temporary ventilation sufficient to prevent accumulation in construction areas and areas occupied by Owner of hazardous and nuisance levels or concentrations of dust and particulates, mist, fumes, vapors, odors, and gases, associated with construction. Similarly, provide temporary ventilation for building or structure spaces temporarily without ventilation due to the Work.
 - 6. Temporary Enclosures:
 - a. Provide temporary enclosures and partitions required to maintain required temperature and humidity.
 - b. Temporary enclosures shall be sufficiently sturdy and durable for the intended use and duration. Maintain and repair temporary enclosures as necessary.
 - 7. Provide temporary heating, cooling, and ventilating for Engineer's field office.
- E. Temporary Water:
 - 1. General:
 - a. Provide temporary water service and facilities including piping, valves, meters if not provided by owner of existing waterline, backflow preventers, pressure regulators, and other appurtenances. Provide freeze-protection as necessary to prevent freezing of temporary services.
 - b. Continuously maintain adequate water flow and pressure for all purposes during the Project, until removal of temporary water systems.

2. Water for Construction Purposes:
 - a. Provide water for Site maintenance and cleaning and, water necessary for construction activities, and water for disinfecting and testing of systems.
 - b. Contractor may use existing hose bibs for short-term wash-downs and intermittent use of water for work areas in existing building and existing structures. Obtain consent of Engineer and Owner if connections to existing hose bibs and similar existing connections will be used for more than one day at a time.
 3. Water for Human Consumption and Sanitation:
 - a. Provide potable water in accordance with Laws and Regulations for consumption by personnel at the Site, for field offices, and for sanitary facilities.
 - b. When necessary, provide bottled, potable water for use and consumption by personnel at the Site, including Contractor, Engineer, and visitors to the Site.
 - c. Provide temporary water for Engineer's field office.
- F. Temporary Sanitary Facilities:
1. Provide suitably-enclosed chemical or self-contained toilets for Contractor's employees, Subcontractors, Suppliers, Engineer, and visitors to the Site. Location of temporary toilets shall be acceptable to Owner and Engineer.
 2. Refer to Paragraph 1.2.E of this Specification Section for requirements for temporary water service intended for human consumption during construction.
 3. Provide suitable temporary washing facilities for employees and visitors.
 4. Provide temporary sanitary facilities for Engineer's field office.
- G. Temporary First-aid Facilities.
1. Provide temporary first-aid stations at or immediately adjacent to the Site's work areas, and inside Contractor's field office. Locations of temporary first-aid stations shall be determined by Contractor's safety representative. Replenish supplies in first-aid stations as items are used, prior to expiration of items, and as necessary. Monitor and log inventory of supplies in temporary first-aid stations not less than once per week.
 2. Provide list of emergency telephone numbers at each hardwired telephone at the Site.
 3. Provide temporary first-aid facilities for Engineer's field office.
- H. Temporary Fire Protection.
1. Provide temporary fire protection in accordance with Laws and Regulations and the requirements of this Specifications section.
 2. For work areas without standpipe fire protection systems, during construction provide portable fire extinguishers rated not less than 2A or 5B in accordance with NFPA 10 – Portable Fire Extinguishers, for each temporary building and for every 3,000 square feet of floor area under construction.
 3. Provide Class A (ordinary combustibles), Class B (combustible liquids and gases), and Class C (electrical equipment) fire extinguishers as necessary.
 4. Comply with NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations, and requirements of fire marshals and authorities having jurisdiction at the Site.
 5. Provide temporary fire protection for Engineer's field office.

1.3 USE OF OWNER'S SYSTEM

- A. Existing Utility Systems: Do not use systems in existing buildings or structures for temporary utilities without Owner's written permission and mutually acceptable basis agreed upon by the parties for proportionate sharing of costs between Owner and Contractor.
- B. Use of Permanent Utility Systems Provided Under the Project:

1. Permanent electrical, lighting, water, heating, ventilating, and fire protection systems and first-aid facilities may be used to provide temporary utilities and temporary facilities if the following are met:
 - a. Obtain Owner's written permission to use permanent systems.
 - b. Permanent systems to be used for temporary utilities or temporary facilities shall be substantially complete, including complete functionality of all controls. Engineer will not certify Substantial Completion for facilities and systems used solely by Contractor during construction.
 - c. Contractor shall pay all costs while using permanent system, including operation, maintenance, replacement of consumables, and provide replacement parts.
2. Do not use the following permanent facilities:
 - a. Telephone and communication facilities.
 - b. Sanitary facilities.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for temporary utilities and temporary facilities:
 1. may be new or used but, if used, shall be in good condition;
 2. shall be adequate for purposes intended;
 3. shall not create unsafe or unsanitary conditions; and
 4. shall comply with Laws and Regulations.
- B. Provide required materials, equipment, and facilities, including piping, cabling, supports, controls, and appurtenances.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install temporary utilities and temporary facilities in neat, orderly, manner, and make structurally, mechanically, and electrically sound throughout.
- B. Location of Temporary Utilities and Temporary Facilities:
 1. Locate temporary systems for proper function and service.
 2. Temporary systems shall not interfere with or provide hazards or nuisances to: the Work under this and other contracts, movement of personnel, traffic areas, materials handling, hoisting systems, storage areas, finishes, and work of utility owners and others.
 3. Do not install temporary utilities on the ground, with the exception of temporary extension cords, hoses, and similar systems in place for short durations.
- C. Modify and extend temporary systems as required by progress of the Work.

3.2 USE

- A. Maintain temporary systems to provide safe, continuous service as necessary and as required.
- B. Properly supervise operation of temporary systems:
 1. Enforce compliance with Laws and Regulations.
 2. Enforce safe practices.
 3. Prevent abuse of services.
 4. Prevent nuisances and hazards caused by temporary systems and their use.
 5. Prevent damage to finishes.
 6. Ensure that temporary systems and equipment do not interrupt continuous progress of construction.

- C. At end of each work day, check temporary systems and verify that sufficient consumables are available to maintain operation until work is resumed at the Site. Provide additional consumables if the supply on hand is insufficient for continuous operation.

3.3 REMOVAL

- A. Completely remove temporary utilities, temporary facilities, equipment, and materials when no longer required. Repair damage caused by temporary systems and their removal and restore the Site to condition required by the Contract Documents; if restoration of damaged areas is not otherwise specified, restore to preconstruction condition.
- B. Where temporary utilities are disconnected from existing utility, provide suitable, watertight or gastight (as applicable) cap or blind flange, as applicable, on service line, in accordance with requirements of utility owner. If utility owner will perform such work, coordinate with and pay utility owner for such work.
- C. Where permanent utilities and systems were used for temporary utilities, upon Substantial Completion replace all consumables such as filters and light bulbs and parts used during the Work.

END OF SECTION

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SECTION 01 52 53
FACILITY TEMPORARY PUMPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Requirements for temporary pumping at facilities such as treatment plants and pump stations.
- B. Scope:
 - 1. Contractor shall provide all labor, materials, tools, equipment, and incidentals shown or indicated for temporary pumping and handling of fluids and slurries during the Project.
 - 2. This Section does not apply to dewatering of excavations, which is addressed in the Division 31 Specifications.
 - 3. This Section does not address temporary handling of storm water runoff at the Site, which is addressed in Section 01 57 05 - Temporary Controls.
- C. Related Requirements: Include, but are not necessarily limited to, the following:
 - 1. Section 01 14 16 - Coordination with Owner's Operations.
 - 2. Section 01 57 05 - Temporary Controls.
 - 3. Section 01 81 33 - Cyber-Security Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate with Owner, facility manager (if other than Owner), other contractors, and others using the Site, the locations of temporary pumping systems and appurtenances.
- B. Scheduling and Sequencing:
 - 1. Include on the Progress Schedule separate activities for set up, check out, and testing of each temporary pumping system; operation of each temporary pumping system; removal of temporary pumping system; and associated restoration.
 - 2. Where necessary include on the Progress Schedule separate activities for shut downs, installation, and removal of temporary plugs, bulkheads, and line stops, and other Work associated with temporary pumping.
 - 3. Submit Progress Schedule with required temporary pumping activities prior to furnishing temporary pumping Submittal required by this Section.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Provide, operate, and maintain temporary pumping systems in accordance with Laws and Regulations.
 - 2. Comply with Laws and Regulations relative to locations of temporary pumping systems (including effect, if any, on public transportation routes and facilities and private property), secondary containment (regarding temporary fuel storage), air quality (relative to emissions from internal combustion engines), water quality (regarding leakage and cleanout of temporary pumping systems), compliance with facility operating permits, and other matters.
 - 3. Onsite fuel storage for temporary pumping systems shall be included in Contractor's spill prevention control and countermeasures plan required.
- B. Qualifications:
 - 1. Temporary Pumping System Supplier or Subcontractor:

- a. Retain a single Supplier or Subcontractor to furnish, install, operate, and remove temporary pumping systems required for the Project.
- b. Supplier or Subcontractor shall possess not less than five years of experience providing temporary pumping systems similar in size or larger than those required for the Project.
- c. Upon request, submit evidence of having previously provided not less than five temporary pumping systems on other projects similar in size (or larger) and similar in service to temporary pumping systems required for the Project.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Temporary pumping plan:

- a. Submit the following for each required temporary pumping system not less than 30 days prior to delivery of temporary pumping system to the Site:
 - 1) Layout Drawings:
 - a) Sketches showing proposed layout of temporary pumping system, including locations of temporary plugs, bulkheads, and line stops; suction and discharge locations; location of pumps and associated piping and valves; and source of power for temporary pumping system. Sketches shall be scale drawings acceptable to Engineer, and shall include site plans similar to those in the Contract Documents.
 - b) Details of system suction and discharge locations. Discharge details shall include measures to protect the receiving structure and dissipate energy.
 - c) Where temporary lines will be buried, submit trench details. Submit sketches and information on other types of protection proposed for temporary piping.
 - 2) System curve of flow plotted against total dynamic head, and calculations that substantiate the proposed temporary pumping system, including comparison of net positive suction head required and net positive suction head available.
 - 3) Manufacturer's data and specifications on each type and size of pump proposed and its capacity, including pump curves.
 - 4) Manufacturer's data and specifications for engines and other equipment required for temporary pumping system, including expected exhaust emissions data. Furnish information on emissions air pollution control system, when proposed, together with expected air quality of emissions.
 - 5) Technical information and specifications on noise controls for noise-emitting equipment.
 - 6) Technical data on temporary piping, pipe joints, valves, pipe supports, controls, flow meter, secondary containment for fuel tanks, and other information pertinent to the temporary pumping system.
 - 7) Temporary Plugs, Bulkheads, and Line Stops: Manufacturer's literature and fabrication drawings showing type of plug, bulkhead or line stop as applicable, materials, and hydrostatic head that the plug, bulkhead, or line stop is designed to withstand. Submit complete technical information for Contractor-proposed line stops, line stop manufacturer's name and product data for line stops proposed, installation procedures, name of proposed line stop installer, and documentation of experience on at least five similar projects.
 - 8) Narrative describing proposed operation of temporary pumping system, including who will operate system, staffing, planned frequency of fueling, contingency plan in event of pump failure, and statement of existing systems that may be affected during operation of temporary pumping system. Where temporary pumping system's instrumentation and controls will be connected to Owner's existing facility monitoring and control system, clearly indicate how and where such temporary connection will be performed and other information necessary to demonstrate compliance with the Contract Documents.

- b. Disclaimer and Limitations of Engineer's review: Engineer's review, comments (if any), and approval (or other appropriate action) on the temporary pumping plan Submittal are only for the limited purposes of endeavoring to verify compliance with the Contract Documents. Engineer's review will not address calculations for the temporary pumping system, sizing of components of temporary pumping systems, or other matters that are part of Contractor's construction means, methods, procedures, techniques, and sequences, for which Contractor remains solely responsible, together with associated safety and protection measures.
- B. Informational Submittals: Submit the following:
 - 1. Qualifications Statements:
 - a. Temporary pumping system Supplier or Subcontractor.

PART 2 - PRODUCTS

2.1 TEMPORARY PUMPING SYSTEMS

- A. Refer to Section 01 81 33 - Cyber Security Requirements for cyber security related requirements.
- B. Suppliers:
 - 1. Subject to compliance with the Contract Documents, provide temporary pumping systems by one of the following:
 - a. Godwin, a Xylem brand.
 - b. Western Oilfields Supply Company doing business as Rain for Rent.
 - c. Or equal.
- C. Description:
 - 1. Design, provide, and maintain temporary pumping systems, including temporary plugs, bulkheads, and line stops as necessary or required; pumps; piping, supports, restraints, and valves; temporary instrumentation and control systems; fuel and electricity; personnel; and appurtenances. System shall be suitable for its service and operating environment.
- D. Performance Criteria:
 - 1. Required capacity of temporary pumping systems is indicated in Section 01 14 16 - Coordination with Owner's Operations. Provide each temporary pumping system of required capacity with not less than the largest pump out of service.
 - 2. System components shall be suitable for continuous operation with the fluid or slurry pumped.
 - 3. Noise Controls: Provide noise controls for temporary pumping systems. Noise emitted from temporary pumping systems shall comply with Laws and Regulations and shall not exceed 70 decibels at a distance of thirty feet from noise source.
 - a.
 - 4. Fuel-consuming temporary pumping system components intended for use when Contractor is not present shall include fuel tanks sized for not less than 24 hours of uninterrupted operation at system's operating capacity, and means to automatically notify Contractor upon high and low suction water level and low fuel level.
- E. Operation:
 - 1. Instrumentation and Controls:
 - a. Provide each temporary pumping system with flow meter acceptable to Engineer and suitable for pumped fluid or slurry, pipe material, and hydraulic conditions. Flow meter shall provide accurate flow measurement and include local display of flow rate in gallons per minute or million gallons per day as required, and be capable of providing 4 to 20 mA vdc output signal for flow rate.

- b. Controls: Provide controls for temporary pumping systems in accordance with Section 01 14 16 - Coordination with Owner's Operations.

F. Temporary Piping Systems:

1. Piping shall be high density polyethylene, steel, ductile iron, or other material accepted by Engineer, and suitable for system operating pressures. Aluminum piping and PVC piping not mechanically restrained are unacceptable. Durable hoses can be used only for short sections and with acceptance by Engineer.
2. Piping systems shall have watertight joints of the following types: fused joints, restrained couplings, flanged coupling adapters, quick-connects by Camlok or equal, flanged joints, grooved and shouldered end-type couplings, or other watertight joints accepted by Engineer.
3. Size discharge piping for flow velocity of not more than 10 feet per second.
4. Provide check valves or appropriate pump control valves as necessary.
5. Provide air valves on discharge piping as necessary. Air valves shall expel air upon pipe filling and admit air upon pipe dewatering, and release small quantities of entrained air during operation. Air valves shall be suitable for service with the pumped fluid or slurry.
6. Discharge from temporary pumping systems shall not adversely affect the existing process or facilities. Provide energy-dissipating measures at piping discharge as necessary.

G. Temporary Plugs, Bulkheads, and Line Stops:

1. Acceptable temporary plugs and bulkheads include inflatable dams specifically designed for such service, brick bulkheads, timber bulkheads, sandbags, and other bulkhead methods suitable for the service and conduit conditions. Temporary line stops, where necessary or required, shall be manufactured units specifically intended for use as line stops.
2. Each temporary plug, bulkhead, and line stop shall be suitable for the maximum pressure encountered.
3. Where temporary plugs and bulkheads are under pressure or surcharged, provide either two plugs or a plug and temporary bulkhead.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Preparation and Installation of Temporary Pumping Systems:

1. Temporary piping shall be located off of roads, drives, other travelled ways, and sidewalks. Piping shall not be located in environmentally-sensitive areas such as wetlands.
2. Where required for Owner's access to and operation of existing facilities, bury temporary piping that would otherwise inhibit access to processes, buildings, structures, roads, drives, and travelled ways. In paved areas, provide temporary surfacing, sufficient for AASHTO H-20 wheel loads over buried temporary piping.
3. Install temporary pumping systems in accordance with written instructions of manufacturer of system component, Laws and Regulations, and requirements of temporary pumping system Supplier.
4. Hydrostatic Testing of Temporary Piping System:
 - a. Perform successful hydrostatic testing of temporary piping systems using clean water at pressure equal to 1.2 times highest expected system operating pressure, for one hour while maintaining test pressure within 3.0 psig of required test pressure.
 - b. Owner will witness hydrostatic test.
 - c. Hydrostatic test criteria for acceptance: No leakage.
5. Verify that entire temporary pumping system is ready for operation before commencing shutdown of Owner's operations, facilities, or systems. Verify that temporary pumping system controls and flow meter are properly connected and functional.

6. Furnish to Owner, facility manager (if other than Owner), and Engineer written advisory of intent to commence temporary pumping system operation in accordance with Section 01 14 16 - Coordination with Owner's Operations.

3.2 OPERATION OF TEMPORARY PUMPING SYSTEMS

A. During Operation of the Temporary Pumping Systems:

1. Temporary pumping system shall operate continuously unless otherwise indicated. In the event of equipment failure, immediately make repairs or replace equipment. Provide spare parts and redundant units as necessary for continuous operation.
2. Provide personnel to monitor, operate, and maintain temporary pumping system 24 hours per day when system is in service.

3.3 DEMOBILIZATION

A. Upon Conclusion of Temporary Pumping:

1. Remove temporary plugs, bulkheads, and line stops in manner that allows flow to slowly return to normal, without surging, surcharging, and adverse effects on existing system. Completely remove all elements of temporary plugs, bulkheads, and line stops.
2. Flush out temporary pumping system with clean water discharged to an appropriate location.
3. Remove temporary pumping system and appurtenances from the Site.
4. When Contractor has obtained permit(s) for temporary pumping from authorities having jurisdiction, furnish written notice to such authorities that temporary pumping has been completed.

END OF SECTION

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SECTION 01 57 05
TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for temporary controls during construction, including:
 - a. Noise control.
 - b. Temporary pest and rodent controls.
 - c. Water control, including storm water, surface water, and groundwater.
 - d. Pollution control, including solid waste, water pollution, atmospheric pollution, and other types of pollution.
 - e. Odor control.

B. Scope:

1. Contractor shall provide and maintain materials, equipment, labor, services, and temporary construction as necessary and required to control environmental conditions at the Site and adjacent areas during construction.
2. Contractor shall pay all costs, including fines and civil penalties, if any, for failure to implement and maintain temporary controls in accordance with the Contract Documents and Laws and Regulations. Contractor is not eligible for increase in Contract Price or Contract Times due to failure to comply with requirements for temporary controls.
3. Maintain temporary controls until no longer necessary or required. Provide temporary controls at all times when Contractor is working at the Site.

C. Related Requirements:

1. Include, but are not necessarily limited to, the following:
2. Section 01 35 43.13 - Environmental Procedures for Hazardous Materials.
3. Section 01 74 00 - Cleaning.
4. Section 31 23 00 - Earthwork
5. Section 31 23 33 - Trenching, Backfilling, and Compacting for Utilities.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with applicable provisions and recommendations of the following:
 - a. City of Hailey, Idaho Code of Ordinances, Title 9, Chapter 4 regarding Noise ordinance for construction.
 - b. Other local Laws or Regulations applicable to temporary controls.

1.3 SUBMITTALS

A. Action Submittals:

1. Submit the following:
 - a. Shop Drawings:
 - 1) Plan for construction staging and maintenance of the Site relative to erosion and sediment controls. Indicate on a site plan approximate areas of planned disturbance of soils and soil cover over time during the Project. For areas not indicated in the Contract Documents as being disturbed and that Contractor proposes to disturb, Shop Drawing shall include proposed erosion and sediment control measures for the additional areas.

- 2) Location and details of each temporary settlement basin.
- b. Product Data:
 - 1) Silt fencing materials.
 - 2) Other materials proposed for temporary erosion and sediment controls, when requested by Engineer.
- B. Informational Submittals:
 - 1. Submit the following:
 - a. Procedural Submittals:
 - 1) Proposed dust control measure, when Submittal is requested by Engineer.
 - b. Field Quality Control:
 - 1) When requested by Engineer, promptly obtain and submit results of field measurements and field test data substantiating compliance of Contractor's temporary controls with the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS FOR TEMPORARY EROSION AND SEDIMENT CONTROLS

- A. Materials for temporary erosion and sediment controls shall be as shown or indicated on the Drawings.

2.2 MATERIALS FOR TEMPORARY EROSION AND SEDIMENT CONTROLS

- A. Temporary Erosion and Sediment Control Materials – General:
 - 1. Materials utilized for temporary erosion and sediment controls shall be in accordance with applicable regulatory requirements indicated in this Section's "Quality Assurance" Article, unless otherwise shown or indicated in the Contract Documents.
- B. Silt Fencing Materials:
 - 1. Filter Cloth:
 - a. Products and Manufacturers: Provide one of the following:
 - 1) Atlantic Construction Fabrics (ACF) Environmental "Silt Fence".
 - 2) Cherokee Manufacturing "Silt Fence".
 - 3) Hanes Geo Components "Silt Fence".
 - 4) Or equal.
 - b. Height: Not less than two feet.
 - c. Securely fasten filter cloth to wire mesh using ties spaced at maximum intervals of 2 feet on centers, at top and mid-height of wire mesh.
 - 2. Wire Mesh: Support filter cloth with wire mesh complying with the following:
 - a. Woven wire mesh, 14-gage steel wire, maximum mesh 6 inches x 6 inches.
 - b. Height: Same as filter cloth height.
 - c. Fasten wire mesh to fence supports with wire ties or staples.
 - d. In lieu of wire mesh, Contractor may propose using purpose-manufactured silt fence system with appropriate reinforcing other than wire mesh.
 - 3. Fence Support Posts:
 - a. Length: Not less than 3 feet each.
 - b. Material: Metal or other acceptable, reasonably durable material with "U", "T", or "I" cross section, or hardwood measuring not less than 1.25 inches by 1.25 inches in cross-section.
- C. Straw Bale Dike Materials:

1. Bales shall be firmly-packed, non-rotted straw bound firmly with baling wire. Cross-sectional area on the small end of each bale shall be approximately 12 inches by 12 inches or larger.
 2. Posts shall comply with requirements for silt fencing support posts, or may be suitable reinforcing steel rods.
- D. Mulch Materials and Soil Stabilization Materials:
1. Mulch shall be non-rotted straw or salt hay.
 2. Soil stabilization emulsions, when used, shall be an inert, eco-friendly chemical manufactured for the specific purpose of erosion control and soil stabilization, applied with mulch or stabilization fibers.
 3. Wood-fiber or paper-fiber, when used, shall be 100% natural and biodegradable.
 4. Erosion control mat or netting shall be biodegradable. Acceptable materials include jute, excelsior, straw, or coconut fiber, and cotton.
- E. Materials for Protection of Storm Water Drainage Inlets and Catch Basins:
1. Inlet Filter Bag:
 - a. Product and Manufacturer: Provide one of the following for each drainage inlet and catch basin to be protected:
 - 1) Atlantic Construction Fabrics (ACF) Environmental, "Silt Sack".
 - 2) Mutual Industries, Inc. "Silt Sack".
 - 3) Or equal.
 - b. Inlet filter bag permeability shall be not less than 40 GAL/SQFT of bag area exposed to the flow. Fabric shall be woven polypropylene with double stitching to prevent bursting.
 - c. Inlet filter bags shall:
 - 1) Fit inside the drainage inlet or catch basin and shall be secured by the structure's grate or by other acceptable means.
 - 2) Have means of removing inlet filter bag and the silt and sediment collected therein without dumping filter bag's contents into the drainage inlet or catch basin.
 - d. Provide sufficient spare inlet filter bags for replacement as indicated in this Section's "Part 3 – Execution".
- F. Temporary Settlement Basin Materials:
1. Embankment Material: Comply with requirements for general fill in Division 31 Specifications sections on earthwork, excavation, and fill.
 2. Provide outfall structure consisting of overflow weir and discharge pipe, and provide emergency spillway, all appropriately sized for storm water discharges.
 3. Overflow Weir and Discharge Pipe: Suitably-sized piping of corrugated metal, high-density polyethylene, or other suitable material. Pipe may be new or used; if used, pipe shall be in good condition.
- G. Filter Bag on Dewatering Pump Discharge – Materials:
1. Provide filter bag on discharge of each dewatering pump drawing from an excavation. Filter bag is not required on pumps drawing from dewatering wells.
 2. Products and Manufacturers: Provide one of the following on each excavation dewatering pump discharge:
 - a. Dirtbag, by Atlantic Construction Fabrics (ACF) Environmental.
 - b. Dewatering (Filter) Bag, by Indian Valley Industries, Inc.
 - c. UltraTech Ultra-Dewatering Sediment Filter Bag, by Interstate Products, Inc.
 - d. Mesh Filter Bag, by Pall Corporation.
 - e. Or equal.

3. Size filter bags for maximum flow of the associated pump. Filter bags shall be specifically fabricated for use as a dewatering pump filter bag.
 4. Provide sufficient spare filter bags for continuous dewatering operations.
- H. Temporary Stone Construction Entrance Materials:
1. Stone:
 - a. Tough, hard, durable stone complying with the following gradation:

Gradation for Temporary Stone Construction Entrance	
Sieve Size	Total Percent Passing
4-IN (100 mm)	100
3.5-IN (90 mm)	90 to 100
2.5-IN (65 mm)	25 to 60
1.5-IN (37.5 mm)	Zero to 15

2. Geotextile Separation Fabric Material:
 - a. Geotextile fabric specifically manufactured for use in separating roadway materials from subgrade, sufficiently durable for the Project.
 - b. As recommended by geotextile manufacturer for separating stone from subgrade, for the vehicle weight and traffic frequency anticipated for the construction entrance.

PART 3 - EXECUTION

3.1 NOISE CONTROL

- A. Noise Control – General:
1. Contractor's vehicles, construction equipment, and machinery shall minimize noise emissions to greatest degree practicable. When necessary, provide mufflers and silencers on construction equipment, machinery, and vehicles, and provide temporary sound barriers sound-absorbing blankets, sound-reducing enclosures, modified backup alarms, and other mitigation measures when necessary.
 2. Noise threshold levels shall comply with Laws and Regulations, including (a) OSHA requirements and recommendations, and (b) local ordinances or other Laws or Regulations.
 3. Noise emissions shall not interfere with the work of Owner, facility manager (if other than Owner), or others. The use of noise-producing signals, including horns, whistles, alarms, and bells shall be for safety warning and emergency purposes only.
 4. Music or entertainment systems, including personal and vehicle radios, media players, and the like, when used, shall not be audible at the property line and shall not disturb others at the Site.
 5. Field Quality Control of Noise:
 - a. If Owner or Engineer believes potential exists that allowable noise levels are being exceeded, Contractor will be required to, and shall promptly perform, appropriate noise monitoring in presence of Owner or Engineer and shall submit written results to Engineer.
 - b. Owner and Engineer reserve the right to perform independent noise monitoring at any time during the Work.
 6. If noise level exceeds allowable maximum, Contractor shall immediately cease the activity emitting the excessive noise and promptly implement noise-mitigating measures to comply with noise limitations.

3.2 DUST CONTROL

A. Dust Control – General:

1. Control objectionable dust caused by Contractor's operation of vehicles and construction equipment and machinery, site clearing, demolition, cleaning, and other actions. To minimize airborne dust, apply water or use other methods subject to acceptance of Engineer and approval of authorities having jurisdiction.
2. Contractor shall prevent blowing and movement of dust from exposed soil surfaces and access roads to reduce onsite and off-Site damage, inconvenience, nuisances, and health hazards associated with dust emissions from Contractor's activities.

B. Dust Control Methods:

1. Dust control may be accomplished by irrigation in which the dust-prone work activity or area of the Site is sprinkled with water until the surface is moist.
2. Apply dust controls as frequently as necessary or required without creating inconveniences, nuisances, or hazards, such as excessive mud and ponding of water at or adjacent to the Site. Do not use water for dust control when water will cause hazardous or objectionable conditions such as ice, mud, ponds, and pollution.
3. Provide dust control that is non-polluting and does not contribute to tracking-out of dirt, mud, and dust onto pavement.
4. Do not allow water used for dust control to discharge to storm water drainage system or surface waters.
5. Where appropriate, reduce travel speed of construction vehicles and construction equipment to reduce the potential for dust emissions arising from vehicle and equipment passage.
6. Where appropriate, apply gravel or other appropriate binder to access roads and parking areas.

C. Removal of Dust and Dirt from Pavement and Other Travelled Ways:

1. Remove dust, mud, and dirt from roads, parking areas, and other travelled ways not less than the frequency indicated in Section 01 74 00 - Cleaning.
2. Perform dust and dirt removal from travelled ways by mechanical wet vacuum sweeping or other method acceptable to Engineer.
3. Remove mud from roads, parking areas, and other travelled ways by appropriate means, including scraping. Avoid damaging surface of travelled way. Remedy damage to roads, parking areas, and travelled ways resulting from mud removal activities.

D. Removal of Dust and Dirt from Buildings and Structures:

1. When dust and dirt from Contractor's activities has accumulated to a noticeable or objectionable extent (compared with preconstruction conditions) on buildings or structures, remove the dust and dirt caused by Contractor's operations by appropriate methods, including power-washing using mild detergent. Remedy damage caused by dust, dirt, and power-washing.
2. Dust in sensitive equipment, such as electrical and control panels, instruments, HVAC systems and other equipment shall be cleaned by a Subcontractor specializing in cleaning such items.
3. During the Project, remove objectionable and noticeable dust, dirt, and mud in areas occupied by Owner or facility manager, and Contractor's work areas, resulting from Contractor's activities. Owner and facility manager will take reasonable measures to avoid tracking dust, dirt, and mud into their occupied areas.
4. Comply with Section 01 74 00 - Cleaning.

3.3 PEST AND RODENT CONTROL

A. Pest and Rodent Control – General:

1. Provide pest and rodent controls as necessary to prevent infestation of the Site, storage areas, and adjacent areas.
 2. Pests and rodents include, but are not limited to: flies, mosquitoes, gnats, midges, stinging insects, other insects and the like, worms, rats, mice, moles, voles, and similar animals, objectionable numbers and species of birds, and others.
 3. Implement appropriate pest and rodent controls when pests, rodents, or both are apparent at the Site or offsite storage, staging, or laydown areas.
 4. Control or remove pests and rodents from adjacent properties when Contractor's activities have fostered or exacerbated pest or rodent problems. For example, ground vibration, such as that associated with horizontal directional drilling, may cause migrations of subterranean animals such as moles and voles. Coordinate with affected property owners regarding appropriate control methods, materials, equipment, and disposal techniques.
- B. Methods, Materials, and Equipment for Pest and Rodent Control during Construction:
1. Employ methods and use materials and equipment for pest and rodent control that do not adversely affect conditions at the Site or on adjacent and nearby properties.
 2. Do not use control methods or poisons injurious to household pets or animals other than targeted pests and rodents.
 3. Avoid control methods that present hazards to humans, including children.
- C. Disposal of Pests and Rodents:
1. In accordance with Laws and Regulations, promptly and properly dispose of pests and rodents trapped or otherwise controlled. Do not bury or dispose of deceased animals at the Site or in adjacent areas.

3.4 WATER CONTROL

- A. Water Control – General:
1. During the Project, provide methods to appropriately control storm water, surface water, water from excavations and structures, groundwater flows altered by Contractor's activities, and groundwater discharges from the Site, to prevent damage to the Work, the Site, adjacent properties, and downstream properties.
 2. Control trenching, filling, and grading to direct water away from excavations, pits, tunnels and other construction areas, and prevent water from entering existing buildings and structures.
 3. Properly manage and control storm water, surface water, and groundwater entering the Site from upstream, where such flows or discharges have potential to affect the Work or to be exacerbated by Contractor's activities.
 4. Avoid ponding of water onsite, except in specially-designated, temporary settlement basins. Where water ponding occurs during construction, perform rough grading to eliminate ponding.
 5. Prevent water from discharging onto roads, parking areas, paved or finished areas, and other travelled ways. Prevent storm water runoff from discharging across access roads and parking areas.
- B. Materials, Equipment, and Facilities for Water Control:
1. Provide, operate, and maintain materials, equipment, and facilities of adequate size, materials, and capacity to control storm water, surface water, groundwater, and discharges from tanks.
- C. Discharge and Disposal of Water during Construction:
1. Discharge storm water, surface water, and groundwater from the Site, and discharges of clean water from tanks, to proper discharge locations, in accordance with Laws and Regulations and the Contract Documents.
 2. Prevent damage and nuisances arising from water discharges on the Site and discharges from the Site.

3. Dispose of water in manner that avoids flooding, erosion, sediment transport, and other damage, in accordance with Laws and Regulations.
4. Avoid overland discharges from the Site and construction activities to adjacent properties,
5. Water discharges from the Site and construction activities shall be via a storm water drainage route or conduit with sufficient capacity for the flow under associated weather and flow conditions and in accordance with requirements of authorities having jurisdiction
6. Do not discharge storm water, surface water, groundwater, or clean water from tanks, into sanitary sewers. Obtain consent of sewerage system owner before discharging such flows into existing combined sewers.
7. Obtain sewerage system owner's consent and approval before discharging polluted water to sewerage system.

3.5 POLLUTION CONTROL

A. Pollution Control – General:

1. Provide means, methods, and facilities necessary and required to prevent contamination of soil, water, and atmosphere caused by accumulation or discharge of substances and materials that are either noxious, polluting, or both, from or caused by construction and related activities.
2. Construction equipment and machinery shall comply with Laws and Regulations.
3. Comply with Section 01 35 43.13 - Environmental Procedures for Hazardous Materials.

B. Spills and Contamination:

1. Perform emergency containment, cleanup, and remedy of spills and contamination resulting from construction and related activities. Promptly remove and properly dispose of contaminated soils and liquids.
2. Excavate contaminated material and properly dispose of off-Site, and replace with suitable compacted fill and appropriate cover.
3. Comply with Owner's and facility manager's (if other than Owner) hazard control procedures as indicated in the Supplementary Conditions.

C. Protection of Surface Water and Groundwater:

1. Provide and maintain appropriate, temporary measures to prevent harmful substances from entering surface water, groundwater, and drinking water. Prevent disposal of wastes, effluents, chemicals, and the like into or adjacent to groundwater, surface water, drainage routes (including swales, ditches, and storm sewers) and drinking water.
2. Obtain sewerage system owner's consent and approval prior to discharging into sanitary sewers or combined sewers. Do not discharge pollutants not in accordance with Laws and Regulations into combined sewers, or sewers tributary to combined sewers, when wet weather overflows to receiving waters may occur.

D. Atmospheric Pollutants:

1. Provide and maintain temporary controls for atmospheric pollutants resulting from construction and related activities, whether to outdoor or indoor atmospheres.
2. Prevent harmful dispersal of pollutants into atmosphere.
3. Do not discharge exhaust from internal combustion engines or combustion operations into buildings, structures, or near ventilation intakes for buildings or structures.
4. Prevent toxic and noxious concentrations of chemicals, fumes, and vapors.

E. Solid Waste:

1. Provide and maintain temporary controls for managing solid waste related to the Work.
2. Prevent solid waste from:
 - a. Becoming airborne or blowing in the wind.

- b. Being inadvertently transmitted to adjacent, offsite properties, and areas of the Site not part of the Project.
 - c. Being deposited in or discharging to surface waters, open process tanks, and drainage routes.
- 3. Properly handle and dispose of solid waste. Burning or burying solid waste, including unused materials, at the Site or adjacent areas is prohibited.
- 4. Cleaning and Disposal of Debris: Comply with applicable requirements of the General Conditions, as may be modified by the Supplementary Conditions, and Section 01 74 00 - Cleaning.
- 5. Do not mix or store in the same container solid waste containing Constituents of Concern (and constitutes, or may constitute, a Hazardous Environmental Condition) with solid waste that does not contain Constituents of Concern.
- 6. Store solid waste in appropriate, covered, containers.
- 7. Promptly, and at regular intervals, remove solid waste from the Site for transport and disposal in accordance with Laws and Regulations.

3.6 ODOR CONTROL DURING CONSTRUCTION

A. Odors – General:

- 1. Avoid discharges of unpleasant or noxious odors from construction and related activities. Whether nature of the Work is such that odor generation is unavoidable, provide appropriate temporary controls for odors.
- 2. Give priority to avoiding odor generation, followed by:
 - a. Counteracting (treating the cause of) odors.
 - b. Containing odors.
 - c. Odor masking as the last resort for odor control.

3.7 EROSION AND SEDIMENT CONTROLS

A. Installation and Maintenance of Temporary Erosion and Sediment Controls – General:

- 1. General Provisions:
 - a. Provide temporary erosion and sediment controls as shown and indicated on the Drawings and as indicated in this Section and elsewhere in the Contract Documents, and as necessary for compliance with Laws and Regulations.
 - b. Provide erosion and sediment controls as the Work progresses into areas where ground cover was previously undisturbed.
 - c. Use necessary and required methods to appropriately control erosion and sediment transport in storm water runoff, including using soil conservation-oriented construction practices (including scheduling and sequencing), vegetative measures, and temporary physical controls.
 - d. Use best management practices (BMP) in accordance with Laws and Regulations, and regulatory requirements indicated in this Section's "Quality Assurance" Article (unless more-stringent requirement are shown or indicated in the Contract Documents), to control erosion and sediment transport in storm water runoff during the Project.
 - e. Plan and execute disturbances of soils and soil cover, and earthwork by methods to control storm water runoff from exposed soil (including stockpiles, borrow areas, and spoil disposal areas), banks of surface waters affected by the Work, and discharges of groundwater, to prevent erosion and sediment transport.
 - f. Where areas must be cleared for storage of materials or equipment, or for temporary facilities, provide measures for regulating storm water discharges and controlling erosion and sediment transport. Where Owner is a co-permittee with Contractor for applicable permits, or when plans for temporary erosion and sediment controls were sealed and signed by Engineer, such methods are subject to Engineer's approval or acceptance, as applicable.

- April 11, 2025
Issued for Review

- d. Periodically remove sediment that has accumulated in or behind sediment and erosion controls. Remove sediment not less often than when sediment is at approximately one-half of storage capacity of associated control element, unless more-frequent interval is indicated elsewhere in the Contract Documents. Properly dispose of sediment.
- 8. Duration of Temporary Erosion and Sediment Controls:
 - a. Maintain temporary erosion and sediment controls in effective, working condition until soil cover of the associated storm water drainage area has been permanently stabilized.
- 9. Work Stoppage:
 - a. If the Work is temporarily stopped or suspended for any reason, Contractor shall provide additional temporary controls necessary to prevent environmental damage to the Site and adjacent areas while the Work is stopped or suspended.
 - b. When temporary erosion and sediment controls remain in place during periods of stopped or suspended Work, continue to perform Contractor's obligations relative to periodic inspection and maintenance of temporary erosion and sediment controls, including removal of accumulated sediment.
- 10. Failure to Provide Adequate Temporary Erosion and Sediment Controls:
 - a. If Contractor repeatedly fails to satisfactorily control erosion and sediment transport in storm water runoff, Owner reserves the right to use Owner's own forces or employ a third-party contractors for temporary erosion and sediment control. Owner's costs for such work, including engineering and inspection costs, will be deducted from amounts due Contractor, as set-offs in accordance with the Contract Documents.
- B. Erosion and Sediment Control Permit:
 - 1. Comply with permit requirements indicated in Section 01 41 24 - Permit Requirements.
- C. Silt Fencing:
 - 1. Provide and maintain silt fencing in a vertical plane, at the locations shown or indicated in the Contract Documents and where necessary or required.
 - 2. Locations of Temporary Silt Fencing:
 - a. Where possible, provide silt fencing along contour lines, so each run of silt fencing is at the same elevation.
 - b. On slopes, provide temporary silt fencing at intervals that do not exceed the maximum indicated in the following table:

Silt Fence Spacing on Slopes	
Slope (percent)	Maxim Allowable Length of Slope Above Each Silt Fence (feet)
2 and less	150
2.1 to 5	100
5.1 to 10	50
10.1 to 20	25
20.1 to 25	20
25.1 to 40	15
40.1 to 50	10

- c. Provide temporary silt fencing around perimeter of each stockpile of topsoil, general fill material, and excavated spoil material. Install silt fencing before expected soil is subject to precipitation. Maintain until stockpile is removed.

- d. Do not install temporary silt fencing at the following types of locations:
 - 1) Area of concentrated storm water flows such as ditches, swales, or channels.
 - 2) Where rock or rocky soils prevent full and uniform anchoring of silt fencing.
 - 3) Across upstream or discharge ends of storm water conduits.
 3. Installation:
 - a. Securely fasten wire mesh to posts, and securely fasten filter cloth to wire mesh.
 - b. When two sections of filter cloth are adjacent to each other, fold over edges and overlap by not less than 6 inches and securely fasten to wire mesh.
 - c. Embed posts in the ground to the depth necessary for proper controls; embed posts to not less than 16 inches below ground.
 - d. Filter cloth and wire mesh shall extend not less than 8 inches below ground and not less than 16 inches above ground.
 - e. Remove accumulated sediment from behind silt fencing as necessary or required. Repair and reinstall silt fencing as necessary or required.
 4. Maintenance:
 - a. Do not allow formation of concentrated storm water flows on slopes above temporary silt fencing unless so shown or indicated in the Contract Documents. If unauthorized concentrated storm water flows occur, stabilize the slope via other appropriate stabilization methods as necessary and required to prevent flow of concentrated storm water flows toward temporary silt fencing.
- D. Straw Bale Dike.
1. Provide temporary straw bale dikes where shown or indicated and where necessary or required, including in swales, along contours, and along toe of slopes.
 2. Provide temporary straw bales in shallow excavation as wide as the bale and approximately 4 to 6 inches below surrounding grade.
 3. Ends of straw bales shall tightly abut ends of adjacent straw bales.
 4. Securely install each straw bale using two support posts, driven into the ground not less than 1.5 to 2 feet below bottom of straw bale. Top of post shall be flush with top of straw bale. Angle first post for each straw bale toward the previously-installed straw bale.
 5. Frequently inspect straw bales and repair or replace as required. Remove accumulated sediment and debris from behind straw bales.
- E. Mulching and Soil Stabilization:
1. Use mulching to temporarily stabilize exposed soil, including spoil and fill materials.
 - a. Immediately following final grading, provide mulch and stabilize with mats or netting, or sprayed soil stabilization emulsion with fiber additive.
 - b. Application of mulching for soil stabilization shall be as follows.
 - 1) Non-Rotted Straw or Salt Hay: Provide 1.5 to two tons per acre.
 - 2) Soil stabilization emulsions, when used, shall be applied in accordance with manufacturer's instructions, and shall be applied with mulch or stabilization fibers.
 - 3) Wood-Fiber or Paper-Fiber Application: Provide 1,500 pounds per acre, installed by hydroseeding.
 - c. Where mats or netting are used:
 - 1) Cover entire area to be stabilized with mats or netting.
 - 2) Provide anchoring trenches at the top and bottom of slopes to receive mats or netting. Bury at least the top and bottom ends of mat or netting, 4 inches or more wide, at top and bottom of slope. Ensure that mesh or netting is secure and will not wash out over time. Tamp trench full of soil. 4 inches from trench, secure mat or netting with appropriate staples at intervals of 10 inches.
 - 3) Overlap adjacent strips of mat or netting by not less than 4 inches.

F. Protection of Storm Water Drainage Inlets and Catch Basins:

1. Protect each drainage inlet and catch basin that has potential to receive storm water runoff from exposed soils and does not discharge into a storm water settlement basin.
2. Provide temporary inlet filter bags inside of drainage inlet or catch basin in accordance with inlet filter bag manufacturer's instructions. Secure inlet filter bag with the structure's grate or by other acceptable means.
3. Inlet filter bags shall not pose any obstruction, above the preconstruction elevation of the drainage inlet or catch basin grate that would necessitate or require temporary barricades or warning lights.
4. When removing sediment from inlet filter bags, do not dump filter bag's contents into the drainage inlet or catch basin. Promptly remove from drainage inlets and catch basins sediment accidentally dumped into the structure.
5. Remove sediment from inlet filter bags, or replace inlet filter bags, when inlet filter bag is not more than half-full.

G. Temporary Settlement Basin:

1. For constructing embankments comply with requirements in Division 31 Specifications on embankments, excavation, and fill.
2. Overflow Weir and Discharge Pipe:
 - a. Provide piping in accordance with manufacturer's instructions. Where permanent piping will be used for temporary settlement basin, provide piping in accordance with the Contract Documents and fully clean piping prior to Substantial Completion.
 - b. Provide overflow weirs at elevation(s) shown or indicated on the Drawings. When not shown or indicated in the Contract Documents, discharge weir elevation(s) shall be in accordance with design by licensed, professional civil engineer retained by Contractor or Subcontractor. Such design and temporary construction shall avoid overtopping and overfilling of settlement basin without short-circuiting the settlement basin's hydraulic performance.
 - c. Wrap and secure geotextile material specified for temporary silt fencing around discharge structures of temporary settlement basins
3. Crushed Stone and Riprap: Provide in accordance with Division 31 Specifications on excavation, fill, and riprap. Provide in areas of temporary settlement basin subject to erosion, and at upstream and downstream ends of each settlement basin's discharge piping.
4. Remove sediment when necessary or required, based on accumulation of material.
5. When temporary settlement basin is no longer required, remove the temporary settlement basin discharge weir, discharge piping, and spillway, fill the temporary settlement basin to required grade in accordance with requirements of Division 31 Specifications on excavation and fill, and provide landscaping in accordance with the Contract Documents.

H. Filter Bag on Dewatering Pump Discharge:

1. Provide dewatering of excavations in compliance with Section 31 23 00 - Earthwork and 31 23 33 - Trenching, Backfilling, and Compacting for Utilities.
2. Locate filter bags and temporary pump discharge lines to avoid interfering with the public, use of private and public property, and Owner's and facility manager's operations. Relocate filter bags and appurtenances when necessary or required.
3. Filter bag discharge shall be directed to appropriate storm water drainage route. Do not discharge into roads, driveways, access roads, parking areas, other travelled ways, or overland. When temporary settlement basin is used, locate filter bags to discharge to temporary settlement basin when practicable.
4. Provide filter bag on discharge of each dewatering pump drawing from an excavation or other area with exposed soil.
5. Securely attach filter bag to pump discharge pipe or hose.

6. Maintain, clean out, and replace filter bags as necessary or required.
- I. Temporary Stone Construction Entrance:
 1. Where shown on the Drawings, and where construction vehicles will regularly transition to paved surfaces from unstabilized surfaces, provide temporary stone construction entrance. Contractor vehicles and mobile construction equipment and machinery shall use temporary stone construction entrances.
 2. Provide temporary stone construction entrances of the width, length, and thickness shown or indicated on the Drawings. When not shown or indicated on the Drawings, temporary stone construction entrance shall be not less than 50 feet long, by 20 feet wide, by 8 inches deep.
 3. Installation:
 - a. Ensure that subgrade under each temporary stone construction entrance is suitably dense for the intended purpose and dry. Suitably prepare subgrade as necessary for temporary stone construction entrance.
 - b. Provide on subgrade a layer of geotextile separation fabric, installed in accordance with geotextile separation fabric manufacturer's recommendations for separation.
 - c. Provide stone on installed geotextile separation fabric. Grade the stone for passage of vehicles.
 4. Maintenance:
 - a. Maintain temporary stone construction entrance at not less than the minimum required thickness. Add stone as required to maintain thickness.
 - b. When upper layer of temporary stone construction entrance becomes contaminated with soil, mud, or other material, remove the contaminated material and replace with clean stone.
 - c. Using water to wash down temporary construction entrance or paved areas onto which soil material has been tracked is unacceptable.

3.8 REMOVAL OF TEMPORARY CONTROLS

- A. Removals – General:
 1. Unless otherwise indicated elsewhere in this Section in requirements for respective temporary controls, upon completion of the associated Work and when temporary controls are no longer necessary, remove temporary controls and restore the Site to condition in accordance with the Contract Documents; if condition is not shown or indicated, restore the Site to pre-construction condition.
 2. After soils are permanently stabilized, remove from the Site temporary erosion and sediment controls.

END OF SECTION

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SECTION 01 61 03
EQUIPMENT - BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements of this Specification Section apply to all equipment provided on the Project including those found in other Divisions even if not specifically referenced in individual "Equipment" Articles of those Specification Sections.

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

1. Section 01 81 10 - Wind and Seismic Design Criteria.
2. Section 03 15 19 - Anchorage to Concrete.
3. Section 03 31 30 - Concrete, Materials and Proportioning.
4. Section 05 50 00 - Metal Fabrications.
5. Section 07 92 00 - Joint Sealants.
6. Section 09 96 00 - High Performance Industrial Coatings.
7. Section 10 14 00 - Identification Devices.
8. Section 26 29 23 - Variable Frequency Drives - Low Voltage.
9. Section 40 90 00 - Instrumentation for Process Control - Basic Requirements.
10. Section 41 22 23 - Hoists, Trolleys, and Monorails.
11. Section 43 25 13 - Pumping Equipment - Submersible End-Suction Sewage Pumps.
12. Section 46 12 22 - Grit Classifier with Cyclone.
13. Section 46 21 00 - Grit Removal Units.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Bearing Manufacturers Association (ABMA).
2. American Gear Manufacturers Association (AGMA).
3. American Petroleum Institute
 - a. API 686 - Recommended Practice for Machinery Installation and Installation Design
4. ASTM International (ASTM):
 - a. E1934, Standard Guide for Examining Electrical and Mechanical Equipment with Infrared Thermography.
 - b. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
5. Hydraulic Institute (HI):
 - a. 9.6.4, Rotodynamic Pumps for Vibration Measurements and Allowable Values.
6. International Electrotechnical Commission (IEC).
7. Institute of Electrical and Electronics Engineers, Inc. (IEEE).
8. International Organization for Standardization (ISO):

- a. 1940, Mechanical Vibration - Balance Quality Requirements for Rotors in a Constant (Rigid) State - Part 1: Specification and Verification of Balance Tolerances.
 - b. 21940-11, Mechanical Vibration - Rotor Balancing - Part 11: Procedures and Tolerances for Rotors with Rigid Behavior.
 - 9. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. ICS 6, Enclosures for Industrial Control and System.
 - c. MG 1, Motors and Generators.
 - 10. InterNational Electrical Testing Association (NETA):
 - a. ATS, Acceptance Testing Specification for Electrical Power Distribution Equipment and Systems.
 - 11. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC):
 - 12. National Institute for Certification in Engineering Technologies (NICET).
 - 13. National Institute of Standards and Technology (NIST).
 - 14. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.
 - 15. Underwriters Laboratories, Inc. (UL).
 - a. 508, Standard for Safety Industrial Control Equipment.
 - b. 508A, Standard for Safety Industrial Control Panels.
 - c. 698A, Standard for Industrial Control Panels Relating to Hazardous (Classified) Locations.
 - 16. Vibration Institute.
- B. Supplier's Vibration Analyst:
- 1. Supplier's vibration analyst shall prepare pre-Shop Drawing vibration analysis of equipment.
 - 2. Where required, Supplier's vibration analyst shall be either equipment manufacturer's qualified employee or independent business entity whose sole business, or principal part of its business, is evaluating and determining natural frequencies of rotating equipment.
 - 3. Shall possess not less than 10 years' relevant experience.
 - 4. Supplier's Vibration Analyst's Professional Engineer:
 - a. Vibration analysis shall be performed by, or under the direct, personal supervision of, professional engineer licensed and registered in the same jurisdiction as the Site experienced in preparing finite element analyses, rotodynamic analyses, and experimental modal analysis similar to that required for the Work.
 - b. Professional engineer shall possess not less than five years' combined experience in field testing and data analysis for vibration analysis.
 - c. Vibration analysis professional engineer's seal and signature, with indication of date seal and signature were applied to the subject document, shall clearly appear on all results and reports furnished as Submittals.
- C. Field Vibration Testing Subcontractor:

1. Field vibration testing Subcontractor shall, where required by the Contract Documents, perform vibration testing of equipment installed at the Site and perform associated vibration analyses.
2. Vibration testing Subcontractor shall be an independent entity that has performed as its sole business, or principal part of its business, for not less than 10 years, inspection, testing, calibrating, adjusting equipment and systems, and performing vibration testing of equipment.
3. Entities whose principal business is one or more of the following are not considered independent vibration testing entities and, therefore, shall not be field vibration testing Subcontractor:
 - a. Motor sales, service, or repairs.
 - b. Process equipment sales, service, or repairs.
4. Acceptable entities include, but are not necessarily limited to:
 - a. AVS Engineering: <https://www.avseengineering.net/>
 - b. Engineering Testing Services: <https://etestinc.com/>
 - c. Maritech, LLC: <http://www.maritech-llc.com/contact.html>
5. Field vibration testing Subcontractor must have an established program for monitoring and testing equipment calibration, with accuracy traceable in an unbroken chain, in accordance with NIST requirements.
6. Field Personnel: Each person employed for field vibration testing on the Work shall possess not less than the following qualifications:
 - a. Three years' field experience covering all phases of field vibration testing and data gathering.
 - b. Current, valid Vibration Category II certification from Vibration Institute or a licensed, registered professional engineer.
7. Analysis Personnel: Personnel performing analysis for field vibration testing Subcontractor shall possess not less than the following qualifications:
 - a. Five years' combined field testing and data analysis experience.
 - b. Current, valid Vibration Category III certification from the Vibration Institute or a professional engineer licensed and registered in in the same jurisdiction as the Site. Where required by Laws and Regulations, field vibration analysis report shall be sealed, signed, and dated by professional engineer who personally prepared, or exercised personal, supervisory control over subordinates in preparing, the field vibration analysis report.
8. Analysis Equipment: Field vibration testing Subcontractor shall have access to and use, where appropriate, the following testing equipment, properly maintained and calibrated:
 - a. Impact Hammer:
 - 1) Frequency Range: 1 kHz.
 - 2) Range (5v output) 5,000 pounds-force (22,200 newtons).
 - 3) Hammer sensitivity (approx.) 1mV/lbf (0.23 mV/N)
 - b. Analyzer:
 - 1) Frequency Range: 1 Hz to 10,000Hz.
 - 2) Frequency Accuracy: 0.02 percent.
 - 3) Non-Integrated Spectral Amplitude Accuracy: 5 percent, 3 Hz to 65 Hz.
 - 4) Single Integrated Spectral Amplitude Accuracy: 5 percent, 10 Hz to 20 Hz.
 - 5) Supports measurements of acceleration, velocity, and displacement.

- c. Vibration Sensor:
 - 1) Sensitivity: ± 5 percent = 100 mV/g
 - 2) Acceleration Range: ± 5 g.
 - 3) Amplitude Nonlinearity: ± 1 percent
 - 4) Frequency Response: ± 10 Hz to 7kHz (± 3 dB)
- d. Data logging equipment for simultaneous recording of the following data points:
 - 1) Vibration in the X, Y, and axial planes (for all pumps pursuant to ANSI/HI Standard).
 - 2) Digital tachometer recording RPM.
 - 3) Discharge Pressure Transmitter
 - a) Accuracy: 0.3 percent of range
 - b) Fluid Temperature Range: 32 to 100 DegF
 - 4) Suction Pressure Transmitter (when other than submersible pump or vertical turbine (suspended) pump).
 - a) Accuracy 0.35 percent of range.
 - b) Fluid Temperature Range: 32 to 100 DegF.
 - c) For submersible pumps and vertical turbine (suspended) type pumps, suction liquid surface level signal from Site's monitoring and control system (e.g., plant PLC/SCADA system).
 - 5) For pumps, pumping rate (flow) signal from Site's monitoring and control system (e.g., plant PLC/SCADA system)
 - 6) Equipment/motor bearing temperature signal from Site's monitoring and control system (e.g., plant PLC/SCADA system)).
 - 7) Pump/motor vibration signal from Site's monitoring and control system (e.g., plant PLC/SCADA system).

D. Infrared Thermography Testing Program:

- 1. Testing firm:
 - a. An independent firm performing, as the sole or principal part of its business for a minimum of 10 years, the inspection, testing, calibration, and adjusting of systems.
 - b. Must have an established monitoring and testing equipment calibration program with accuracy traceable in an unbroken chain, according to NIST.
- 2. Field personnel:
 - a. Minimum of one year field experience covering all phases of field thermography testing and data gathering.
 - b. Supervisor certified by NETA or NICET.
- 3. Analysis personnel:
 - a. Minimum three years combined field testing and data analysis experience.
 - b. Supervisor certified by NETA or NICET.

E. Electrical Equipment and Connections Testing Program:

- 1. Qualification requirements as specified in section 26 08 00 – Commissioning of Electrical Systems.

F. Miscellaneous:

- 1. A single manufacturer of a "product" shall be selected and utilized uniformly throughout Project even if:

- a. More than one manufacturer is listed for a given "product" in Specifications.
- b. No manufacturer is listed.
- 2. Equipment, electrical assemblies, related electrical wiring, instrumentation, controls, and system components shall fully comply with specific NEC requirements related to area classification and to NEMA 250 and NEMA ICS 6 designations shown on Electrical Power Drawings and defined in the Electrical specifications.
- 3. Variable speed equipment applications: The driven equipment manufacturer shall have single source responsibility for coordination of the equipment and VFD system and verify their compatibility.

1.3 DEFINITIONS

- A. Product: Manufactured materials and equipment.
- B. Major Equipment Supports - Supports for Equipment:
 - 1. Located on or suspended from elevated slabs with supported equipment weighing 2000 pounds or greater, or;
 - 2. Located on or suspended from roofs with supported equipment weighing 500 pounds or greater, or;
 - 3. Located on slab-on-grade or earth with supported equipment weighing 5000 pounds or more.
- C. Equipment:
 - 1. One or more assemblies capable of performing a complete function.
 - 2. Mechanical, electrical, instrumentation or other devices requiring an electrical, pneumatic, electronic or hydraulic connection.
 - 3. Not limited to items specifically referenced in "Equipment" articles within individual Specifications.
- D. Installer or Applicator:
 - 1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 - 2. Installer and applicator are synonymous.
- E. Baseplate or equipment base plate or machine base
 - 1. Are fabricated frames of structural shapes and plates with enough strength and sturdiness to serve as the surface to which other equipment is attached to and supported by. Baseplates can be directly mounted and grouted to concrete equipment support bases or machined and bolted to a sole plate.
- F. Sole plate
 - 1. A thick steel machined plate that is attached to and grouted to a concrete equipment support base.
 - 2. Base plates are bolted to a sole plate when a sole plate is specified and/or provide.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. General for all equipment:
 - a. Data sheets that include manufacturer's name and complete product model number.
 - 1) Clearly identify all optional accessories that are included.

- b. Acknowledgement that products submitted comply with the requirements of the standards referenced.
 - c. Manufacturer's delivery, storage, handling, and installation instructions.
 - d. Equipment identification utilizing numbering system and name utilized in Drawings.
 - e. Equipment installation details:
 - 1) Location of anchorage.
 - 2) Anchorage setting templates.
 - 3) Manufacturer's installation instructions.
 - f. Equipment area classification rating.
 - g. Shipping and operating weight.
 - h. Equipment physical characteristics:
 - 1) Dimensions (both horizontal and vertical).
 - 2) Materials of construction and construction details.
 - i. Equipment factory primer and paint data.
 - j. Manufacturer's recommended spare parts list.
 - k. Equipment lining and coatings.
 - l. Equipment utility requirements include air, natural gas, electricity, and water.
 - m. Ladders and platforms provided with equipment:
 - 1) Certification that all components comply fully with OSHA requirements.
 - 2) Full details of construction/fabrication.
 - 3) Scaled plan and sections showing relationship to equipment.
2. Mechanical and process equipment:
- a. Operating characteristics:
 - 1) Technical information including applicable performance curves showing specified equipment capacity, rangeability, and efficiencies.
 - 2) Brake horsepower requirements.
 - 3) Copies of equipment data plates.
 - b. Piping and duct connection size, type and location.
 - c. Equipment bearing life certification.
 - d. Equipment foundation data:
 - 1) Equipment center of gravity.
 - 2) Criteria for designing vibration, special or unbalanced forces resulting from equipment operation.
 - 3) Type, size, and materials of construction of anchorage.
 - 4) Data required by Section 03 15 19 Anchorage to Concrete for anchor rod design.
 - e. Equipment electrical and control elements:
 - 1) Manufacturer's descriptive information.
 - 2) Outline diagrams.
 - 3) Conduit entrance locations.
 - 4) One-line diagrams.
 - 5) Interconnection wiring diagrams including all field devices.

- 6) Control schematics showing wiring, remote control devices, remote indication and pilot lights, interconnections and interlocking circuits between equipment elements, and tag numbers associated with all control devices and equipment.
3. Electric motor:
 - a. Motor manufacturer and model number.
 - b. Complete motor nameplate data.
 - c. Weight.
 - d. NEMA design type.
 - e. Enclosure type.
 - f. Frame size.
 - g. Winding insulation class and temperature rise.
 - h. Starts per hour.
 - i. Performance data:
 - 1) Motor speed-torque curve superimposed over driven machine speed-torque curve during start-up acceleration and at rated terminal voltage a minimum permissible or specified terminal voltage for all motors over 5 HP.
 - 2) Time-current plots with acceleration versus current and thermal damage curves at the operating and ambient temperatures and at rated terminal voltage and minimum permissible or specified terminal voltage for all motors over 5 HP.
 - 3) Guaranteed minimum efficiencies at 100 percent, 75 percent, and 50 percent of full load.
 - 4) Guaranteed minimum power factor at 100 percent, 75 percent, and 50 percent of full load.
 - 5) Locked rotor and full load current at rated terminal voltage and minimum permissible or specified terminal voltage.
 - 6) Starting, full load, and breakdown torque at rated terminal voltage and minimum permissible or specified terminal voltage.
 - j. Bearing data and lubrication system.
 - k. Natural frequency calculations for:
 - 1) Completed assembly including but not limited to the equipment base, rotating piece of equipment, and the rotating piece of equipment driver.
 - 2) Individual piece of rotating equipment.
 - 3) Equipment driver and connected gear reducer, if applicable.
 - l. Thermal protection system including recommended alarm and trip settings for winding and bearing RTD's.
 - m. Fabrication and/or layout drawings:
 - 1) Dimensioned outlined drawing.
 - 2) Connection diagrams including accessories (strip heaters, thermal protection, etc.).
 - n. Certifications:
 - 1) When utilized with a reduced voltage starter, certify that motor and driven equipment are compatible.
 - 2) When utilized with a variable frequency controller, certify motor is inverter duty and the controller and motor are compatible.

- a) Include minimum speed at which the motor may be operated for the driven machinery.
 - o. Electrical gear:
 - 1) Unless specified in a narrow-scope Specification Section, provide the following:
 - a) Equipment ratings: Voltage, continuous current, kVa, watts, short circuit with stand, etc., as applicable.
 - 2) Control panels:
 - a) Panel construction.
 - b) Point-to-point ladder diagrams.
 - c) Scaled panel face and subpanel layout.
 - d) Technical product data on panel components.
 - e) Panel and subpanel dimensions and weights.
 - f) Panel access openings.
 - g) Nameplate schedule.
 - h) Panel anchorage.
 - i) Short Circuit Current Rating (SCCR) nameplate marking per NFPA 70. Include any required calculations.
 - 4. Systems schematics and data:
 - a. Provide system schematics where required in system specifications.
 - 1) Acknowledge all system components being supplied as part of the system.
 - 2) Utilize equipment, instrument and valving tag numbers defined in the Contract Documents for all components.
 - 3) Provide technical data for each system component showing compliance with the Contract Document requirements.
 - 4) For piping components, identify all utility connections, vents and drains which will be included as part of the system.
 - 5. For factory painted equipment, provide paint submittals in accordance with Section 09 96 00.
 - 6. Qualifications for:
 - a. Natural frequency analysis firm and personnel.
 - b. Vibration testing firm and personnel.
 - c. Infrared thermography testing firm and personnel.
 - d. Electrical equipment and connections testing firm and personnel.
 - 7. Equipment Monitoring and Testing plans, in accordance with PART 3 of this Specification Section:
 - a. Natural frequency analysis and calculations.
 - b. Vibration testing.
 - c. Thermography testing.
 - d. Electrical equipment and connection testing.
- B. Factory Test Reports:
- 1. Natural frequency bump test reports where required for rotating equipment.
 - a. Minimum characteristics of impact hammer.
 - 1) Frequency Range 1 kHz.
 - 2) Range (5v output) 5,000 pounds-force (22,200 N).

- 3) Hammer Sensitivity (7pprox.) 1 mV/lbf (0.23 mV/N).
 - 4) Resonant Frequency 12 kHz
 2. Motor, equipment and final assembled equipment including motor.
 - a. Determine natural frequency of assembled motor prior to shipping to equipment manufacturer or job site.
 - 1) Individual motor fastened to an "infinitely rigid" mass at the same bolt circle as the final assembled equipment.
 - b. Determine natural frequency of the pump.
 - 1) Pump fastened to an "infinitely rigid" mass at the same bolt circle as the final assembled equipment.
 - c. Determine natural frequency of the pump/motor assembly.
 - 1) Pump/motor assembly fastened to an "infinitely rigid" mass at the same bolt circle as the final field assembled equipment.
 - d. For this use, the "infinitely rigid" mass shall be at least 10 times the weight of the equipment being tested.
 3. Submit natural frequency report(s) for approval prior to shipment.
 4. Equipment performance tests.
 - a. As listed in individual equipment specifications.
- C. Contract Closeout Information:
1. Operation and Maintenance Data:
 - a. See Section 01 78 23 for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.
- D. Informational Submittals:
1. Notification, at least one week in advance, that testing will be conducted at factory.
 2. Certification from equipment manufacturer that all manufacturer-supplied control panels that interface in any way with other controls or panels have been submitted to and coordinated with the supplier/installer of those interfacing systems.
 3. Submit sample Manufacturer's Field Service Report (MFSR). Report shall use manufacturer's standard report or use the form in the Exhibits and have at least the following information:
 - a. Certification that equipment has been installed properly, has been initially started up, has been calibrated and/or adjusted as required, and is ready for operation.
 - b. Certification for major equipment supports that equipment foundation design loads shown on the Drawings or specified have been compared to actual loads exhibited by equipment provided for this Project and that said design loadings are equal to or greater than the loads produced by the equipment provided.
 - c. Motor test reports.
 - d. Field noise testing reports if such testing is specified.
 - e. Preliminary field quality control testing format to be used as a basis for final field quality control reporting.
 - f. Provide three bound final written reports documenting natural frequency testing, vibration monitoring and testing for specified equipment.
 - 1) Include the acceptance criteria of all equipment tested.
 - 2) Provide individual tabbed sections for information associated with each piece of tested equipment.

- g. Certification prior to Project closeout that electrical panel drawings for manufacturer-supplied control panels truly represent panel wiring including any field-made modifications.
- h. Testing and monitoring reports in accordance with PART 3 of this Specification Section.
- i. Certification that driven equipment and VFD are compatible.
- 4. Submit completed Manufacturer's Field Service Report (MFSR) for each piece of equipment supplied.
- E. Refer to Section 01 81 33 – Cyber Security Requirements for required cyber security related submittals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Motors:
 - a. ABB Baldor-Reliance.
 - b. General Electric.
 - c. Hyundai Heavy Industries.
 - d. Marathon Electric.
 - e. Siemens.
 - f. TECO-Westinghouse.
 - g. Toshiba U.S.
 - h. U.S. Motors, Nidec Motor Corporation.
 - i. WEG.
 - 2. Mechanical variable speed drives:
 - a. Reeves.
 - b. U.S. Motors (VariDrive).

2.2 MANUFACTURED UNITS

- A. Electric Motors:
 - 1. Where used in conjunction with adjustable speed AC or DC drives, provide motors that are fully compatible with the speed controllers.
 - 2. Design for frequent starting duty equivalent to duty service required by driven equipment.
 - 3. Design for full voltage starting.
 - 4. Design bearing life based upon actual operating load conditions imposed by driven equipment.
 - 5. Size for altitude of Project.
 - 6. Furnish with stainless steel nameplates which include all data required by NEC Article 430.
 - 7. Use of manufacturer's standard motor will be permitted on integrally constructed motor driven equipment specified by model number in which a redesign of the complete unit would be required in order to provide a motor with features specified.
 - 8. AC electric motors less than 1/3 hp:

- a. Single phase, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Permanently lubricated sealed bearings conforming to ABMA standards.
 - c. Built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element with stainless steel enclosure.
9. AC electric motors 1/3 to 1 hp:
- a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Permanently lubricated sealed bearings conforming to ABMA standards.
 - 1) For single phase motors, provide built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element.
10. AC electric motors 1-1/2 to 10 hp:
- a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Permanently lubricated sealed bearings conforming to ABMA standards.
 - c. For vertical motors provide 15 year, average-life thrust bearings conforming to ABMA standards.
 - d. Provide inverter duty motors with integral thermal detectors (thermostat) per phase with normally closed contacts wired in series that will open on overtemperature.
11. AC electric motors greater than 10 hp:
- a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.
 - b. Oil or grease lubricated antifriction bearings conforming to ABMA standards.
 - 1) Design bearing life for 90 percent survival rating at 50,000 hours of operation for motors up to and including 100 hp.
 - 2) For motors greater than 100 hp, design bearing life for 90 percent survival rating at 100,000 HRS of operation.
 - c. For vertical motors provide 15 year, average-life thrust bearings conforming to ABMA standards.
 - d. Thermal protection:
 - 1) For motors controlled from a variable frequency drive and for all other motors 100 hp and above, provide one of the following:
 - a) Integral thermal detectors (thermostat) per phase with normally closed contacts wired in series that will open on overtemperature.
 - b) Resistance type temperature detector (RTD) complete with monitor and alarm panel having a normally closed contact that will open on overtemperature.
 - (1) Two thermal sensing devices per phase in each phase hot-spot location.
 - (2) Monitor and alarm panel:
 - (a) For constant speed motors, install panel in and energize from the motor starter equipment.
 - (b) For variable speed motors, install panel in and energize from the variable speed drive equipment.
12. Severe duty motor to have the following minimum features:
- a. All cast iron construction.
 - b. Gasketed conduit box.
 - c. Epoxy finish for corrosion protection.
 - d. Hydroscopic varnish on windings for corrosion protection.

- e. Drain plug and breather.

B. NEMA Design Squirrel Cage Induction Motors:

1. Provide motors designed and applied in compliance with NEMA and IEEE for the specific duty imposed by the driven equipment.
2. Motors to meet NEMA MG 1 NEMA Premium efficiencies.
3. Do not provide motors having a locked rotor kVA per HP exceeding the NEMA standard for the assigned NEMA code letter.
4. For use on variable frequency type adjustable speed drives, provide:
 - a. Induction motors that comply with NEMA MG 1, Part 31.
 - b. Nameplate identification meeting NEMA MG 1 Part 31 requirements.
 - c. Insulated drive end bearing on all motors.
 - d. Insulated non-drive end bearings, at a minimum, on all motors with horizontal shaft 100 hp and larger.
 - e. An insulated bearing carrier on the non-drive end for vertical shaft motors 100 hp and larger.
 - f. Shaft grounding ring on all motors:
 - 1) Factory installed, maintenance free, circumferential, bearing protection ring with conductive microfiber shaft contacting material.
 - 2) Electro Static Technology AEGIS SGR Bearing Protection Ring or approved equal.
 - g. Have the following minimum turndown ratio without the use of additional cooling, such as a blower, to provide continuous supply of cooling air over the motor.
 - 1) Variable torque: 10:1.
 - 2) Constant torque: 6:1.
5. Design motor insulation in accordance with NEMA standards for Class F insulation with Class B temperature rise above a 40 degrees C ambient.
6. Design motors for continuous duty.
7. Size motors having a 1.0 service factor so that nameplate HP is a minimum of 15 percent greater than the maximum HP requirements of the driven equipment over its entire operating range.
 - a. As an alternative, furnish motors with a 1.15 service factor and size so that nameplate HP is at least equal to the maximum HP requirements of the driven equipment over its entire operating range.
8. Motor enclosure and winding insulation application:
 - a. The following shall apply unless modified by specific Specification Sections:

MOTOR LOCATION	MOTOR ENCLOSURE / WINDING INSULATION
Unclassified Indoor Areas	DPFG (for horizontal motors), WP-I (for vertical motors)
Wet indoor Areas	WP-II (for vertical motors)]
Wet outdoor Areas	WP-II (for vertical motors)
Corrosive Areas	TEFC, Severe/ Chemical Duty
Class I, Division 1 Areas	Explosion Proof, Approved for Class I Division 1 Locations
Class II, Division 1 Areas	Explosion Proof, Approved for Class II Division 1 Locations

MOTOR LOCATION	MOTOR ENCLOSURE / WINDING INSULATION
Class I or Class II, Division 2 Areas	Explosion Proof, Approved for Division 1 Locations or TEFC with maximum external frame temperature compatible with the gas or dust in the area, Extra Dip and Bake for moisture

NOTE: Provide TENV motors in the smaller horsepower ratings where TEFC is not available.

9. Provide oversize conduit box complete with clamp type grounding terminals inside the conduit box.
10. Balance motors to ISO G2.5 level.
 - a. Submit prior to shipping to equipment manufacturer or job site.
- C. Submersible Motors: Refer to individual narrow-scope Specification Sections for submersible motor requirements.
- D. V-Belt Drive:
 1. Provide each V-belt drive with sliding base or other suitable tension adjustment.
 2. Provide V-belt drives with a service factor of at least 1.6 at maximum speed.
 3. Provide static proof belts.
- E. Mechanical Variable Speed Drives:
 1. Oil-lubricated shaft-mounted reduction gear drive capable of 300 percent shock load and providing a 1.5 service factor in accordance with AGMA.
 2. Assure infinite speed adjustment over a 4:1 range.
 3. Secure drive to equipment base.
 4. Flexible coupling between drive shaft and equipment shaft.
- F. Vibration Isolators:
 1. Provide all equipment subject to vibration with restrained spring type vibration isolators or pads according to the manufacturer's written recommendation.
- G. Space Heaters:
 1. Silicone rubber strip type, 120 V rated.
 2. Provided on:
 - a. All motors 10 hp and larger mounted outdoors.
 - b. Indoor motors in humid environments as indicated.

2.3 COMPONENTS

- A. Gear Drives and Drive Components:
 1. Size drive equipment capable of supporting full load including losses in speed reducers and power transmission.
 2. Provide nominal input horsepower rating of each gear or speed reducer at least equal to nameplate horsepower of drive motor.
 3. Design drive units for 24-hour continuous service, constructed so oil leakage around shafts is precluded.
 4. Utilize gears, gear lubrication systems, gear drives, speed reducers, speed increasers and flexible couplings meeting applicable standards of AGMA.
 5. Gear reducers:
 - a. Provide gear reducer totally enclosed and oil lubricated.
 - b. Utilize antifriction bearings throughout.

- c. Provide worm gear reducers having a service factor of at least 1.20.
- d. Furnish other helical, spiral bevel, and combination bevel-helical gear reducers with a service factor of at least 1.50.

2.4 ACCESSORIES

A. Guards:

- 1. Provide each piece of equipment having exposed moving parts with full length, easily removable guards, meeting OSHA requirements.
- 2. Interior applications:
 - a. Construct from expanded galvanized steel rolled to conform to shaft or coupling surface.
 - b. Utilize non-flattened type 16 GA galvanized steel with nominal 1/2 inches spacing.
 - c. Connect to equipment frame with hot-dip galvanized bolts and wing nuts.
- 3. Exterior applications:
 - a. Construct from 16 GA stainless steel or aluminum.
 - b. Construct to preclude entrance of rain, snow, or moisture.
 - c. Roll to conform to shaft or coupling surface.
 - d. Connect to equipment frame with stainless steel bolts and wing nuts.

B. Anchorage:

- 1. Cast-in-place anchorage:
 - a. Provide ASTM F593, Type 316 stainless steel anchorage for all equipment.
 - b. Configuration and number of anchor bolts shall be per manufacturer's recommendations.
 - c. Provide two nuts for each bolt.
- 2. Drilled anchorage:
 - a. Adhesive anchors per Section 03 15 19.
 - b. Epoxy grout per Section 03 31 30.
 - c. Threaded rods same as cast-in-place.

C. Data Plate:

- 1. Attach a stainless steel data plate to each piece of rotary or reciprocating equipment.
- 2. Permanently stamp information on data plate including manufacturer's name, equipment operating parameters, serial number and speed.

D. Gages:

- 1. Provide gages in accordance with Section 40 73 00.
- 2. Provide at the following locations:
 - a. Inlet and outlet of all reciprocating, centrifugal and positive displacement mechanical and process equipment.
 - b. At locations identified on Drawings.
- 3. Utilize tapping sleeves for mounting per Section 40 05 00.

E. Lifting Eye Bolts or Lugs:

- 1. Provide on all equipment 50 pounds or greater.

2. Provide on other equipment or products as specified in the narrow-scope Specification Sections.
- F. Platforms and Ladders:
1. Design and fabricate in accordance with OSHA Standards.
 2. Fabricate components from fiberglass-reinforced plastic.
 3. Provide platform surface: Non-skid checkered plate, unless specified in narrow-scope Specification Sections.

2.5 FABRICATION

- A. Design, fabricate, and assemble equipment in accordance with modern engineering and shop practices.
- B. Manufacture individual parts to standard sizes and gages so that repair parts, furnished at any time, can be installed in field.
- C. Furnish like parts of duplicate units to be interchangeable.
- D. Ensure that equipment has not been in service at any time prior to delivery, except as required by tests.
- E. Furnish equipment which requires periodic internal inspection or adjustment with access panels which will not require disassembly of guards, dismantling of piping or equipment or similar major efforts.
1. Quick opening but sound, securable access ports or windows shall be provided for inspection of chains, belts, or similar items.
- F. Provide common, lipped base plate mounting for equipment and equipment motor where said mounting is a manufacturer's standard option.
1. Provide drain connection for 3/4 inches PVC tubing.
- G. Machine the mounting feet of rotating equipment.
- H. Fabricate equipment which will be subject to Corrosive Environment in such a way as to avoid back to back placement of surfaces that cannot be properly prepared and painted.
1. When such back to back fabrication cannot be avoided, provide continuous welds to seal such surfaces from contact with corrosive environment.
 2. Where continuous welds are not practical, after painting seal the back to back surfaces from the environment in accordance with Section 07 92 00.
- I. Natural frequency/critical Speed:
1. All rotating parts accurately machined and in as near perfect rotational balance as practicable.
 2. Excessive vibration is sufficient cause for equipment rejection.
 3. Ratio of all rotative speeds to natural frequency/critical speed of a unit or components: Greater than 1.2.
- J. Equipment Base
1. Adequate grout and vent openings to allow grout to flow under entire base.
- K. Control Panels Engineered and Provided with the Equipment by the Manufacturer:
1. Manufacturer's standard design for components and control logic unless specific requirements are specified in the specific equipment Specification Section.

2. NEMA or IEC rated components are acceptable, whichever is used in the manufacturer's standard engineered design, unless specific requirements are required in the specific equipment Specification Section.
3. Affix entire assembly with a UL 508A or UL 698A label "Listed Enclosed Industrial Control Panel" prior to delivery.
 - a. Control panels without an affixed UL 508A or UL 698A label shall be rejected.
4. Provide equipment or control panels with Short Circuit Current Rating (SCCR) labeling as required by NFPA 70 and other applicable codes.
 - a. Determine the SCCR rating by one of the following methods:
 - 1) Method 1: SCCR rating meets or exceeds the available fault current of the source equipment when indicated on the Drawings.
 - 2) Method 2: SCCR rating meets or exceeds the source equipment's Amp Interrupting Current (AIC) rating as indicated on the Drawings.
 - 3) Method 3: SCCR rating meets or exceeds the calculated available short circuit current at the control panel.
 - b. The source equipment is the switchboard, panelboard, motor control center or similar equipment where the control panel circuit originates.
 - c. For Method 3, provide calculations justifying the SCCR rating. Utilize source equipment available fault current or AIC rating as indicated on the Drawings.

2.6 SHOP OR FACTORY PAINT FINISHES

- A. Electrical Equipment:
 1. Provide factory-applied paint coating system(s) for all electrical equipment components except those specified in Section 09 96 00 to receive field painting.
 - a. Field painted equipment: See Section 09 96 00 for factory applied primer/field paint compatibility requirements.
- B. Field paint other equipment in accordance with Section 09 96 00.
 1. See Section 09 96 00 for factory applied primer/field paint compatibility requirements.

2.7 SOURCE QUALITY CONTROL

- A. Motor Tests:
 1. Test motors in accordance with NEMA and IEEE standards.
 2. Provide routine test for all motors.
 3. The Owner reserves the right to select and have tested, either routine or complete, any motor included in the project.
 - a. The Owner will pay all costs, including shipping and handling, for all motors successfully passing the tests.
 - b. Pay all costs, including shipping and handling, for all motors failing the tests.
 - c. If two successive motors of the same manufacturer fail testing, the Owner has the right to reject all motors from that manufacturer.
- B. Balance:
 1. Unless specified otherwise, for all equipment 10 hp or greater, all rotating elements in motors, pumps, blowers, and centrifugal compressors shall be fully assembled, including coupling hubs, before being statically and dynamically balanced. Balance all rotating elements to the following criteria, per ISO 21940-11:

$$U_{per} = \frac{G \times 6.015 \times W/2}{N}$$

Where:

U_{per} = Permissible residual unbalance for each correction plane in ounce-inches (OZ-IN). See ISO 21940-11 for acceptable values.

G = ISO Balance Quality Grade Number, per ISO 21940-11

W = Rotor weight in pounds

N = Maximum continuous operating RPM

- a. Where specified, balancing reports, demonstrating compliance with this requirement, shall be submitted as product data.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment as shown on the Drawings and other Contract Documents, in accordance with manufacturer's written instructions, and in accordance with Laws and Regulations. Where the Contract Documents, manufacturer's written instructions, or Laws and Regulations conflict, obtain interpretation or clarification from Engineer before proceeding.
- B. Utilize appropriate templates for anchorage placement for equipment installed on concrete.
- C. Equipment Drainage Discharges:
 1. For equipment having drainage requirements, such as seal water, provide 3/4-inch copper, PVC, or clear plastic tubing from drainage discharge at equipment base to nearest floor drain or equipment drain. Do not discharge liquid across floors.
 2. Furnish and install bell up at each equipment base.
 3. Route equipment drainage piping clear of major traffic areas, to discharge to locations approved by Engineer. To extent practical, avoid creating tripping hazards.
- D. Coordination of Equipment Supports and Bases with Structures:
 1. Do not construct foundations until major equipment supports are approved by Engineer.
- E. Equipment Lubrication Points:
 1. Extend all non-accessible or difficult-to-access lubrication fittings to reasonably accessible locations to facility operation and maintenance personnel without use of ladders or elevating devices, by providing stainless steel tubing (of appropriate wall thickness for the service and application) to a location which allows easy access of fittings from closest operating floor level.
- F. Concrete Equipment Support Bases:
 1. Install level in both directions, with acceptable vertical tolerance of 1/4-inch±.
 2. At anchorage locations, install bases flat and level.
- G. Machine Bases / Sole Plates:
 1. Grease or tape anchorages and jack screws to inhibit grout from adhering to bolts and other anchors.

- a. Jack screws number and size by equipment manufacturer.
 - 1) Jack screw
 - a) 304 Stainless Steel minimum
 - b) 0.5 inches diameter minimum
 - 2) Jack Screw Pad
 - a) 2 inch diameter minimum
 - b) Anchored in place with a structural epoxy adhesive.
 2. Install machine base of rotating equipment on equipment base.
 3. Level in both directions using jack screws, with a machinist level, according to machined surfaces on base. Base shall be level within vertical tolerance of the lesser of (a) 0.005 inch per foot with no more than 0.0005 inches difference between any two points, or (b) equipment manufacturer's written instructions.
 4. Level machine base on equipment base and align couplings between driver and driven equipment.
- H. Couplings for Rotating Equipment:
1. Align in annular and parallel positions.
 - a. For equipment rotating at 1200 rpm or less, align both annular and parallel within 0.001 inch tolerance for couplings four-inch size and smaller.
 - b. Couplings larger than four-inch size: Increase tolerance 0.0005 inch per inch of coupling diameter above four-inch; for example: for six-inch coupling, tolerance is 0.002 inch. For 10 inch coupling, required tolerance is 0.004 inch.
 - c. For equipment rotating at speeds greater than 1200 rpm, tolerance for both annular and parallel positions shall be rate of 0.00025 inch (or less) per inch of coupling diameter.
 2. If equipment is furnished by manufacturer as mounted unit, verify factory alignment after installation at the Site. Realign if as necessary, in accordance with equipment manufacturers' written instructions, to provide required factory tolerance.
 3. Inspect surfaces for runout before attempting to trim or align units.
- I. Grouting:
1. Level onto equipment base with jack screws in accordance with the Contract Documents, provide a dam or formwork around base to contain grout between equipment base and equipment support pad.
 2. Preparation:
 - a. Extend dam or formwork to cover leveling shims and blocks.
 - b. Anchor sleeves:
 - 1) Required for equipment (Pumps, Mixers, Blowers) greater than 50 hp
 - 2) If anchor sleeves were used, fill voids in anchor sleeves with foam or room temperature vulcanizing (RTV) silicone to keep grout from filling sleeves.
 - c. Do not use nuts below the machine base to level the unit.
 - d. Saturate top of roughened concrete surface with water before grouting.
 3. Grout Installation:
 - a. Install grout until entire space under machine base is completely filled to underside of base. Voids are unacceptable.
 - b. Puddle grout by working a stiff wire through the grout and vent holes, to ensure grout is installed properly and to release air entrained in grout or base cavity.
 4. After Grout Installation:

- a. When grout is sufficiently hardened, remove dam or formwork and finish exposed grout surface to fine, smooth surface.
- b. Completely cover exposed grout surfaces with wet burlap and keep covering sufficiently wet to prevent too-rapid evaporation of water from grout.
- c. Check for voids by tapping along the top deck of the mounting plate. A solid thud indicates grout-filled areas while a drum-like hollow sound indicates a void requiring filling.
 - 1) Void areas are to be filled by drilling 1/8 inches NPT holes in opposite corners of each void area. Grout to be pumped into one void with a grout gun until grout emerges from the other vent hole.
- d. When grout is fully hardened (after not less than seven days), remove jack screws, and tighten nuts on anchor bolts and similar anchors to required torque.
- e. Inspect and verify levelness of machine base and, if not in accordance with requirements, remedy by removing base and reinstalling in accordance with the Contract Documents.
- f. Inspect driver-driven equipment for proper alignment. When not in accordance with requirements, remedy so that the Work is not defective.

3.2 INSTALLATION CHECKS

- A. For all equipment specifically required in detailed specifications, secure services of experienced, competent, and authorized representative(s) of equipment manufacturer to visit site of work and inspect, check, adjust and approve equipment installation.
 1. In each case, representative(s) shall be present during placement and start-up of equipment and as often as necessary to resolve any operational issues which may arise.
- B. Secure from equipment manufacturer's representative(s) a written report certifying that equipment:
 1. Has been properly installed and lubricated.
 2. Is in accurate alignment.
 3. Is free from any undue stress imposed by connecting piping or anchor bolts.
 4. Has been operated under full load conditions and that it operated satisfactorily.
 - a. Secure and deliver a field written report to Owner immediately prior to leaving jobsite.
- C. No separate payment shall be made for installation checks.
 1. All or any time expended during installation check does not qualify as Operation and Maintenance training or instruction time when specified.

3.3 IDENTIFICATION OF EQUIPMENT AND HAZARD WARNING SIGNS

- A. Identify equipment and install hazard warning signs in accordance with Section 10 14 00.

3.4 FIELD PAINTING AND PROTECTIVE COATINGS

- A. For required field painting and protective coatings, comply with Section 09 96 00, High Performance Industrial Coatings.

3.5 WIRING CONNECTIONS AND TERMINATION

- A. Clean wires before installing lugs and connectors.

- B. Coat connection with oxidation eliminating compound for aluminum wire.
- C. Terminate motor circuit conductors with copper lugs bolted to motor leads.
- D. Tape stripped ends of conductors and associated connectors with electrical tape.
 - 1. Wrapping thickness shall be 150 percent of the conductor insulation thickness.
- E. Connections to carry full ampacity of conductors without temperature rise.
- F. Terminate spare conductors with electrical tape.

3.6 FIELD QUALITY CONTROL

- A. General:
 - 1. Furnish equipment manufacturer's field quality control services and testing as specified in the individual equipment Specification Sections.
 - 2. Execute pre-demonstration requirements in accordance with Section 01 75 00.
 - 3. Perform and report on all tests required by the equipment manufacturer's Operation and Maintenance Manual.
 - 4. Provide testing for all equipment furnished or installed as part of the Work.
 - 5. Repair or replace equipment shown to be out of range of the acceptable tolerance until the equipment meets or exceeds acceptable standards.
 - 6. Equip testing and analysis personnel with all appropriate project related reference material required to perform tests, analyze results, and provide documentation including, but not limited to:
 - a. Contract Drawings and Specifications.
 - b. Related construction change documentation.
 - c. Approved Shop Drawings.
 - d. Approved Operation and Maintenance Manuals.
 - e. Other pertinent information as required.
- B. Equipment Monitoring and Testing Plans:
 - 1. Approved in accordance with Shop Drawing submittal schedule.
 - 2. Included as a minimum:
 - a. Qualifications of firm, field personnel, and analysis personnel doing the Work.
 - b. List and description of testing and analysis equipment to be utilized.
 - c. List of all equipment to be testing, including:
 - 1) Name and tag numbers identified in the Contract Documents.
 - 2) Manufacturer's serial numbers.
 - 3) Other pertinent manufacturer identification,
- C. Instruments Used in Equipment and Connections Quality Control Testing:
 - 1. Minimum calibration frequency:
 - a. Field analog instruments: Not more than 6 months.
 - b. Field digital instruments: Not more than 12 months.
 - c. Laboratory instruments: Not more than 12 months.
 - d. If instrument manufacturer's calibration requirements are more stringent, those requirements shall govern.
 - 2. Carry current calibration status and labels on all testing instruments.

3. See individual testing programs for additional instrumentation compliance requirements.
- D. Testing and Monitoring Program Documentation:
1. Provide reports with tabbed sections for each piece of equipment tested.
 2. Include all testing results associated with each piece of equipment under that equipment's tabbed section.
 - a. Include legible copies of all forms used to record field test information.
 3. Prior to start of testing, submit one copy of preliminary report format for Engineer review and comment.
 - a. Include data gathering and sample test report forms that will be utilized.
 4. In the final report, include as a minimum, the following information for all equipment tested:
 - a. Equipment identification, including:
 - 1) Name and tag numbers identified in the Contract Documents.
 - 2) Manufacturer's serial numbers.
 - 3) Other pertinent manufacturer identification,
 - b. Date and time of each test.
 - c. Ambient conditions including temperature, humidity, and precipitation.
 - d. Visual inspection report.
 - e. Description of test and referenced standards, if any, followed while conducting tests.
 - f. Results of initial and all retesting.
 - g. Acceptance criteria.
 - h. "As found" and "as left" conditions.
 - i. Corrective action, if required, taken to meet acceptance.
 - j. Verification of corrective action signed by the Contractor, equipment supplier, and Owner's representative.
 - k. Instrument calibration dates of all instruments used in testing.
 5. Provide three (3) bound final reports prior to Project final completion.
- E. Electrical Equipment and Connections Testing Program:
1. Perform testing on Electrical equipment, connections, and motors in accordance with 26 08 00 - Commissioning of Electrical Systems.
- F. Other Testing:
1. Perform tests and inspections not specifically listed but required to assure equipment is safe to energize and operate.
 2. Subbase that supports the equipment base and that is made in the form of a cast iron or steel structure that has supporting beams, legs, and cross members that are cast, welded, or bolted shall be tested for a natural frequency of vibration after equipment is mounted.
 - a. The ratio of the natural frequency of the structure to the frequency of the disturbing force shall not be between 0.5 and 1.5.
- G. Infrared Thermography Testing Program:
1. Perform infrared thermography testing for equipment specified in other Divisions during the Equipment Demonstration Period.

- a. Perform on all rotating and reciprocating equipment having drivers 25 hp or greater.
 2. Additional requirements for infrared thermography monitoring and testing equipment:
 - a. Temperature range: -10 to 350 degrees C.
 - b. Accuracy: ± 2 percent or 2 degrees C, whichever is greater.
 - c. Repeatability: ± 1 percent or 1 degree C, whichever is greater.
 - d. Temperature indication resolution: 0.1 degrees C.
 - e. Minimum focus distance: 0.3 meters.
 - f. Output in color palettes: JPEG, BMP, or other digital format compatible with Windows.
 3. Perform inspection per ASTM E1934.
 - a. Operate VFD driven equipment at 100 percent speed during thermographic inspection.
 4. Acceptability of electrical connections and components based on temperature comparison between components and ambient air temperatures not greater than 10 degrees C per ASTM E1934.
 5. Acceptability of motors and equipment bearings based on temperature rise not greater than 5 DEGC above the equipment and/or bearing manufacturers published criteria.
- H. Equipment Field Vibration Monitoring and Testing Program:
1. Perform vibration monitoring and testing for equipment specified in other Divisions during the Equipment Demonstration Period.
 2. Perform field vibration testing on each item of rotating and reciprocating equipment having driver 50 HP and greater
 3. Acceptability of equipment conditions, except pumps, based on ISO 1940-1 Balance Quality Grade G6.3 criteria.
 4. Acceptability of pumping equipment to be based on current ANSI/HI criteria:
 - a. ANSI/HI 11.6-2012 for Submersible Pumps in a Wet-pit or Dry-pit configuration.
 - b. ANSI/HI 9.6.4-2016 for all other centrifugal pumps.
 5. Utilize an Engineer approved 3rd party testing agency to perform vibration monitoring and testing on equipment.
 6. For variable speed equipment provide vibration testing at no more than 3 percent increments of maximum speed throughout entire operating range.
 7. Provide machinery condition diagnosis based on an acceptable machinery vibration severity guide or machinery fault guide analysis provided by the testing agency.
 8. Tolerances for pumping equipment shall be per HI published standards.
 9. Repair or replace equipment shown to be out of range of the specified tolerance until the equipment meets the specified normal operation range required in the machinery fault guide analysis.
 10. Document testing with written report.
 - a. Report to include initial testing results, acceptance criteria, corrective action taken to meet acceptance, verification of corrective action and acceptance report and baseline.
 - b. Natural frequency of installed equipment utilizing an impact hammer.
 - c. Report to include graphical plots of vibration signature for each test point at a scale which illustrates all vibration levels greater than 0.025 ips RMS.

3.7 DEMONSTRATION

- A. Demonstrate equipment in accordance with Section 01 75 00.

3.8 ABBREVIATION TABLE

- A. As indicated on the Drawings.

3.9 CLOSEOUT ACTIVITIES

- A. Refer to Section 01 81 33 – Cyber-Security Requirements for cyber security related closeout requirements.

END OF SECTION

EXHIBIT A

MANUFACTURER FIELD SERVICE REPORT

This field service report is generic in nature. An electronic copy of this form will be furnished upon request from the Engineer. This report is to reflect that all requirements of the Operations and Maintenance Manual and the individual equipment specification requirements have been performed for the installation and operation and also to provide a baseline for amperage draw for each phase, vibration readings, rotation, alignment and all other applicable tests required to ensure that the equipment has been installed properly. A MFSR will be required for each individual piece of equipment requiring a MFSR.

Definitions of Reports:

Initial service report: Required for construction preparations. Equipment delivered to site is in good condition and conforms to specification requirements. Anchor bolts, hardware and ancillary items (piping, flanges, conduits, fuel/power supply) are compatible with equipment.

Interim service report: Required for equipment installation onto base or foundation. Piping connections, electrical and control connections or structural attachment are complete. For equipment stored on site over four weeks, interim service report will document that manufacturer's long-term storage procedures have been incorporated and equipment has not been damaged, nor coatings deteriorated.

Final service report is to be completed when equipment can be started, electrical amperage and voltage draw measured, cold and hot alignments performed, vibration testing and monitoring performed and the equipment is found to be in compliance with Manufacturer's operating parameters and the requirements of the individual equipment specifications.

PROJECT: Woodside WRF – Headworks Improvements

Report Status:

Initial Service Report completed and submitted on _____

Interim Service Report completed and submitted on _____

Final Service Report completed and submitted on _____

Commencement of Warranty _____

I Description

A. Equipment Name and Identification: _____

B. Serial Number: _____

C. Specification Section Number: _____

D. Manufacturer: _____

E. Representative: _____

F. Type of Service: Initial [_____] Interim [_____] Final [_____]

II General Review

A. The above referenced equipment/material/supplies have been inspected, checked, and adjusted. Yes [_____] No [_____]

Summary: _____

B. The above referenced equipment/material/supplies were placed upon properly prepared or suitable substrate. N/A [_____] Yes [_____] No [_____]

Summary: _____

C. The above referenced equipment/material/supplies are free from any undue stress imposed by any connected piping, anchor bolts or any other load. N/A [_____] Yes [_____] No [_____]

Summary: _____

- D. The above referenced equipment/material/supplies have operated under design conditions. N/A ☐ Yes ☐ No ☐

Summary: _____

- E. The above referenced equipment/material/supplies have been installed in accordance with the manufacturer's recommendations and the Procurement Documents, require no corrective work, and are hereby approved. Yes ☐ No ☐

Summary: _____

- F. The above referenced equipment/material/supplies are acceptable to the manufacturer as installed providing the following corrective action(s) are performed:

1. _____

2. _____

3. _____

4. _____

5. _____

III Inspection Checklist

Item	Acceptable (Yes/No)	Readings/Comments
Bearings (1)		
Belts (tension reading)		
Lubrication Levels		
Vibration (1) (2) (MILS/SEC)		
Infrared Thermography (1) (2)		
Starting AMPS		
Full Load AMPS		
Volts		
Rotation		
Jacket Temperature (DEGF)		
Seal Water Flow Rate (GPH or GPM)		
Seal Water Pressure (PSI)		
O-rings/Packing		
Alignment (1)		

Item	Acceptable (Yes/No)	Readings/Comments
Anchor Bolts		
Anchor Bolt Torque		
Grout		
Substrate Approval		
Sound level (4 feet from unit) (1) (dB)		
Other		

(1) Inspection or testing reports must be attached.

(2) Provide vibration testing and monitoring procedures for Engineer's review and approval prior to testing.

IV O&M Manuals

- A. The O&M manual as presented contains all information required for proper operation, maintenance, and instruction of this system. N/A [] Yes [] No []

Summary: _____

V Preventive Maintenance

- A. The preventive maintenance summary outlined in the O&M manual is acceptable for operation of the system throughout the warranty period. N/A [] Yes [] No []

Summary: _____

VI Operator Training/Classroom Instruction

- A. Training and instruction have been performed in accordance with the requirements of the Procurement Documents. N/A [] Yes [] No []

- B. Final Training/Classroom Instruction Completed on: _____

Summary: _____

VII Remarks

VIII Certification

I hereby certify, that I, [____], am a duly authorized representative of the manufacturer, that I am empowered by the manufacturer to inspect, approve, and operate his equipment, and that I am authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as modified herein. I also certify that all information contained herein is true and accurate.

By: _____
(Authorized Representative)

For: _____

Date: _____

IX Acknowledgments

By: _____

For: _____
(Contractor)

Date: _____

By: _____

For: _____
(Engineer)

Date: _____

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SECTION 01 62 00
PRODUCT OPTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Contractor's options for selecting materials and equipment.
 2. Requirements for consideration of "or equal" materials and equipment.

1.2 CONTRACTOR'S PRODUCT OPTIONS

- A. For materials and equipment specified only by reference standard or description, without reference to Supplier, furnish materials and equipment complying with such reference standard and descriptive requirements in the Contract Documents, by a Supplier or from a source that complies with the Contract Documents.
- B. For materials and equipment specified by naming one or more items or Suppliers, furnish the named materials and equipment that comply with the Contract Documents, unless an "or equal" or substitute item is approved by Engineer.
- C. For materials and equipment specified by naming one or more items or Suppliers and the term, "or equal", when Contractor proposes a material or equipment item or Supplier as an "or equal", submit to Engineer a request for approval of an "or equal" item or Supplier.

1.3 "OR EQUAL" ITEMS

- A. Procedure: The following augments the requirements of the General Conditions, as may be modified by the Supplementary Conditions:
1. For proposed materials and equipment, whether or not indicated by name in the Contract Documents, and considered by Contractor as an "or equal" in accordance with the General Conditions, Contractor shall request in writing Engineer's approval of each proposed "or equal".
 2. Request for approval of an "or equal" item shall accompany the Shop Drawing, product data Submittal, or Sample for the proposed item. Engineer may reject or otherwise not approve or accept any such request or Submittal that is incomplete.
 3. Indicate on the Schedule of Submittals which Submittals were for proposed "or equals" and which were approved as "or equals".
 4. Clearly indicate in the associated Submittal transmittal whether the Submittal includes request for approval of a proposed "or equal".
 5. Comply with the Contract Documents' requirements to clearly indicate all proposed deviations from the requirements of the Contract Documents. Where the Contract Documents do not otherwise require such indication, Contractor shall indicate in detail, both in the Submittal for the "or equal" item and in separate, written correspondence, each proposed deviation from the requirements of the Contract Documents.
 6. Requirements for furnishing information and documents related to proposed "or equals" shall be furnished with the initial Submittal for that item and for all subsequent re-Submittals, if any.
 7. Engineer's approval, if any, of a proposed "or equal" will be indicated by the Engineer's approval of the associated Shop Drawing, product data Submittal, or Sample, as applicable, unless otherwise indicated on the associated Submittal.
 8. Should Engineer reject or otherwise not approve a proposed "or equal", Contractor may propose the item as a substitute, subject to the Contract Documents' requirements concerning requests for approval of substitute items or procedures.
- B. Contractor's request for approval of each proposed "or equal" shall include:

1. Contractor's written request that the proposed item be considered as an "or equal" in accordance with the General Conditions and this Specifications section.
 2. Contractor's certifications required in the General Conditions.
 3. Documentation adequate to demonstrate to Engineer that proposed item does not require extensive revisions to the Contract Documents, that proposed item is consistent with the Contract Documents, and that proposed item will produce results and performance required in the Contract Documents, and that proposed item is compatible with other portions of the Work.
 4. Detailed comparison of significant qualities of proposed item with the materials and equipment and Suppliers named in the Contract Documents. Significant qualities include attributes such as performance, weight, size, durability, corrosion resistance in the service environment, visual and textural effect and attributes, and specific features and requirements shown or indicated.
 5. Evidence that proposed item's manufacturer will furnish warranty equal to or better than that specified, if any.
 6. List of similar installations for completed projects with project names and addresses, and names, address, telephone number, and e-mail address of design professionals and owners, when requested by Engineer.
 7. Samples, when requested by Engineer.
 8. Other information requested by Engineer.
- C. When used in the Contract Documents, the terms "or equal", "or-equal", and "or approved equal" have the same meaning and refer to materials or equipment proposed by Contractor for Engineer's approval as equivalent to materials or equipment indicated in the Contract Documents using the name of specific manufacturers or products. Such materials or equipment shall be incorporated into the Work only after being duly approved in writing by Engineer.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

SECTION 01 64 00
OWNER-FURNISHED PRODUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements and procedures for Owner-furnished materials and equipment to be installed by Contractor, including:
 - a. Items in Owner's existing stock to be installed or relocated by Contractor.
 - b. Items purchased by Owner under one or more separate procurement contracts.
 - c. Handling and storage of Owner-furnished items.

B. Scope:

1. Contractor shall provide labor, materials, tools, equipment, services, and incidentals shown, specified, and necessary for accepting, handling, insuring, storing, and maintaining as required, installing, checking out, starting-up, and completing Owner-furnished materials and equipment in accordance with the Contract Documents.

1.2 OWNER FURNISHED MATERIALS AND EQUIPMENT

A. Items of equipment and materials to be furnished by Owner for installation by Contractor are indicated below.

1. Furnished under one or more procurement contracts separately entered into by Owner (as "buyer") with a seller:
 - a. Installed by Contractor: Influent Screen 01 (SCRN-02-01) and Influent Screen 02 (SCRN-02-02). Items will be delivered FOB to the Site.

B. Availability of Owner-Furnished Materials and Equipment:

1. Owner-furnished materials and equipment will be available to Contractor starting on:
 - a. Items Obtained via Procurement Contracts: On the date(s) or time(s) indicated for delivery as set forth in the associated procurement contract.

C. Availability of Procurement Contract Documents:

1. Procurement Contract is not Assigned: An electronic copy of the procurement contract documents was distributed with the construction Bidding Documents. Should such copy not be available to Contractor, an electronic copy, in portable document format (PDF), of the procurement contract documents is available from Engineer upon request. Contractor is responsible for printing and binding paper copies of the procurement contract documents needed by Contractor.

D. For Owner-furnished materials and equipment obtained via one or more procurement contracts that are not assigned to Contractor, Engineer will keep Contractor informed of probable delivery dates of the materials and equipment included in the procurement contract.

E. Owner's Responsibilities:

1. Engineer will arrange for and deliver to Contractor an electronic copy (in portable document format; PDF) of each of seller's approved shop drawings, samples (except for physical samples, of which one each will be delivered to Contractor), and other submittals as reviewed by Engineer or Owner through the Project Website. Such submittals, whether approved or otherwise, are not part of the Contract Documents.
2. When Procurement Contract is Not Assigned to Contractor: Owner (or Engineer, on behalf of Owner) will advise Contractor of the anticipated delivery date 10 days prior to scheduled delivery. Upon telephone advisory from seller's shipping entity/carrier, Owner (or Engineer,

on behalf of Owner) will give Contractor approximately 24 hours' advance notification, by telephone, of scheduled delivery.

3. Owner shall arrange and pay for delivery to the Site of Owner-furnished materials and equipment obtained via procurement contracts.
4. When procurement contract is not assigned to Contractor, upon delivery, Owner (who may be accompanied by Engineer, at Owner's option) shall inspect, jointly with Contractor, the materials and equipment delivered by seller. Where appropriate, Owner will arrange with seller to have seller's representative present at the delivery point to assist in visually inspecting the delivered materials and equipment.
5. When procurement contract is not assigned to Contractor, the Owner will submit to seller claims for damage incurred in transit to the delivery location and shall replace damaged, defective, or nonconforming items of Owner-furnished materials and equipment obtained via procurement contract.
6. When procurement contract is not assigned to Contractor, the Owner shall pay for services of seller's factory-trained representative to furnish consultation and advice during installation of associated Owner-furnished materials and equipment, to inspect, check, and approve installation before operation, and to furnish technical advice and direction during start-up and field quality control activities for Owner-furnished materials and equipment. Extent to which services of seller's representative will be provided during installation will be in accordance with the procurement contract documents.
7. If services of seller's representative beyond the scope of such services set forth in the procurement contract document is desired by Contractor, or if such services are necessary as a result of defective Work by Contractor, Contractor shall arrange and pay for such services of seller's representative.
8. After Substantial Completion, Owner (or facility manager, if other than Owner) will operate and maintain the items obtained via procurement contract and coordinate directly with seller regarding matters of routine maintenance. When associated procurement contract is not assigned to Contractor, the Owner (or facility manager, if other than Owner) will communicate directly with seller regarding warranty-related matters. When procurement contract is assigned to Contractor, the Owner (or facility manager, if other than Owner) will communicate warranty-related issues to Contractor.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Review installation procedures for Owner-furnished materials and equipment and coordinate installation of items to be installed with or before Owner-furnished materials and equipment.

B. Scheduling:

1. Schedule and perform the Work to coordinate with anticipated delivery dates for Owner-furnished materials and equipment, as indicated in Owner's procurement contract(s) therefor.
2. Where Owner will furnish services of a manufacturer's representative for Owner-furnished materials and equipment, schedule and perform the Work in accordance with scheduling constraints of manufacturer's representative.
3. Comply with the Contract Time indicated in the Contract Documents and Section 01 13 13 - Milestones.

1.4 HANDLING AND STORAGE

A. Handling:

1. Handle Owner-furnished materials and equipment in accordance with the Contract Documents and the item manufacturer's written instructions. Handle so that warranties in effect are not voided.

B. Storage:

1. Store Owner-furnished materials and equipment in accordance with the Contract Documents and the item manufacturer's instructions. Store so that warranties in effect are not voided.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 65 00
PRODUCT DELIVERY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General requirements for:
 - a. Coordination of deliveries.
 - b. Preparing materials and equipment for shipping from the production or fabrication facility, including packaging.
 - c. Shipment.
 - d. Delivery of materials and equipment to the Site.
 - e. Inspection upon delivery and remedy of damaged, deteriorated, or otherwise defective items, and remedy of missing or lost items.

B. Scope:

1. Contractor shall make all arrangements for packaging, shipping, delivering, inspecting upon delivery, and unloading upon delivery materials and equipment necessary and required for the Work.
2. Contractor shall provide all labor, materials, equipment, tools, incidentals, and services necessary to have materials and equipment properly packaged, shipped, and delivered to the Site, and all related Work required by the Contract Documents.

C. Related Requirements: Include but are not limited to:

1. Section 01 29 76 - Progress Payment Procedures.
2. Section 01 35 43.13 - Environmental Procedures for Hazardous Materials.
3. Section 01 66 00 - Product Storage and Handling Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. To extent practicable, coordinate shipping and delivery of materials and equipment with anticipated shipping requirements, such as allowing sufficient time for customs inspections on international shipments, availability of shipping services and facilities, and seasonal concerns (such as shipments that may be influenced by major tropical storms and predictable, typical weather).
2. Coordinate shipping and delivery of materials and equipment to the Site and other locations where such items may be stored prior to delivery to the Site. Coordinate such shipments and deliveries with the progress of the Work and status of adequate facilities, whether temporary storage or permanent installation locations, necessary to properly store and safeguard materials and equipment to be incorporated into the Work.
3. Where possible, deliver to the Site materials and equipment as close as possible to when such items will be incorporated into appropriately protected, permanent installation location.

1.3 PREPARATION FOR SHIPMENT

A. Factory Assembly:

1. When practical, factory-assemble materials and equipment. Mark or tag separate parts and assemblies to facilitate field assembly.

B. Temporary Protection:

1. Appropriately cover, with strippable, protective coating or other material, machined parts and unpainted, uncoated, or unprotected surfaces subject to damage or deterioration caused by weather elements or environment,
2. To extent practical, strippable, removable, disposable protective materials shall be recyclable.
3. To extent practical, strippable, removable, and disposable protective items shall be type resulting in minimum waste and cleanup upon removal.
4. Protection of Electrical Equipment, Instrumentation and Controls, Items with Computer Chips Solid-State Devices, and Other Electronics:
 - a. Provide appropriate temporary protection of electrical equipment, microprocessors, and other electronics from humidity, moisture, and corrosion by appropriate packaging, protection, desiccants, and volatile corrosion inhibitor (VCI) blocks.
 - b. Immediately prior to shipment, provide new, fresh desiccants and ensure integrity of other protective materials.

C. Packaging:

1. Package materials and equipment to facilitate handling, and protect materials and equipment from damage during shipping, handling, and storage.
2. Mark, label, or tag, on outside of each package, crate, and container, to indicate associated:
 - a. Purchase order number.
 - b. Bill of lading number.
 - c. Delivery address (including facility name, where applicable).
 - d. Owner's contract designation or Project name.
 - e. Contractor name.
 - f. Purchasing Subcontractor's name (as applicable).
 - g. Contents by name and designation within the Work (for example, "Influent Pump No. 1"),
 - h. Approximate weight of container, crate, package, including packaging.
 - i. Special instructions for handling and protection during shipment and unloading.
 - j. Comply with Section 01 35 43.13 - Environmental Procedures for Hazardous Materials, when materials or equipment contain Constituents of Concern.
3. The Site may be listed as the "ship to" or "delivery" address; but Owner or facility manager shall not be listed as recipient of shipment unless otherwise directed in writing by Engineer.
4. Truthfully and accurately mark, label, or tag items for shipment and delivery.
5. Include complete packing lists and bills of materials with each shipment.
6. Protect materials and equipment with appropriate, temporary packaging or protection when such items may rotate or move during shipment.
7. Protect materials and equipment from exposure to weather elements, adverse environments, and keep thoroughly dry and dust-free. Protect painted surfaces against impact, abrasion, discoloration, and other damage and deterioration.
8. Lubricate bearings and other items requiring lubrication, in accordance with manufacturer's written instructions.

1.4 SHIPPING

A. Notification of Shipments:

1. Keep Engineer and Owner informed of delivery of all materials and equipment to be incorporated into the Work.
2. Upon receipt of Supplier's advance notice of shipment, not less than seven days prior to delivery of materials and equipment at the Site or Contractor's storage location, furnish Engineer written notice of anticipated delivery date and specific location (at the Site or Contractor's storage location, as applicable) of the following:

- a. Shaftless screw conveyors.
 - b. Hoist, trolley, and monorail.
 - c. Torque flow overhung horizontal centrifugal pump.
 - d. Submersible end-suction sewage pumps.
 - e. Grit classifier with cyclone.
 - f. Vortex grit chamber equipment.
 - g. In-channel drum screens.
- B. Do not ship materials and equipment until:
- 1. Related Shop Drawings, product data, Samples, shop testing plan Submittals, and other Submittals required by the Contract Documents are approved by Engineer, including, but not necessarily limited to, all Action Submittals associated with the materials and equipment being delivered.
 - 2. Manufacturer's written instructions for handling, storing, and installing the associated materials and equipment have been submitted to and accepted by Engineer, in accordance with the Specifications.
 - 3. Results of source quality control activities (factory testing and inspections), when required by the Contract Documents for the subject materials or equipment, have been submitted to and accepted by Engineer.
 - 4. Facilities required for handling materials and equipment, in accordance with the Contract Documents and manufacturer's instructions, are in place and available at the delivery location.
 - 5. Required storage facilities and protection measures have been provided.
- C. Loss or Damage During Shipment:
- 1. Unless otherwise indicated in the Contract Documents (whether expressly or in provisions regarding builder's risk insurance), Contractor is responsible for all loss, damage, and deterioration to materials and equipment incurred during shipment and delivery.
 - 2. Contractor is not eligible for additional Contract Times or increase in the Contract Price due to delays or costs incurred due to loss, damage, or deterioration during shipment, unless Owner was responsible for shipping the subject materials or equipment to the Site or other delivery location.

1.5 DELIVERY

- A. Scheduling and Timing of Deliveries:
- 1. Arrange deliveries of materials and equipment in accordance with the Progress Schedule accepted by Engineer and in ample time to facilitate inspection and observation prior to installation.
 - 2. Schedule deliveries to minimize space required for, and duration of, storage of materials and equipment at the Site or other delivery location, as applicable.
 - 3. Coordinate deliveries to avoid conflicting with the Work and conditions at the Site, and to accommodate the following:
 - a. Work of other contractors at or adjacent to the Site, Owner, and others.
 - b. Storage space limitations.
 - c. Availability of appropriate construction equipment and machinery, tools, and qualified personnel for inspecting, unloading, and handling materials and equipment.
 - d. Owner's use of premises.
 - 4. Deliver materials and equipment to the Site during regular working hours.
 - 5. Deliver materials and equipment to avoid delaying the Work and the Project.
- B. Deliveries:

1. Provide Contractor's telephone number to shipper; do not provide Owner's telephone number to shipper or carrier.
2. Arrange for deliveries while Contractor's personnel are at the Site. Contractor shall receive and coordinate shipments upon delivery. Shipments delivered to the Site when Contractor is not present will be refused by Owner, and Contractor shall be responsible for the associated delays and costs, including demurrage.
3. Comply with Section 01 35 43.13 – Environmental Procedures for Hazardous Materials, as applicable.

C. Containers and Marking:

1. Have materials and equipment delivered in manufacturer's original, unopened, labeled containers.
2. Clearly mark partial deliveries of component parts of materials and equipment to identify materials and equipment, to allow easy accumulation of parts, and to facilitate assembly.

D. Inspection of Materials and Equipment Upon Delivery:

1. Immediately upon delivery, visually but critically inspect shipment to verify that:
 - a. Materials and equipment comply with the Contract Documents and approved or accepted (as applicable) Submittals.
 - b. Quantities are correct.
 - c. Materials and equipment are undamaged and of required quality.
 - d. Containers and packages are intact and labels are complete and legible.
2. Eligibility for Payment:
 - a. Materials and equipment are not eligible for payment until duly inspected and determined to be in accordance with the Contract Documents and Engineer-approved Submittals, without damage or deterioration.
 - b. No payment can be made for damaged, deteriorated, or otherwise defective items.
 - c. No payment can be made for missing or lost items.
 - d. Other provisions of the Contract Documents may establish other preconditions for payment for delivered material and equipment, including Section 01 29 76 – Progress Payment Procedures.
3. Damaged, Deteriorated, and Otherwise Defective Items:
 - a. Promptly remove from the Site damaged, deteriorated, or defective materials and equipment and expedite delivery of new, undamaged materials and equipment.
 - b. Promptly remedy incomplete or lost materials and equipment.
 - c. Furnish materials and equipment in accordance with the Contract Documents, to avoid delaying progress of the Work.
 - d. Promptly advise Engineer in writing: (1) when damaged, deteriorated, incomplete, or otherwise defective materials and equipment are delivered, and (2) associated impact on the Progress Schedule.

E. Handling of Materials and Equipment Upon Delivery:

1. Provide construction equipment and machinery, tools, and qualified personnel necessary to unload and handle materials and equipment, by methods that prevent damaging, defacing, and soiling materials and equipment and packaging.
2. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
3. Provide additional protection during unloading and handling as necessary to prevent scraping, marring, and otherwise damaging materials and equipment and adjacent surfaces.
4. Unload and handle materials and equipment by methods that prevent bending, warping, and overstressing.
5. Lift heavy components only at designated lifting points.

6. Unload and handle materials and equipment in safe manner and as recommended by manufacturer to prevent damage. Do not drop, roll, or skid materials and equipment off delivery vehicles or at other times during unloading and handling.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 66 00
PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General requirements for:
 - a. Payment considerations for stored materials and equipment.
 - b. Handling of materials and equipment.
 - c. Storage of materials and equipment, including:
 - 1) General provisions for storage.
 - 2) Storage locations.
 - 3) Protection of stored items.
 - 4) Storage of items containing Constituents of Concern.
 - 5) Outdoor, uncovered storage.
 - 6) Outdoor, covered storage.
 - 7) Fully-protected storage.
 - 8) Removal of temporary storage facilities and restoration of storage areas.
 - d. Maintenance of storage.

B. Scope:

1. Contractor shall provide all labor, materials, equipment, tools, services, lands, and incidentals necessary and required to store and handle materials and equipment to be incorporated into the Work, and other materials and equipment at the Site, adjacent areas, and offsite storage areas.

C. Related Requirements: Include but are not limited to:

1. Section 01 29 76 - Progress Payment Procedures.
2. Section 01 35 43.13 - Environmental Procedures for Hazardous Materials.
3. Section 01 57 05 - Temporary Controls.
4. Section 01 65 00 - Product Delivery Requirements.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:

1. Materials and equipment delivered but not suitably stored and protected will not be eligible for payment.
2. Engineer may recommend reduction in payment, and Owner may reduce payments to Contractor ("set-offs") by an appropriate amount when stored items are subsequently revealed to be improperly stored or protected.
3. Payment for Suitably Stored Items:
 - a. Requirements for payment for materials and equipment delivered and suitably stored, but not yet incorporated into the Work, are in the General Conditions, as may be modified by the Supplementary Conditions, and Section 01 29 76 - Progress Payment Procedures.
 - b. Materials and equipment delivered and suitably stored, but not yet incorporated into the Work, will not be eligible for payment until the inspection upon delivery, required in Section 01 65 00 - Product Delivery Requirements, is completed and Engineer concurs that such items generally appear to be in good condition, in accordance with the Contract Documents, and are of the required quality and quantity.

1.3 SUBMITTALS

- A. Informational Submittals: Submit the following:
 - 1. Affidavits of Inspection and Maintenance Performed on Mechanical and Electrical Equipment in Long-Term Storage:
 - a. Submit in accordance with requirements of Article 3.1 of this Section.
 - 2. Other Records of Inspection and Maintenance of Stored Materials and Equipment:
 - a. Establish and maintain such records as required by this Section.
 - b. Submit to Engineer or Owner (as applicable) within three days of Contractor's receipt of such request.

1.4 HANDLING

- A. Handling of Materials and Equipment – General:
 - 1. Handle materials and equipment to be incorporated into the Work in accordance with the Contract Documents and manufacturer's written instructions.
 - 2. During handling and assembling of materials and equipment:
 - a. Maintain validity of manufacturers' warranties.
 - b. Comply with:
 - 1) Section 01 65 00 - Product Delivery Requirements.
 - c. Do not drop, drag (without appropriate rollers or skids), or scrape materials and equipment.
 - d. Use proper construction equipment and machinery, and tools, operated by sufficient number of qualified personnel.
 - e. Maintain materials and equipment in neutral position.
 - f. Do not exert undue stress on materials and equipment.
 - g. Do not deform, bend, or damage materials and equipment.
 - h. Do not deform or mar shafts, bearings, or other parts.
- B. Additional Requirements for Hoisting and Lifting:
 - 1. When lifting or hoisting, support materials and equipment from appropriate lifting points using proper hooks and suitable nylon lifting straps, chains, and cables. Do not mar or scrape surfaces of materials and equipment during handling.
 - 2. For work in existing facilities, comply with Section 01 14 19 - Use of Site, regarding use of Owner's existing hoisting equipment and elevators, as applicable.
 - 3. Do not support rigging from building or structure without written approval of Engineer.
 - 4. Contractor is responsible for and shall remedy damage to building, structure, and existing hoisting equipment and elevators, resulting from Contractor's operations.

1.5 STORAGE

- A. Storage – General:
 - 1. Contractor shall make all arrangements and provide all measures necessary and required for, and pay all costs associated with, storing materials and equipment.
 - 2. Store materials and equipment in accordance with the Contract Documents and manufacturer's written instructions. In event of conflict between the Contract Documents and manufacturer's written instructions regarding storage and protection, comply with the more-stringent, more-protective requirements.
 - 3. Records:
 - a. Establish and maintain up-to-date account of materials and equipment in storage, to facilitate preparation of progress payment requests, if the Contract Documents provide for payment for materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing.

- b. Submit affidavits of inspection and maintenance of mechanical and electrical equipment in long-term storage in accordance with this Section's Article 3.1 ("Maintenance of Storage").
 4. Arrange stored materials and equipment to allow easy access for observation or inspection by Owner, Engineer, Resident Project Representative (RPR), Owner's Site Representative (OSR), Owner-hired testing and inspection entities, and authorities having jurisdiction.
 5. Inspect and maintain stored materials and equipment in accordance with this Section's Article 3.1 ("Maintenance of Storage").
- B. Storage Location:
 1. Area(s) available at the Site for storing materials and equipment are addressed in Section 01 14 19 - Use of Site.
 2. When onsite storage is insufficient, Contractor shall provide additional lands for storage facilities as necessary and required for the Work.
 3. Restrictions on Storage Locations:
 - a. Do not store materials or equipment in structures being constructed unless approved by Engineer in writing.
 - b. Do not use lawns, landscaped areas, or private property for storage without written permission of property owner.
 - c. Comply with:
 - 1) Section 01 14 19 - Use of Site.
- C. Protection of Stored Items – General:
 1. Store materials and equipment indicated below to ensure preservation of quality and fitness for intended uses in the Work, including proper protection against damage and deterioration resulting from: water (including precipitation, flood, and other), moisture, humidity, wind, dust, freezing, and outdoor ambient air high temperature as high as 95 degrees F. Temperature and humidity inside crates, containers, storage structures, and packaging may be significantly higher than outdoor ambient air temperature.
 2. Store in indoor, climate-controlled storage all materials and equipment subject to damage or deterioration by water, moisture, humidity, heat, cold, and other elements, unless otherwise acceptable to Owner and Engineer.
 3. Do not open manufacturer's crates, containers, and packaging until time of installation, unless recommended by the manufacturer or otherwise required in the Contract Documents.
 4. Store all materials and equipment off the ground (or floor) on raised supports such as skids or pallets.
 5. Electrical Equipment, Instrumentation and Controls, Items Containing Computer Chips, Solid-State Devices, and Other Electronics:
 - a. Contractor shall obtain, coordinate, and comply with specific temperature, humidity, and environmental limitations on materials and equipment, because temperature inside cabinets and components stored in warm temperatures can approach 200 degrees F.
 - b. Protect from water, moisture, humidity, dust, heat, cold, and other potentially harmful elements and environments. Space heaters provided in equipment shall be connected and operating at all times until equipment is connected to active, permanent, electrical power.
 - c. Provide inside each electrical panel, control panel, and other enclosures with electronic device(s) each of the following: (1) desiccant, (2) volatile corrosion inhibitor (VCI) blocks, (3) moisture indicator, and (4) maximum- and minimum-indicating thermometer.
 - d. Check panels and equipment not less than once per month. Replace desiccant, VCI, and moisture indicator the earlier of: (1) as often as necessary, or (2) every six months.
 - e. Establish and maintain certified record of daily maximum and minimum temperature and humidity in storage facility. Such records shall be available for Engineer's and

Owner's inspection upon request. Certified record of monthly inspection, noting maximum and minimum temperature for month, condition of desiccant, VCI, and moisture indicator, shall be available to Engineer and Owner upon request.

6. Finished Surfaces:

- a. Protect finished surfaces against impact, abrasion, discoloration, and other damage.
- b. Remedy, in accordance with requirements of item manufacturer and finishing system manufacturer damaged, marred, or deteriorated finishes, to Engineer's satisfaction.

7. Contractor is fully responsible for loss, damage, and deterioration, including theft and vandalism, to stored materials and equipment.

D. Storage of Materials or Equipment Containing Constituents of Concern:

1. Prevent contamination of personnel, storage areas, the Site, and adjacent areas.
2. Comply with Laws and Regulations, Section 01 35 43.13 - Environmental Procedures for Hazardous Materials, and other provisions of the Contract Documents relative to Constituents of Concern and Hazardous Environmental Conditions.

E. Uncovered Storage:

1. The following materials may be stored outdoors without cover on supports, so there is no contact with the ground:
 - a. Precast concrete materials.
 - b. Metal stairs.
 - c. Handrails and railings.
 - d. Grating.
 - e. Checker plate.
 - f. Metal access hatches, such as floor doors, roof hatches, and the like.
 - g. Castings.
 - h. Fiberglass items.
 - i. Rigid electrical conduit, except PVC-coated conduit.
 - j. Fencing intended for permanent, outdoor installation.
 - k. Piping, except PVC or chlorinated PVC (CPVC) pipe.

F. Covered Storage:

1. The following materials and equipment may be stored outdoors on supports and completely covered with covering impervious to water:
 - a. Reinforcing steel.
 - b. Structural steel.
 - 1) Contractor shall ensure that covered storage for structural steel is sufficient to prevent corrosion. If corrosion is found, remove before installation of coating in accordance with Section 09 96 00 - High Performance Industrial Coatings.
 - c. Grout and mortar materials.
 - d. Masonry units.
 - e. Metal decking.
 - f. Rough lumber.
 - g. Soil materials and granular materials such as aggregate.
 - h. PVC and CPVC pipe.
 - i. PVC-coated electrical conduit.
 - j. Filter media.
2. Properly and fully secure covers against coming loose in strong winds.
3. Install coverings properly sloped to prevent accumulation of water.
4. Loose Soil Material and Loose Granular Material:

- a. Store such materials in well-drained areas.
- b. Prevent mixing of such materials with foreign matter. Provide underlying separation layer or store on solid, impervious surface, where appropriate.
- c. Provide temporary erosion and sediment controls for stockpiled soil materials in accordance with Section 01 57 05 - Temporary Controls.

G. Fully-Protected Storage:

1. Store all materials and equipment not indicated in the provisions above regarding uncovered storage and covered storage on supports, in buildings, trailers, or other suitable temporary storage facility with concrete or wood flooring, solid and impervious roof, and fully closed walls on all sides.
2. Covering with visqueen plastic sheeting or similar material in storage space without floor, roof, and walls is unacceptable.
3. Provide heated storage for materials and equipment that could be damaged or deteriorate by low temperatures or freezing.
4. Provide air-conditioned storage for materials and equipment that could be damaged or deteriorate by high temperature or humidity.
5. Protect mechanical and electrical equipment from being contaminated by dust, dirt, and moisture.
6. Maintain temperature and humidity at levels recommended by materials and equipment manufacturers.
7. Prevent infestation of stored items by pests and rodents. Promptly and properly remedy such infestation when apparent.

H. Removal of Temporary Storage Facilities and Restoration of Storage Areas:

1. Completely remove temporary storage facilities when no longer necessary for the Work.
2. Restore areas used for storage and areas occupied by temporary storage facilities, in accordance with the Contract Documents.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE OF STORAGE

- A. On a scheduled basis, periodically inspect stored materials and equipment to ensure that:
 1. Condition and status of storage facilities is adequate to provide required storage conditions.
 2. Required environmental conditions are maintained on continuing basis.
 3. Materials and equipment exposed to weather elements or other environment are not adversely affected.
- B. Mechanical and Electrical Equipment in Long-Term Storage:
 1. Meaning of the term "long-term storage" is as established in written instructions of manufacturer of associated materials or equipment.
 2. Mechanical and electrical equipment requiring long-term storage shall have complete manufacturer's written instructions for servicing each item, with notice of enclosed instructions shown on exterior of crate, container, or packaging.
 3. Frequency of inspections and maintenance of stored items shall be in accordance with manufacturer's written instructions.
 4. For mechanical equipment with bearings and shafts, manually rotate shaft during inspection and maintenance, as recommended by equipment manufacturer.
 5. Space heaters that are part of electrical equipment shall be connected and operated continuously until equipment is connected to permanent electrical power supply.

6. Other requirements for maintenance during storage of electrical equipment, instrumentation and controls, items with computer chips, solid-state devices and other electronics are in this Section's provision on general protection during storage.
- C. Affidavits:
1. Submit to Engineer affidavit for each time maintenance and inspection was performed on materials and equipment in long-term storage. Affidavit shall be signed by Contractor and entity performing the inspection and maintenance on the stored items.
 2. Indicate on affidavit:
 - a. Date of inspection.
 - b. Personnel involved and employer of each.
 - c. Condition of storage environment.
 - d. Specific stored items inspected, equipment condition, problems observed, problems corrected, maintenance tasks performed, and other relevant information.
 - e. Signature of Contractor's person responsible for the inspection and maintenance.
 - f. Signed and notarized statement by items' manufacturer indicating whether storage conditions and tasks performed are suitable for continued compliance with manufacturer's warranties.
 3. Submit each affidavit, complete, not later than seven days after performing associated inspection and maintenance.

END OF SECTION

SECTION 01 71 14
MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Construction mobilization and demobilization.
- B. Scope:
 - 1. Contractor shall provide all labor, materials, equipment, tools, services, and incidentals to perform mobilization and demobilization for the Work.
 - 2. This Section is general and does not necessarily indicate all activities required for mobilization and demobilization, which may be indicated in other parts of the Contract Documents.,
- C. Related Requirements: Include, but are not necessarily limited to:
 - 1. Section 01 14 19 - Use of Site.
 - 2. Section 01 22 00 - Measurement and Payment.
 - 3. Section 01 29 73 - Schedule of Values.
 - 4. Section 01 57 05 - Temporary Controls.
 - 5. Section 01 74 00 - Cleaning.

1.02 PRICE AND PAYMENT PROCEDURES

- A. Measurement and Payment:
 - 1. Where costs of mobilization and demobilization are to be included in a specific bid/pay item, such item is indicated in the Contract, including Section 01 22 00 - Measurement and Payment.
 - 2. Where the Contract does not expressly require costs for mobilization and demobilization are to be under specific bid/pay item(s), Contractor may allocate such costs among bid/pay items as Contractor deems appropriate.
 - 3. Where mobilization and demobilization is to be part of a larger lump sum bid/pay item, limitations on eligibility for payment of mobilization and demobilization costs are indicated in Section 01 29 73 - Schedule of Values.
- B. If costs for mobilization, demobilization, or both change as a result of Contract modifications, include the total cost of such changes to mobilization and demobilization in Change Proposal submitted for each associated change. Make no subsequent claim, whether via Change Proposal, Claim, or dispute, for additional compensation for mobilization, demobilization, or both.

1.03 MOBILIZATION AND DEMOBILIZATION - GENERAL

- A. Do not commence mobilization at the Site or other areas until:
 - 1. The Contract is signed by both parties and is effective.
 - 2. Required insurance documentation, performance bond, and payment bond have been submitted by Contractor and accepted by Owner, and builder's risk insurance complying with the Contract Documents is furnished and in place, and documentation thereof accepted by the parties.
 - 3. Conditions, if any, of Owner-issued Notice to Proceed, if any, have been complied with by the applicable party.
 - 4. Preconstruction conference(s), including items on agenda for site mobilization matters, is completed.

5. Preconstruction photographic documentation is obtained and submitted in accordance with the Contract Documents.
- B. Mobilization Work includes, but is not limited to:
1. Establishing vehicular access and parking.
 2. Establishing temporary controls in accordance with Section 01 57 05 - Temporary Controls and establishing and initial compliance with security for the Site in accordance with Owner's requirements.
 3. Establishing Contractor's staging and laydown areas, in accordance with Section 01 14 19 - Use of Site.
 4. Establishing temporary utilities and temporary facilities in accordance with the Contract Documents.
 5. Establishing required and necessary temporary project signage.
 6. Other mobilization Work required by the Contract Documents, including Section 01 22 00 - Measurement and Payment, and Section 01 29 73 - Schedule of Values.
- C. Demobilization Work includes, but is not limited to:
1. Removing from the Site and other areas Contractor's temporary utilities, temporary facilities, temporary signage, temporary security measures; construction equipment, machinery, and tools; ,unused items of materials and equipment; and other items.
 2. Final restoration and repair of damage caused by Contractor.
 3. Final cleaning in accordance with Section 01 74 00 - Cleaning.
 4. Other demobilization Work required by the Contract Documents, including Section 01 22 00 - Measurement and Payment, and Section 01 29 73 - Schedule of Values.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION - (NOT USED)

SECTION 01 73 20
OPENINGS AND PENETRATIONS IN CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Methods of installing and sealing openings and penetrations in construction.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 05 50 00 - Metal Fabrications.
 - 2. Section 06 82 00 - Fiberglass Reinforced Plastic Fabrications.
 - 3. Section 07 62 00 - Flashing and Sheet Metal.
 - 4. Section 07 84 00 - Firestopping.
 - 5. Section 07 92 00 - Joint Sealants.
 - 6. Section 09 96 00 - High Performance Industrial Coatings.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. ASTM International (ASTM):
 - a. A36, Standard Specification for Carbon Structural Steel.
 - b. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - c. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - d. A312, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
 - e. A351, Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
 - f. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.
 - g. A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - h. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - i. A995, Castings, Austenitic-Ferritic (Duplex) Stainless Steel, for Pressure-Containing Parts.
 - 2. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC):
 - 1) Article 501, Class 1 Locations.
 - b. 90A, Standard for Installation of Air Conditioning and Ventilating Systems.
 - c. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).

1.3 DEFINITIONS

- A. Corrosive Areas: For the purpose of this specification section, the following areas are defined as corrosive:
 - 1. Woodside Influent Lift Station.
 - 2. Headworks Building, Screen Room.
- B. Hazardous Areas: Areas shown in the Contract Documents as having Class I or Class II area classifications.

C. Washdown Areas: Areas having floor drains or hose bibbs.

1.4 SUBMITTALS

A. Shop Drawings:

1. For each structure provide dimensioned or scaled (minimum 1/8 inches = 1 foot) plan view drawings containing the following information:
 - a. Vertical and horizontal location of all required openings and penetrations.
 - b. Size of all openings and penetrations.
 - c. Opening type.
 - d. Seal type.
2. Manufacturer's installation instructions for standard manufactured products.

1.5 SITE CONDITIONS

A. For purposes of this Project, groundwater was not encountered by geotechnical investigation. The Geotechnical Engineering Evaluation dated June 4, 2024 indicates groundwater to be greater than 40 feet below existing grade.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe Sleeves:

1. Areas listed as Corrosive Areas in PART 1:
 - a. Stainless steel, Type 316L.
 - b. Penetrations 24 inches diameter or less: ASTM A269, ASTM A312 or ASTM A554, Schedule 40.
 - c. Penetrations larger than 24 inches diameter: Stainless steel, ASTM A666, Minimum 1/4 inches thickness.
2. All other Areas:
 - a. Steel, Hot-dipped galvanized after fabrication.
 - b. Steel, painted in accordance with Specification Section 09 96 00.
 - c. Penetrations 24 inches diameter or less: ASTM A53, Schedule 40.
 - d. Penetrations larger than 24 inches diameter: ASTM A36, Minimum 1/4 inches thickness.

B. Backing Rod and Sealant: See Specification Section 07 92 00.

C. Modular Mechanical Seals:

1. Acceptable manufacturers:
 - a. Link-Seal.
2. 316 stainless steel bolts, nuts and washers.

D. Flexible Pipe Connectors for Precast Manhole, Catch Basin, and Utility Structures:

1. Acceptable Manufacturers:
 - a. Kor-N-Seal.
 - b. Or equal.

E. Firestopping Material: See Specification Section 07 84 00.

F. Sheet Metal Sleeves:

1. Areas listed as Corrosive Areas in PART 1: Stainless steel: ASTM A240, Type 316L.
2. All other areas: Galvanized steel: ASTM A653, G90.
3. Minimum 12 GA.

G. Commercial Wall Castings:

1. Ductile iron, ASTM A536.
2. For wet/corrosive areas either side of penetration: Stainless Steel, ASTM A352 or ASTM A995.
3. Grade equal to connecting piping system.

PART 3 - EXECUTION

3.1 FABRICATION

- A. Fabricate pipe sleeves in accordance with Specification Section 05 50 00.
- B. Fabricate sheet metal sleeves in accordance with Specification Section 07 62 00.
- C. Provide waterstop plate/anchor flange for piping, ducts, castings and sleeves cast-in-place in concrete.
 1. For fabricated units, weld plate to sleeve, pipe, or ductwork.
 2. For commercial castings, cast water stop/anchor with wall pipe.
 3. Plate is to be same thickness as sleeve, pipe, casting or ductwork.
 4. For fabricated units, diameter of plate or flange to be 4 inches larger than outside diameter of sleeve, pipe or ductwork.
 5. For commercial castings, waterstop/anchor size to be manufacturer standard.
 6. Provide continuous around entire circumference of sleeve, pipe, or ductwork.
- D. Factory or shop-coat painted components in accordance with Specification Section 09 96 00.

3.2 INSTALLATION AND APPLICATION

- A. Firestopping materials used in fire-resistance rated construction shall be in full compliance with Specification Section 07 84 00.
- B. Seal openings and penetrations in non-fire-resistance-rated construction in accordance with Specification Section 07 92 00.
- C. Obtain prior approval from Engineer when any opening larger than 100 square inches must be made in existing or newly completed construction.
- D. Perform HVAC penetrations in accordance with NFPA 90A.
- E. Perform electrical penetrations in accordance with NFPA 70, Article 501.
- F. When mechanical or electrical work cannot be installed as structure is being erected, provide and arrange for building-in of boxes, sleeves, insets, fixtures or devices necessary to permit installation later.
 1. Lay out chases, holes or other openings which must be provided in masonry, concrete or other work.
- G. Where pipes, conduits or ducts pass through floors in washdown areas, install sleeves with top 3 IN above finish floors.
 1. In non-washdown areas, install sleeves with ends flush with finished surfaces.
- H. Size sleeves, blockouts and cutouts which will receive sealant seal such that free area to receive sealant is minimized and seal integrity may be obtained.
- I. For insulated piping and ducts, size sleeves, blockouts and cutouts large enough to accommodate full thickness of insulation.
- J. Where pipes, conduits or ducts pass through grating, provide banding at the entire perimeter of the opening.
 1. Metal grating: See Specification Section 05 50 00.
 2. FRP grating: See Specification Section 06 82 00.

- K. Where pipes, conduits or ducts are removed where passing through grating:
1. Metal grating:
 - a. Provide banding at perimeter and cover opening with 1/4 inches plate of the same material of the grating.
 - b. See Specification Section 05 50 00.
 2. FRP grating:
 - a. Provide full depth cover meeting same loading requirement as existing material or replace grating section.
 - b. See Specification Section 06 82 00.
- L. Do not cut into or core drill any beams, joists, or columns.
- M. Do not install sleeves in beams, joists, or columns.
- N. Do not install recesses in beams, joists, columns, or slabs.
- O. Field Cutting and Coring:
1. Saw or core drill with non-impact type equipment.
 2. Mark opening and drill small 3/4 inches or less holes through structure following opening outline.
 3. Sawcut opening outline on both surfaces.
 - a. Knock out within sawcuts using impact type equipment.
 - b. Do not chip or spall face of surface to remain intact.
 - c. Do not allow any overcut with saw kerf.
- P. Precast-Prestressed Concrete Construction:
1. Do not cut openings or core drill vertically or horizontally through stems of members.
 2. Do not locate or install sleeves or recess sleeves vertically or horizontally through or in stems of members.
 3. Cast openings and sleeves into flanges of units.
 4. Cast openings larger than 6 inches in diameter or 6 inches maximum dimension in units at time of manufacture.
 5. Cast openings smaller than 6 inches in diameter or 6 inches maximum dimensions in flanges of units at time of manufacture or field cut.
- Q. Where alterations are necessary or where new and old work join, restore adjacent surfaces to their condition existing prior to start of work.
- R. Where area is blocked out to receive sheet metal sleeve at later date:
1. If blockout size is sufficient to allow placement, utilize dowels for interface of initially placed concrete and sleeve encasement concrete which is placed later.
 - a. Size blockout based on sleeve size required plus 4 to 6 inches each side of sleeve for concrete encasement.
 - b. Provide #4 dowels at 12 inches spacing along each side of blockout with minimum of two dowels required per side.
 2. If blockout size is not sufficient to allow placement of dowels, provide keyway along all sides of blockout.
 - a. Size blockout based on sleeve size required plus 2 to 4 inches each side of sleeve for concrete encasement.
- S. For interior wall applications where backer rod and sealant are specified, provide backer rod and sealant at each side of wall.
- T. Refer to Drawings for location of fire-rated walls, floors, and ceilings.

1. Utilize firestopping materials and procedures specified in Specification Section 07 84 00 inches conjunction with scheduled opening type to produce the required fire rating.
- U. Use full depth expanding foam sealant for seal applications where single or multiple pipes, conduits, etc., pass through a single sleeve.
- V. Do not make duct or conduit penetrations below high water levels when entering or leaving tankage, wet wells, or other water holding structures.
- W. Modular Mechanical Seals:
 1. Utilize one seal for concrete thickness less than 8 inches and two seals for concrete, 8 inches thick or greater.
 2. Utilize two seals for piping 16 inches diameter and larger if concrete thickness permits.
 3. Install seals such that bolt heads are located on the most accessible side of the penetration.
- X. Backer Rod and Sealant:
 1. Install in accordance with Specification Section 07 92 00.
 2. Provide backer rod and sealant for modular mechanical seal applications.
 - a. Apply on top side of slab penetrations and on interior, dry side wall penetrations.

3.3 SCHEDULES

- A. General Schedule of Penetrations through Floors, Roofs, Foundation Base Slabs, Foundation Walls, Foundation Footings, Partitions and Walls for Ductwork, Piping, and Conduit:
 1. Provide the following opening and penetration types:
 - a. Type A - Block out 2 inches larger than outside dimensions of duct, pipe, or conduits.
 - b. Type B - Saw cut or line-drill opening. Place new concrete with integrally cast sheet metal or pipe sleeve.
 - c. Type C - Fabricated sheet metal sleeve or pipe sleeve cast-in-place. Provide pipe sleeve with water ring for wet and/or washdown areas.
 - d. Type D - Commercial type casting or fabrication.
 - e. Type E - Saw cut or line-drill opening. Place new concrete with integrally cast pipe, duct or conduit spools.
 - f. Type F - Integrally cast pipe, duct or conduit.
 - g. Type G - Saw cut or line-drill and remove area 1 inch larger than outside dimensions of duct, pipe or conduit.
 - h. Type H - Core drill.
 - i. Type I - Block out area. At later date, place new concrete with integrally cast sheet metal or pipe sleeve.
 - j. Type J - Grating Banding for any field cut openings.
 2. Provide seals of material and method described as follows.
 - a. Category 1 - Modular Mechanical Seal.
 - b. Category 2 - Roof curb and flashing according to SMACNA specifications unless otherwise noted on Drawings. Refer to Specification Section 07 62 00 and roofing Specification Sections for additional requirements.
 - c. Category 3 - 12 GA sheet metal drip sleeve set in bed of silicon sealant with backing rod and sealant used in sleeve annulus.
 - d. Category 4 - Backer rod and sealant.
 - e. Category 5 - Full depth compressible sealant with escutcheons on both sides of opening.
 - f. Category 6 - Full depth compressible sealant and flanges on both sides of opening. Flanges constructed of same material as duct, fastened to duct and minimum 1/2 inches larger than opening.

- g. Category 7 - Full depth compressible sealant and finish sealant or full depth expanding foam sealant depending on application.
 - h. Category 8 - Banding for all grating openings and banding and cover plate of similar materials for abandoned openings.
- 3. Furnish openings and sealing materials through new floors, roofs, grating, partitions and walls in accordance with Schedule A, Openings and Penetrations for New Construction.
- 4. Furnish openings and sealing materials through existing floors, grating, roofs, partitions and walls in accordance with Schedule B, Openings and Penetrations for Existing Construction.

**SCHEDULE A. OPENINGS AND PENETRATIONS SCHEDULE
FOR NEW CONSTRUCTION**

APPLICATIONS	DUCTS		PIPING		CONDUIT	
	OPENING TYPE	SEAL CATEGORY	OPENING TYPE	SEAL CATEGORY	OPENING TYPE	SEAL CATEGORY
Through floors with bottom side a hazardous location	C F I	7 Not Req 7	D F I ⁽¹⁾	Not Req Not Req 7	C F	7 Not Req
Through floors on grade above water table	C F I	4 Not Req 4	C F I ⁽¹⁾	7 Not Req 7	C F I ⁽¹⁾	4 Not Req 7
Through slab on grade below water table	F	Not Req	F	Not Req	F	Not Req
Through floors in washdown areas	C I	4 4	C H ⁽²⁾ I ⁽¹⁾	4 3 4	F H ⁽²⁾ I ⁽¹⁾	Not Req 3 7
Through walls where one side is a hazardous area	C F I	7 Not Req 7	D F I ⁽¹⁾	Not Req Not Req 7	C F	7 Not Req
Through exterior wall below grade above water table	C F I	7 Not Req 7	C D F I ⁽¹⁾	1 Not Req Not Req 1	F I ⁽¹⁾	Not Req 7
Through wall from tankage or wet well (above high water level) to dry well or dry area	C F I	7 Not Req 7	C D F H ⁽²⁾	1 Not Req Not Req 1	C F H ⁽²⁾ I ⁽¹⁾	7 Not Req 7 7
Through wall from tankage or wet well (below high water level) to dry well or dry area	F	Not Req	F	Not Req	F	Not Req
Through exterior wall above grade	A B C	6 6 6	A B D H ⁽²⁾	5 5 Not Req 5	C H ⁽²⁾	5 4
Roof penetrations	A	2	A	2	A	2
Through interior walls and slabs not covered by the above applications	A C	4 4	A C	4 4	A C F	4 4 Not Req
Grating openings and penetrations	J	8	J	8	J	8

**SCHEDULE B. OPENINGS AND PENETRATIONS SCHEDULE
FOR EXISTING CONSTRUCTION**

APPLICATIONS	DUCTS		PIPING		CONDUIT	
	OPENING TYPE	SEAL CATEGORY	OPENING TYPE	SEAL CATEGORY	OPENING TYPE	SEAL CATEGORY
Through floors with bottom side a hazardous location	B E	7 Not Req	B ⁽¹⁾ E ⁽³⁾ H ⁽²⁾	7 Not Req 7	B ⁽¹⁾ E ⁽³⁾ H ⁽²⁾	7 Not Req 7
Through floors on grade above water table	B	7	B	7	B	7
Through slab on grade below water table	E	Not Req	E	Not Req	E	Not Req
Through floors in washdown areas	G	3	G H ⁽²⁾	3 3	G H ⁽²⁾	3 3
Through walls where one side is a hazardous area	B E	7 Not Req	B ⁽¹⁾ B ⁽³⁾ _ E H ⁽²⁾	7 1 Not Req 7	B ⁽¹⁾ ⁽³⁾ E H ⁽²⁾	7 Not Req 7
Through exterior wall below grade above water table	B	7	B ⁽¹⁾ B ⁽³⁾ H ⁽²⁾	7 1 7	B ⁽¹⁾ ⁽³⁾ H ⁽²⁾	7 7
Through wall from tankage or wet well (above high water level) to dry well or dry area	B E	7 Not Req	B E H ⁽²⁾	1 Not Req 1	B ⁽¹⁾ ⁽³⁾ E H ⁽²⁾	7 Not Req 7
Through wall from tankage or wet well (below high water level) to dry well or dry area	E	Not Req	E	Not Req	E	Not Req
Through exterior wall above grade	G	6	G ⁽¹⁾ ⁽³⁾ H ⁽²⁾	5 5	G ⁽¹⁾ ⁽³⁾ H ⁽²⁾	5 7
Roof penetrations	G	2	G ⁽¹⁾ ⁽³⁾ H ⁽²⁾	2	G	2
Through interior walls and slabs not covered by the above applications	G	4	G ⁽¹⁾ ⁽³⁾ H ⁽²⁾	4 4	G ⁽¹⁾ ⁽³⁾ H ⁽²⁾	4 4
Grating openings and penetrations	J	8	J	8	J	8

(1) Multiple piping 3 inches and smaller or multiple conduits.

(2) Single pipe 3 inches and smaller or single conduit.

(3) Single pipe or conduit larger than 3 inches.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General requirements for cutting and patching Work.

B. Scope:

1. Contractor shall perform cutting and coring, and rough and finish patching of holes and openings in existing construction.
2. Provide cutting, coring, fitting, and patching, including attendant excavation and fill, required to complete the Work, and to:
 - a. remove and replace defective Work;
 - b. remove samples of installed Work as specified or required for testing;
 - c. remove construction required to perform required alterations or additions to existing construction;
 - d. uncover the Work for Engineer's observation of covered Work, testing, or inspection by testing entities, or observation by authorities having jurisdiction;
 - e. connect to completed Work not performed in proper sequence;
 - f. remove or relocate existing utilities and piping that obstruct the Work in locations where connections are to be made;
 - g. make connections or alterations to existing or new facilities.

C. Related Requirements:

1. Section 03 31 30 - Concrete, Materials and Proportioning.
2. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
3. Section 09 96 00 - High Performance Industrial Coatings.
4. Section 31 23 00 - Earthwork.
5. Section 31 23 33 - Trenching, Backfilling, and Compacting for Utilities.

1.2 SUBMITTALS

A. Action Submittals: Submit the following:

1. Cutting and Patching Request:
 - a. Submit written request to Engineer, well in advance of executing cutting or alteration that affects one or more of the following:
 - 1) Design function or intent of Project.
 - 2) Work of Owner or other contractors retained by Owner.
 - 3) Structural capacity or integrity of an element of the Project, building, or structure.
 - 4) Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 5) Efficiency, operational life, maintenance, or safety of operational elements.
 - 6) Visual qualities of elements that will be exposed to view after completion of the Work.
 - b. Request shall include:
 - 1) Identification of Project and Contract designation.
 - 2) Description of affected Work of Contractor and work of others (if any) retained by Owner.

- 3) Necessity for cutting.
 - 4) Effect on work or operations of Owner and other contractors (if any) retained by Owner, and on structural and weatherproof integrity of Project, building, or structure.
 - 5) Description of proposed Work, indicating: scope of cutting and patching; trades that will execute the cutting and patching Work; materials and equipment to be used; extent of refinishing; schedule of operations; alternatives (if any) to cutting and patching, and net effect on aesthetics following completion of finishing Work.
 - 6) Indication of entity responsible for cost of cutting and patching, when applicable.
 - 7) Written permission of other prime contractors (if any) whose work will or may be affected.
2. Recommendation Regarding Cutting and Patching:
 - a. Should conditions of work or schedule indicate a change of materials or specified methods, furnish Submit written recommendation to Engineer including:
 - 1) Conditions indicating change.
 - 2) Recommendations for alternative materials or alternatives to specified methods.
 - 3) Material manufacturer's printed recommendations for the proposed product and recommendations of manufacturer's technical representative for the specific application(s). The latter shall be on technical representative's letterhead and shall explicitly indicate the Project and specific cutting and patching application(s) to which the recommendation(s) apply.
 - 4) Items required with request for approval of substitute, in accordance with the substitution request requirements of the Contract Documents.
 3. Product Data:
 - a. Submit manufacturer's published data for the protective compound to be applied to core-drilled surfaces and cut concrete surfaces.
 - b. When not required under other Specifications sections, submit manufacturer's published data on materials to be used for finishing around the cut or patched area(s), together with indication of the location(s) where each is proposed for use.
 - c. Furnish Submittals for patching materials under the associated Specifications section. Submittal to include letter of recommendation from product manufacturer's technical representative indicating on technical representative's letterhead, explicitly indicating:
 - 1) Project name and facility name;
 - 2) specific cutting and patching application(s) to which the recommendations apply;
 - 3) that product manufacturer's technical representative has personally observed and is familiar with conditions in the work area(s) of the subject cutting and patching;
 - 4) materials that are the subject of the Submittal are appropriate for the condition(s) of the proposed patch and will remain durable in the patch's final exposure upon Substantial Completion; and.
 - 5) patching material manufacturer's technical representative's recommendations for surface preparation, installation of patching material(s), and curing.
- B. Informational Submittals: Submit the following:
1. Written Notification of Cutting and Patching:
 - a. Furnish as a Submittal written indication designating the day and time that the construction associated with cutting and patching will be uncovered to allow for observation. Do not begin cutting or patching operations until submittal is accepted by Engineer.
 2. X-ray Investigations:
 - a. Proposed method of investigation. Submit and obtain Engineer's acceptance prior to performing x-ray inspections.
 - b. Report of x-ray evaluation of slabs, floors, and walls to be cut or core-drilled.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials – General:

1. Provide materials that comply with the Contract Documents.
2. If not shown or indicated in the Contract Documents, use materials identical to existing materials affected by cutting and patching Work.
3. For exposed surfaces, use materials that visually match existing adjacent surfaces to fullest extent possible. If identical materials are unavailable or cannot be used, provide materials whose installed performance will equal or surpass that of existing materials.
4. Replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, using materials that do not void required or existing warranties.

B. Compound Applied to Core-Drilled Surfaces and Cut Concrete Surfaces:

1. After core-drilling or sawcutting (as applicable) and before installing the utility or equipment through the penetration, coat exposed concrete and exposed steel with solvent-free, two-component, protective, epoxy resin coating.
2. Color shall approximate the finish color of the existing surface to be coated.
3. Product and Manufacturer: Subject to compliance with the Contract Documents, the following products and manufacturers are acceptable:
 - a. Sikagard 62, by Sika Corporation.
 - b. Or equal.

C. Grout Materials:

1. Comply with Section 03 31 30 - Concrete, Materials and Proportioning.

D. Epoxy Bonding Adhesive:

1. Provide two-component, moisture-insensitive adhesive manufactured for the purpose of bonding fresh concrete to hardened concrete.
2. Comply with Section 03 31 30 - Concrete, Materials and Proportioning.
3. Product and Manufacturer: Subject to compliance with the Contract Documents, the following products and manufacturers are acceptable:
 - a. Euco No.452 MV by Euclid Chemical Co.
 - b. Sikadur 32, Hi-Mod by Sika Corporation.
 - c. Or equal.

E. Epoxy Patch Material:

1. Engage the manufacturer's representative to observe and recommend a suitable patching material of the actual construction conditions.
2. Subject to compliance with the Contract Documents, the following products and manufacturers are acceptable:
 - a. Depth of patch greater than 3/4 inches:
 - 1) Five Star MP Epoxy Patch.
 - 2) Or equal.
 - b. Depth of patch between 1/8 inches and 3/4 inches:
 - 1) Five Star Fluid Epoxy.
 - 2) Or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination and Assessment – General:

1. Examine surfaces to be cut or patched, and conditions under which cutting or patching will be performed before starting cutting or patching Work.
2. Report unsatisfactory or questionable conditions to Engineer in writing.
3. Do not proceed with cutting or patching Work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Provide temporary support required to maintain structural integrity of facilities, to protect adjacent work from damage during cutting, and to support the element(s) to be cut.
- B. Protection of Existing Construction during Cutting and Patching:
 1. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project and facility that will be exposed during cutting and patching operations.
 2. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
 3. Do not cut existing pipe, conduit, ductwork, or other utilities serving facilities scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 CUTTING AND PATCHING – GENERAL

- A. Perform cutting and coring in such manner that limits extent of patching required.
- B. Structural Elements:
 1. Do not cut or patch structural elements in manner that would change the element's structural load-carrying capacity as load deflection ratio.
- C. Operating Elements:
 1. Do not cut or patch operating elements in manner that would reduce their capacity to perform as intended.
 2. Do not cut or patch operating elements or related components in manner that would increase maintenance requirements or decrease operational life or safety.
- D. Replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, using methods that do not void required or existing warranties.
- E. Provide adequate temporary covering over openings (whether cut or core-drilled) where not in use. Avoid creating tripping hazards for openings provided in floors and slabs.

3.4 CORING

- A. Use core-drilling to make penetrations through concrete and masonry walls, slabs, or arches, unless otherwise accepted by Engineer in writing.
- B. Coring:
 1. Perform coring with non-impact rotary tool using diamond core-drills. Size holes for pipe, conduit, sleeves, equipment or mechanical seals, as required, to be installed through the penetration.
 2. Do not core-drill through electrical conduit or other utilities embedded in walls or slabs without approval of Engineer. To extent possible, avoid cutting reinforcing steel in slabs and walls.
- C. Protection:
 1. Protect existing equipment, utilities, and adjacent areas from water and other damage caused by or resulting from core-drilling operations.
 2. After core-drilling and before installing the utility or equipment through the penetration, coat exposed concrete and steel with protective coating material indicated in Paragraph 2.1.B of this Specification Section. Apply protective coating in accordance with manufacturer's instructions.

D. Cleaning:

1. After core-drilling, vacuum or otherwise remove slurry and tailings from the work area.

3.5 CUTTING

A. Cutting – General:

1. Cut existing construction using methods least-likely to damage elements retained and adjoining construction and that provide proper surfaces to receive subsequent installation or repair.
2. In general, use hand tools or small power tools suitable for sawing or grinding. When possible, avoid using hammering and avoid chopping. Carefully chip out concrete where necessary and as indicated in the Contract Documents.
3. Cut holes and slots as small as possible, neatly to the size required, and with minimum disturbance of adjacent surfaces.
4. Prior to starting cutting, provide adequate bracing of area to be cut.
5. To avoid marring existing finished surfaces, cut or drill from exposed or finished side into concealed side.
6. Use equipment of adequate size to remove the cut panel or “coupon”.

B. Cutting – Concrete and Masonry:

1. Cut through concrete and masonry using concrete wall saw with diamond saw blades.
2. On both sides of the element being cut, provide for control of slurry generated during sawing.
3. Concrete Cutting:
 - a. Make openings by sawing through existing concrete. Core drill with 6 inches diameter core at the corners of openings to avoid overcutting at corners.
 - b. When the cut-out concrete or “coupon” cannot be removed in one piece, or where concrete is too thick for saw to penetrate fully, break out concrete after initial saw cuts.
 - c. Where saw cutting is not possible:
 - 1) Make openings by drilling holes around perimeter of required opening and subsequently carefully chip out concrete.
 - 2) Holes shall be sufficient in quantity to prevent damage to remaining concrete.
4. Sizing and Repair of Cut Concrete Surfaces:
 - a. Where reinforcing steel is cut, for openings indicated on the Drawings, remove existing reinforcing steel back to 1.5 inches below concrete surface. When using heat or torching to remove ends of reinforcing steel, remove adjacent, heat-damaged concrete prior to patching. Sides of resulting hole to be patched shall be approximately perpendicular to finished concrete surface. Provide bonding adhesive on surfaces of resulting holes and fill resulting holes with non-shrink grout in accordance with the Contract Documents.
 - b. Oversize required openings in existing concrete by one inch on all sides and build back to required opening size by providing epoxy grout bonded to existing concrete.
 - c. Where oversizing the cut opening by one inch is not possible, cut the opening to the required dimensions. After cutting concrete and before installing subsequent construction on or through the opening, coat exposed concrete and steel with protective coating material indicated in Paragraph 2.1.B of this Specifications Section. Apply protective coating in accordance with manufacturer's instructions.
 - d. Where indicated, finish remaining surfaces as indicated in Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.

3.6 PATCHING

A. Patching – General:

1. Patch large openings to be filled with concrete in accordance with the Contract Documents. Before installing new concrete, apply bonding adhesive indicated in Paragraph 2.1.C of this Specifications section in accordance with manufacture's recommendations.
 2. Where large openings to be filled with concrete are indicated on the Drawings as requiring reinforcing steel, provide reinforcing steel as shown and indicated in the Contract Documents. Where openings in existing reinforced concrete are larger than 2 feet in diameter or 2 feet by 2 feet and the Drawings or elsewhere in the Contract Documents do not expressly require reinforcing steel for the opening, submit a request for interpretation to Engineer and obtain Engineer's response before proceeding.
 3. Where concrete infill or grout repair materials are not used, patch using epoxy patch material indicated in Paragraph 2.1.D of this section unless otherwise indicated on Drawings.
 4. Patch construction by filling, repairing, refinishing, closing-up, and similar operations following performance of other Work.
 5. Patch with durable seams that are as inconspicuous as possible. Provide materials and comply with installation requirements indicated in the Contract Documents and the published installation instructions of the material's manufacturer.
 6. Patch to provide airtight and watertight connections to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 7. Where feasible, test patched areas to demonstrate integrity of installation.
- B. Restoration:
1. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in manner that eliminates evidence of patching and refinishing.
 2. For continuous surfaces, refinish to nearest intersection.
 3. For an assembly, refinish the entire unit that was patched.
 4. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 CLEANING

- A. Cleaning and Restoration:
1. Perform cleaning promptly after associated cutting, coring, and patching.
 2. Clean areas and spaces where cutting, coring, or patching were performed.
 3. Clean piping, conduit, and similar constructions before applying paint or other finishing materials.
 4. Restore damaged coverings of pipe and other utilities to original condition.

END OF SECTION

SECTION 01 74 00

CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for keeping the Site free of accumulations of waste materials during construction ("progress cleaning").
2. Cleaning for Substantial Completion and prior to final inspection (collectively, "closeout cleaning").

B. Scope:

1. Contractor shall perform cleaning during the Project, including progress cleaning, as condition precedent to Substantial Completion, upon completion of the Work, and as required by the General Conditions, as may be modified by the Supplementary Conditions, this Specifications section, and elsewhere in the Contract Documents.
2. Maintain in a clean manner the Site, the Work, and areas adjacent to or affected by the Work.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. National Fire Protection Association (NFPA):
 - a. 241, Safeguarding Construction, Alteration, and Demolition Operations.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. Progress Cleaning – General:

1. Clean the Site, work areas, and other areas occupied by Contractor not less than weekly. Dispose of waste materials in accordance with the General Conditions, as may be modified by the Supplementary Conditions, and the following:
 - a. Comply with NFPA 241 for removing combustible waste materials and debris.
 - b. Do not hold non-combustible materials at the Site more than three days if the ambient air temperature is expected to rise above 80 degrees F. When ambient air temperature is less than 80 degrees F, dispose of non-combustible materials within seven days of their generation.
 - c. Provide suitable containers for storage of waste materials and debris. Avoid generation of odors and creation of nuisances.
 - d. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately.

B. Progress Cleaning – Site:

1. Keep outdoor, dust-generating areas wetted down or otherwise control dust emissions.
2. Not less than weekly, brush-sweep roadways and paved areas at the Site and adjacent areas used by construction vehicles or otherwise affected by construction activities.
3. Comply with dust control requirements of Section 01 57 05 - Temporary Controls.

C. Progress Cleaning – Work Areas:

1. Clean areas where the Work is in progress to maintain an extent of cleanliness necessary for proper execution of the Work and safety of personnel.
 2. Remove liquid spills promptly. Where spills may have harmful effects on health, safety, protection of facilities, or the environment, immediately report spills to Owner, Engineer, and authorities having jurisdiction, in accordance with the Contract Documents and Laws and Regulations.
 3. Where dust would impair proper execution of or quality of the Work, broom-clean or vacuum entire work area, as necessary.
 4. Concealed Spaces: Remove waste material and debris from concealed spaces before enclosing the space.
- D. Progress Cleaning – Installed Work:
1. Keep installed Work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of installed materials and equipment, using only cleaning agents and methods specifically recommended by material or equipment Supplier.
 2. If Supplier does not recommend specific cleaning agents or methods, use cleaning agents and methods that are not hazardous to health and property and that will not damage or mar exposed surfaces.
- E. Progress Cleaning – Exposed Surfaces:
1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until Substantial Completion.
- F. Progress Cleaning – Cutting and Patching:
1. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, trailings and cuttings, and similar materials.
 2. Comply with Section 01 73 29 - Cutting and Patching, regarding cleaning during and after cutting and patching Work.
 3. Thoroughly clean piping, ductwork, conduits, and similar features before applying patching material, paint, or other finishing materials.
 4. Restore damaged insulation and coverings on piping, cutwork, and similar items to its pre-construction condition.
- G. Cleaning of Hydraulic Structures:
1. Clean hydraulic structures that will contain fluid, such as tanks and channels, in accordance with this Specifications section and Section 01 45 25 - Testing and Disinfecting Hydraulic Structures.
 2. Do not perform field quality control activities such as testing tanks, channels, and other hydraulic structures for leakage or disinfecting (where applicable), and do not apply for inspection for Substantial Completion for hydraulic structures, until the associated hydraulic structures are clean and free of all waste materials, and ready for intended use.
- H. Waste Disposal:
1. Properly dispose of waste materials (including surplus materials, debris, rubbish, and other waste) off the Site.
 2. Do not burn or bury waste materials at the Site.
 3. Remove waste material and rubbish from excavations before backfilling.
 4. Do not discharge volatile or hazardous substances, such as mineral spirits, oil, or paint thinner, into storm sewers, gutters, sanitary sewers, or other location in the environment. Dispose of such materials in accordance with Laws and Regulations.
 5. Do not discharge wastes to surface waters, drainage routes, or groundwater.
 6. Contractor is solely responsible for complying with Laws and Regulations regarding storing, transporting, and disposing of waste generated by Contractor's operations or brought to the Site by Contractor.

- I. During handling and installation of materials and equipment, clean and protect construction in progress and adjoining materials and equipment already in place. Apply protective covering where necessary or required for protection from damage or deterioration, until Substantial Completion.
- J. Clean completed construction as frequently as necessary throughout the construction period.

3.2 CLOSEOUT CLEANING

- A. Complete the following prior to requesting inspection for Substantial Completion:
 - 1. Clean and remove from the Site waste material (including rubbish and debris) and other foreign and undesirable items and substances.
 - 2. Sweep broom-clean paved areas suitable for access by vehicles.
 - 3. Remove spills and stains or petroleum, oils, solvents, other chemicals, and other foreign and undesirable deposits.
 - 4. Hose-clean sidewalks and loading areas.
 - 5. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - 6. Surface waterways and drainage routes (including storm sewers, gutters, and ditches) shall be open and clean.
 - 7. Repair pavement, roads, sod, and other areas affected by construction operations and restore to specified condition; if condition is not specified, restore to preconstruction condition.
 - 8. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of spatter, grease, stains, fingerprints, films, and similar foreign and undesirable substances.
 - 9. Clean, wax, and polish wood, vinyl, and painted floors.
 - 10. Remove waste material and surface dust from limited-access spaces, including roofs, plenums, shafts, trenchway, equipment vaults, manholes, and similar spaces.
 - 11. In unoccupied spaces, sweep concrete floors broom-clean.
 - 12. Clean transparent materials, including mirrors and glazing in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - 13. Remove non-permanent tags and labels.
 - 14. Surface Finishes:
 - a. Touch-up and otherwise repair and restore chipped, scratched, dented or otherwise marred surfaces to specified finish and match adjacent surfaces.
 - b. Do not paint over "UL" or similar labels, including mechanical and electrical nameplates.
 - 15. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint, and mortar droppings, and other foreign or undesirable substances.
 - 16. Clean plumbing fixtures to sanitary condition, free of stains, including stains resulting from water exposure.
 - 17. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - 18. Clean lighting fixtures, lamps, globes, and reflectors to function with full efficiency. Replace temporary lamps provided in permanent fixtures. Replace existing lighting fixture components that are burned out or noticeably dimmed from use during construction. Replace defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - 19. Leave the Site clean, and in neat, orderly condition, satisfactory to Owner and Engineer.
- B. Complete the following prior to requesting final inspection:
 - 1. After Substantial Completion of all the Work, following completion of items of incomplete or damaged Work ("punch list Work"), clean "punch list Work areas in accordance with Paragraph 3.2.A of this Specifications Section.

2. Remove field offices, Contractor's storage sheds, and remaining stockpiles and clean all such areas in accordance with Paragraph 3.2.B of this Specifications Section, and in accordance with Contract Documents for landscaping and restoration.

END OF SECTION

SECTION 01 75 00
CHECKOUT AND START-UP PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for checkout and startup of equipment, systems, and facilities.

B. Scope:

1. Contractor shall initially check out, start up, and place equipment and systems installed under the Contract into successful operation, in accordance with the material and equipment manufacturers' written instructions, Suppliers' recommendations at the Site, and the Contract Documents.
2. Provide the following:
 - a. All labor, tools, materials, and equipment required to complete equipment and system checkout and startup.
 - b. Chemicals, lubricants, and other required operating fluids necessary for checkout, startup, and initial operation of the Work.
 - c. Filters and other temporary or consumable items necessary for checkout, startup, and initial operation of the Work.
 - d. Fuel, electricity, water, and other temporary utilities and temporary facilities necessary for checkout and startup of equipment and systems, unless otherwise specified.
3. The General Conditions, as may be modified by the Supplementary Conditions, and Section 01 77 19 - Closeout Requirements, address requirements for documenting Substantial Completion.

C. Related Sections include but are not necessarily limited to:

1. Section 01 61 03 - Equipment - Basic Requirements.
2. Section 01 77 19 - Closeout Requirements.
3. Section 01 78 23 - Operation and Maintenance Data
4. Section 01 79 23 - Instruction of Operations and Maintenance Personnel.
5. Section 40 90 00 - Instrumentation for Process Control - Basic Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate checkout and startup with other contractors, as necessary.
2. Do not start up equipment or system(s) for continuous operation until all components of that equipment item or system, including instrumentation and controls, have been tested to the extent practicable and proven to be operable as intended by the Contract Documents.
3. Subject to the constraints of this Specifications section, Owner will furnish sufficient personnel to assist Contractor in starting up equipment and system(s), but responsibility for proper operation of the Work is Contractor's.
4. Supplier shall be present during checkout, startup, and initial operation, unless otherwise acceptable to Engineer or otherwise required by the Contract Documents.
5. For startup of heating equipment, air conditioning equipment, and other equipment and systems that provide temperature control, that are dependent upon the time of year, return to the Site at beginning of next heating or cooling season (as applicable) to recheck and start the appropriate equipment and system(s).

6. Do not start up equipment and system(s), without submitting acceptable preliminary operations and maintenance manuals by Contractor in accordance with the Contract Documents.
- B. Checkout and Startup Planning Meeting:
1. Contractor, with appropriate Subcontractors and Suppliers, shall attend and participate in a meeting with Owner, facility manager, and Engineer to discuss planning, scheduling, and coordination of checkout and startup activities.
 2. Upon mutual concurrence of Owner, facility manager, Engineer, and Contractor, meeting may be concurrent with the training scheduling planning meeting required in Section 01 79 23 – Instruction of Operations and Maintenance Personnel.
 3. Meeting shall be held by the earlier of: (1) not less than 60 days prior to first scheduled training session for the equipment and system(s) to be checked out and started-up, and (2) not less than 60 days prior to the checkout and startup of the associated equipment and system(s).
 4. Attend meeting prepared to knowledgably and effectively discuss:
 - a. Status of the Work and schedule-to-complete for requirements prerequisite to checkout and startup.
 - b. Schedule for and status of training required for each equipment item and system.
 - c. Schedule for checkout, startup, and field quality control activities for the subject Work.
 - d. Status and quantities of required consumables, lubricants, and utility services necessary for checkout and startup.
 5. Meeting will be chaired by Engineer. Engineer will prepare and distribute a record of topics discussed and decisions made during the meeting. If meeting is concurrent with the training planning meeting required under Section 01 79 23 - Instruction of Operations and Maintenance Personnel, Contractor shall chair and prepare minutes of the training scheduling planning portion of the meeting and furnish its draft minutes to Engineer to incorporate into the overall minutes.
 6. Comply with decisions made at the meeting and the Contract Documents.
- C. Sequencing:
1. Comply with Section 01 14 16 - Coordination with Owner's Operations, regarding staging (phasing) of the Work and allowable shutdowns.
- D. Scheduling:
1. Progress Schedule:
 - a. Clearly indicate in the Progress Schedule planned and actual dates for checkout, startup, and field quality control activities, including all demonstration testing activities addressed in this Specifications section and elsewhere in the Contract Documents. Separately indicate checkout, startup, and field quality control activities for each equipment item and system.
 - b. Perform startup and field quality control activities on the associated, scheduled dates, unless otherwise acceptable to Owner, facility manager, and Engineer.
 2. Restrictions for Scheduling:
 - a. Checkout of materials, equipment, and systems by Contractor that do not involve or require Owner's or facility manager's personnel may be performed at any time during normal working hours. Where required by the Contract Documents or requested by Engineer, perform checkout in the presence of Engineer or Resident Project Representative (RPR).
 - b. Startup, including initial operation of materials, equipment, and systems, shall not be initiated on: Monday, Friday, Saturday, Sunday, Owen's holidays, the day immediately prior to a holiday, or the day immediately following a holiday, unless otherwise acceptable to Owner, facility manager, and Engineer.

- c. Unless otherwise indicated in the Contract Documents or acceptable to Owner, facility manager, and Engineer, perform all startup during normal working hours of the day shift.
- d. To the extent practicable, where extended-duration startup or field quality control activities are required by the Contract, avoid having such activities extend into evening, night, weekend, or holiday hours.
- e. Owner reserves the right to require a minimum seven days' notice of rescheduled startup when Contractor cannot perform the associated activities as scheduled.
- 3. Operation and Maintenance Data:
 - a. Comply with Section 01 78 23 - Operation and Maintenance Data.
 - b. A preliminary copy of all operation and maintenance manuals shall be received by Engineer prior to the start of the demonstration period.
- 4. Training:
 - a. Comply with Section 01 79 23 - Instruction of Operations and Maintenance Personnel.
- 5. Spare Parts, Tools, and Extra Materials.
 - a. Furnish spare parts, tools, and extra materials to Owner as required for regular maintenance of Contractor-furnished equipment and for documenting Owner's receipt of such items.
 - b. Deliver to Owner or facility manager (as applicable) all required spare parts, tools, and extra materials prior to commencing the demonstration period, unless earlier delivery is required elsewhere in the Contract Documents.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:

- 1. Do not start up equipment or systems or place into initial operation until required operating permits are obtained from authorities having jurisdiction.
- 2. Where Owner (with or without assistance of Engineer) has applied for and obtained initial approvals or permits necessary for operation, Contractor shall furnish information and assistance to Owner or Engineer for Owner to secure final approvals from authorities having jurisdiction for required operating permits.

1.4 DEFINITIONS

A. The following defined terms are used in this Specifications Section:

- 1. Instrumentation Supplier: Entity retained by Contractor, Subcontractor, or Supplier to furnish instrumentation or controls that will be part of the completed Work, including manufacturers, manufacturer representatives, wholesalers, retailers, and others, including entities retained to perform systems integration Work.
- 2. Project Classified System (PCS): An established, distinct part of the Project, consisting of an arrangement of items, such as equipment, structures, components, piping, cabling, materials, and incidentals, so related or connected to form an identifiable, unified, functional, operational, safe, and independent system. PCSs may be specifically indicated in this Specifications section or elsewhere in the Contract Documents, such as Section 01 13 13 - Milestones, Section 01 14 16 - Coordination with Owner's Operations, and others.
- 3. Pre-Demonstration Period: The period of time, of unspecified duration after initial construction and installation activities during which Contractor, with assistance from manufacturer's representatives, performs in the following sequence:
 - a. Finishing type construction work to ensure the Project has reached a state of Substantial Completion.
 - b. Equipment start-up.
 - c. Personnel training.
- 4. Demonstration Period: A period of time, of specified duration, following the Pre-Demonstration Period, during which the Contractor initiates process flow through the facility

and starts up and operates the facility, without exceeding specified downtime limitations, to prove the functional integrity of the mechanical and electrical equipment and components and the control interfaces of the respective equipment and components comprising the facility as evidence of Substantial Completion.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Data collection and reporting log for each required Demonstration Period.

B. Informational Submittals: Submit the following:

1. Progress Schedules indicating dates for checkout, startup, and field quality control activities.
2. Completed checkout and startup log required in Paragraph 3.2.C of this Specifications section.
3. Manufacturer's installation check letters (also known as Manufacturer's Field Services Report) required in Paragraph 3.2.C of this Specifications section.
4. Instrumentation Supplier's Instrumentation Installation Certificate, required in Paragraph 3.2.C of this Specifications section.
5. Letter verifying completion of all pre-demonstration startup activities, required in Paragraph 3.2.C of this Specifications section.
6. Report of data collected during each required Demonstration Period.
7. Qualifications Statements:
 - a. Qualifications, including resume' and copy of license, of Contractor-retained licensed operator.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 CHECKOUT AND STARTUP – GENERAL

A. Facility Startup Divided into Two Periods:

1. Pre-Demonstration Period including:
 - a. Obtain Engineer's approval or acceptance (as applicable) of Submittals required prior to checkout and startup, including all Shop Drawings, Samples, source quality control (shop testing) Submittals, preliminary operation and maintenance manuals, and other Submittals required by the Contract Documents, other than Submittals that cannot be furnished until after startup.
 - b. Complete the Work to a point ready for checkout and startup, including operation available in all manual, automatic, and other modes.
 - c. Checkout and initial field quality control activities that can be performed prior to startup of the equipment or system.
 - d. Startup of the associated Work.
 - e. Field quality control activities for the subject Work as indicated elsewhere in the Specifications and other Contract Documents, other than this section.
 - f. Training of operations and maintenance personnel.
2. Demonstration Period, including:
 - a. Demonstration of functional integrity of equipment, system, or PCS.

3.2 PRE-DEMONSTRATION PERIOD

- A. Prior to the Pre-Demonstration Period, complete the Work to the point where it is ready for checkout and startup.
- B. Checkout.

1. Comply with Section 01 61 03 - Equipment - Basic Requirements, including provisions concerning installation checks.
- C. Startup:
1. Comply with requirements for startup of materials, equipment, and systems indicated in the associated Specification sections and elsewhere in the Contract Documents.
 2. Prepare the Work so it will operate properly and safely and be ready to demonstrate functional integrity during the Demonstration Period.
 - a. Perform startup to extent possible without introducing process flow.
 3. Introduce process flow to complete startup for the following:
 - a. Woodside Influent Pumps.
 4. Procedures include but are not necessarily limited to the following:
 - a. Test or check and correct deficiencies of:
 - 1) Power, control, and monitoring circuits for continuity prior to connection to power source.
 - 2) Voltage of all circuits.
 - 3) Phase sequence.
 - 4) Cleanliness of connecting piping systems.
 - 5) Alignment of connected machinery.
 - 6) Vacuum and pressure of all closed systems.
 - 7) Lubrication.
 - 8) Valve orientation and position status for manual operating mode.
 - 9) Tankage for integrity using utility water.
 - 10) Pumping equipment using utility water.
 - a) Woodside Influent Pumps will require testing using process flow due to shutdown time constraints identified in Section 01 14 16 - Coordination with Owner's Operations.
 - 11) Instrumentation and control signal generation, transmission, reception, and response.
 - a) Comply with Section 40 90 00 - Instrumentation for Process Control - Basic Requirements.
 - 12) Tagging and identification systems.
 - 13) Proper connections, alignment, calibration and adjustment.
 - b. Calibrate safety equipment.
 - c. Manually rotate or move moving parts to assure freedom of movement.
 - d. "Bump-start" electric motors to verify proper rotation.
 - e. Perform other tests, checks, and activities required to make the Work ready for Demonstration Period.
 - f. Checkout and Startup Log:
 - 1) Prepare a log showing each equipment item and system requiring checkout and startup. Indicate in the log activities to be accomplished during checkout and startup.
 - 2) Provide a place for Contractor to record date and person performing required checkout and startup. Indicate associated date(s), personnel, and employer of each.
 - 3) Submit completed checkout and startup log to Engineer and obtain Engineer's acceptance.
 5. Obtain Suppliers' certifications of the installed and operational Work, without restrictions, and submit to Engineer:

- a. Manufacturer's installation check letters (sometimes referred to as Manufacturer's Field Services Report).
- b. Instrumentation Supplier's Instrumentation Installation Certificate.
6. Letter verifying completion of all pre-demonstration startup activities including receipt of all specified items from Suppliers as final item prior to initiation of Demonstration Period.
7. Personnel Training:

3.3 DEMONSTRATION PERIOD

A. Demonstration Period – General:

1. Demonstrate the operation and performance of mechanical, electrical, instrumentation, and control interfaces of the Work undergoing the Demonstration Period, in accordance with the Contract Documents.
2. Duration of Demonstration Period: 120 consecutive hours.
3. If, during the Demonstration Period, the aggregate time used for repair, alteration, or unscheduled adjustments to any part of the Work that renders the affected Work inoperative or operation outside of recommended ranges exceeds 10% of the Demonstration Period, the demonstration of operation and performance will be deemed unacceptable and Contractor shall provide appropriate adjustments and remedies and re-perform the Demonstration Test, at no additional cost to Owner or facility manager, until acceptable results are obtained. Re-performance of the Demonstration Period shall comply with the same requirements as the original Demonstration Period.
4. Perform the demonstration of operation and performance of the Work under full operational conditions.
5. Owner's or Facility Manager's Personnel:
 - a. Owner or facility manager (as applicable) will make available operations personnel to make process decisions affecting facility performance and compliance with applicable operating permits.
 - b. Owner's or facility manager's assistance will be available only for process decisions.
 - c. Contractor will perform all other functions associated with the Demonstration Period including but not limited to equipment operation and maintenance until successful completion of the Demonstration Period in accordance with the Contract Documents.
6. Owner or facility manager reserves the right to simulate operational variables, equipment failures, routine maintenance scenarios, and similar actions and events during the Demonstration Period to verify the operation and performance of the Work in automatic, manual, and other types of operating modes, backup systems, and alternate operating modes.
7. Prior to Starting Demonstration Period:
 - a. Prepare data collection and reporting log for sampling, analytical data, and data to be obtained by manually recording data from field or panel indicators. Not less than 30 days prior to the start of the Demonstration Period, submit the data collection and reporting log to Engineer for acceptance.
8. Timing of Start and End of Demonstration Period:
 - a. Schedule the end of the Demonstration Period at a convenient time such as midnight, so the Owner or facility manager can assume operational responsibility on a new day beginning immediately after completion of the Demonstration Period.
 - b. Time of beginning and ending Demonstration Period shall be agreed upon by Contractor, Owner (and facility manager, if other than Owner), and Engineer in advance of initiating Demonstration Period.

B. Demonstration Period, Evaluation, and Acceptance:

1. Throughout the Demonstration Period, provide knowledgeable personnel to answer Owner's or facility manager's questions, provide final field instruction on select systems (where appropriate) and to respond to problems or failures of the Work.

2. Responsibilities for Sampling and Data Collection:
 - a. Use the data collection and reporting log format accepted by Engineer. Indicate data clearly and legibly.
3. Responsibilities for Data Reporting:
 - a. Submit data collected to Engineer for evaluation of acceptability of results.
4. Data Evaluation:
 - a. Engineer, in consultation with Owner and facility manager (as applicable) as necessary, will evaluate the data collected during the Demonstration Period and other information obtained during the Demonstration Period for compliance with the Contract Documents.
 - b. Engineer will advise Contractor in writing of whether the data and information obtained indicate that the Demonstration Period was successfully completed.
5. Criteria for Acceptance:
 - a. Tolerance for acceptance as indicated in section for each equipment.

END OF SECTION

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SECTION 01 77 19

CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements for:
1. Substantial Completion.
 2. Final inspection.
 3. Request for final payment and acceptance of the Work.

1.2 SUBSTANTIAL COMPLETION

- A. Substantial Completion – General:
1. Prior to requesting inspection for Substantial Completion, perform the following for the substantially completed Work:
 - a. Materials and equipment for which Substantial Completion is requested shall be fully ready for their intended use, including full operating and monitoring capability in automatic, manual, and other operating modes set forth in the Contract Documents.
 - b. Permanent provisions for safety and protection, shown and indicated in the Contract Documents and associated with the substantially completed Work or for personnel accessing and using the substantially completed Work, shall be in place and ready for their intended use.
 - c. Complete field quality control Work, including inspections and testing at the Site, indicated in Specifications sections for individual materials and equipment items and related Contract Documents. Submit results of, and obtain Engineer's acceptance of, field quality control tests and inspections required by the Contract Documents.
 - d. Complete checkout and startup in accordance with Section 01 75 00 - Checkout and Startup Procedures, requirements of the Specifications for the various materials and equipment in the substantially completed Work, and related Contract Documents.
 - e. Cleaning for Substantial Completion shall be completed in accordance with Section 01 74 00 - Cleaning.
 - f. Spare parts, tools, and extra materials shall be delivered and accepted in accordance with the Contract Documents and documentation of Owner's acceptance thereof has been submitted to Engineer in acceptable form.
 - g. Training of the facility's operations and maintenance personnel shall be completed in accordance with the Contract Documents, including Section 01 79 23 - Instruction of Operations and Maintenance Personnel.
 - h. Submit and obtain Engineer's acceptance of final operations and maintenance manuals in accordance with Section 01 78 23 - Operation and Maintenance Data.
 - i. Obtain and submit to Engineer all required permits, inspections, and approvals of authorities having jurisdiction for the substantially completed Work to be occupied and used by Owner.
 - j. Complete other tasks that the Contract requires be completed prior to Substantial Completion.

2. Procedures for requesting and documenting Substantial Completion are in the General Conditions, as may be modified by the Supplementary Conditions.
3. Sample letter for Contractor's request for inspection for Substantial Completion is attached to this Specifications section. Use the model language of the sample letter, modified to suit the Project and the needs of Contractor's request.
4. Unless decided otherwise by Owner and Engineer, form of certificate of Substantial Completion will be EJCDC C-625, "Certificate of Substantial Completion" (2018 edition or later), prepared by Engineer.
5. Refer to the Agreement and Section 01 29 76 - Progress Payment Procedures, for requirements regarding consent of surety to partial release of or reduction in retainage.

1.3 FINAL INSPECTION

A. Final Inspection – General:

1. Prior to requesting final inspection, verify that all the Work is fully complete and ready for final payment. Partial checklist for this purpose is attached to this Specifications section.
2. Sample letter for Contractor to request final inspection is attached to this Specifications section. Use the model language of the sample letter, modified to suit the Project.
3. Procedures for requesting and documenting the final inspection are in the General Conditions, as may be modified by the Supplementary Conditions, and as augmented in this Specifications section.

1.4 REQUEST FOR FINAL PAYMENT AND ACCEPTANCE OF THE WORK

A. Procedure:

1. After successful completion of the final inspection, submit request for final payment in accordance with the Agreement and General Conditions, as may be modified by the Supplementary Conditions, and using procedure specified in Section 01 29 76 - Progress Payment Procedures, and this Specifications section.
2. Acceptance of the Work:
 - a. Upon Engineer's concurrence that the Work is complete and ready for final payment (as a result of the final inspection and other communications between the parties and Engineer) and receipt of the final Application for Payment, accompanied by other required Contract closeout documentation, all in accordance with the Contract Documents, Engineer will issue to Owner and Contractor a notice of acceptability of the Work, in accordance with the General Conditions, as may be modified by the Supplementary Conditions.
 - b. Unless decided otherwise by Owner and Engineer, form of acceptance will be EJCDC C-626, "Notice of Acceptability of Work", (2018 edition or later).
 - c. Nothing other than receipt of such notice of acceptability from Engineer constitutes acceptance of the Work.
 - d. Receipt of Engineer's notice of acceptability of the Work does not relieve Contractor of Contractor's continuing obligations under the Contract, including correction period obligations, warranty obligations, indemnification obligations, insurance requirements, and Contractor's other obligations following acceptance of the Work by Engineer and final payment. Such obligations shall commence and remain in effect as indicated elsewhere in the Contract Documents.

B. Request for final payment shall include:

1. Documents required for progress payments in Section 01 29 76 - Progress Payment Procedures.
2. Documents required in the General Conditions, as may be modified by the Supplementary Conditions.
3. List, on Contractor's letterhead, of all Change Proposals, Claims, and disputes that Contractor believes are unsettled. If there are no such Change Proposals, Claims, or disputes, so indicate in writing.
4. Consent of Surety to Final Payment:
 - a. Acceptable form includes AIA G707, "Consent of Surety to Final Payment" (1994 or later edition), or other form acceptable to Owner.
5. Releases of Liens:
 - a. Submit complete and legally effective releases (satisfactory to Owner) of all Liens filed in connection with the Work, regardless of whether such Lien was filed by Contractor, Subcontractor, or Supplier.
 - b. Each release of Lien shall be signed by an authorized representative of the entity submitting the release of Lien, and shall include Contractor's, Subcontractor's, or Supplier's (as applicable) corporate seal, when applicable.
6. Waivers of Lien Rights:
 - a. Submit legally-binding waivers of rights to file Liens, acceptable to Owner, as required in the General Conditions (as may be modified by the Supplementary Conditions) from Contractor and each Subcontractor and Supplier that furnished or provided labor, material, or equipment totaling \$1,000 or more for the Work.
 - b. Furnish final list of Subcontractors and Suppliers indicating final amount of the associated subcontract or purchase order for each. Include on the list all lower-tier Subcontractors and Suppliers retained by higher-tier Subcontractors and Suppliers. Prepare the list using the form included in Section 01 29 76 - Progress Payment Procedures.
 - c. Each waiver of Lien rights shall be signed by an authorized representative of the entity submitting waiver of Lien rights, and shall include Contractor's, Subcontractor's, or Supplier's (as applicable) corporate seal, when applicable.
 - d. Waiver of Lien rights may be conditional upon receipt of final payment.
 - e. Required Affidavits: Submit the following:
 - 1) Affidavit of payment of debts and claims, submitted by Contractor. Acceptable form includes AIA G706, "Contractor's Affidavit of Payment of Debts and Claims" (1994 or later edition), or other form acceptable to Owner, and;
 - 2) Affidavit of release of Liens, submitted by Contractor. Acceptable form includes AIA G706A, "Affidavit of Release of Liens" (1994 or later edition).
 - 3) Each affidavit shall be signed by an authorized representative of Contractor and shall bear Contractor's corporate seal, as applicable.
 - f. In the event Contractor is unable to obtain one or more required waivers of Lien rights, recourse is set forth in the General Conditions, as may be modified by the Supplementary Conditions.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. The documents listed below, following this Specification section's "End of Section" designation, are part of this Specifications section:
 - 1. Sample letter for Contractor's use in requesting inspection for Substantial Completion (two pages).
 - 2. Sample partial checklist to identify readiness for final inspection (four pages).
 - 3. Sample letter for Contractor's use in requesting final inspection (one page).
- B. In the model language of the attached sample letters for Contractor to request inspection for Substantial Completion and the final inspection, italicized language in brackets, e.g., "[insert date]" indicates instructions to the drafter of the letter and often indicates specific information to be inserted by Contractor; do not include bracketed, italicized text in the final version of the letter(s) prepared for the Project. Non-italicized language in brackets is optional language; use the appropriate language to complete the actual letter for the Project and edit where required to suit the specific circumstances.

END OF SECTION

**SAMPLE LETTER FOR CONTRACTOR'S USE IN
REQUESTING INSPECTION FOR SUBSTANTIAL COMPLETION**

SENT VIA E-MAIL AND U.S. CERTIFIED MAIL/RETURN RECEIPT REQUESTED

[Date]

Brad Bjerke
HDR
412 East Parkcenter Boulevard, Suite 100
Boise, Idaho 83706

Subject:
Woodside WRF – Headworks Improvements
Request for Inspection for Substantial Completion

Dear Mr. Bjerke:

In our opinion, [all of] [or] [a portion of] the Work under the above-referenced Contract is substantially complete as of [insert month, day, year on which Substantial Completion was achieved]. [The specific portion of the Work that we believe is substantially complete is [insert identification of that portion of the Work that is substantially complete].]

Enclosed is our listing of uncompleted Work items ("punch list"). In accordance with Paragraph 15.03.A of the General Conditions, we hereby request: (1) That the Engineer schedule and perform the inspection for Substantial Completion as soon as possible, and (2) Issuance of the certificate of Substantial Completion.

In accordance with Paragraph 15.03.D of the General Conditions, upon Substantial Completion, we propose the following relative to apportionment of responsibilities between the Owner and the Contractor:

1. Security, Protection, Insurance:
 - a. Site Security: [insert proposal; address whether Owner or Contractor will be responsible for security of the Site].
 - b. Protection of the Substantially Completed Work: [insert proposal; address whether Owner or Contractor will be responsible for protection].
 - c. Property Insurance: [insert proposal; typically Owner assumes responsibility for property insurance upon Substantial Completion]
2. Operation and Maintenance:
 - a. Operation: [insert proposal; address whether Owner or Contractor will be responsible for operating the substantially completed Work].
 - b. Maintenance: [insert proposal; address whether Owner or Contractor will be responsible for maintaining the substantially completed Work].
3. Utilities: [for each of the following, indicate whether Owner or Contractor will be responsible for utilities and services, or whether responsibility will be shared; if shared, indicate proposed cost-sharing]
 - a. Electricity: [insert proposal].
 - b. Natural Gas/Fuel/Heating: [insert proposal].

- c. Water Supply: [insert proposal].
- d. Wastewater: [insert proposal].
- e. Communications (Telephone, Internet, Video): [insert proposal].

In accordance with Paragraph 15.08.A of the General Conditions, we understand that the Contract's correction period for the Work covered by the certificate of Substantial Completion commences on the Substantial Completion date documented in said certificate. [Drafter: Also see Paragraph 15.04 ("Partial Utilization") of the General Conditions and, where necessary, edit this paragraph of the letter accordingly.]

Should you have questions or comments regarding this notice, please contact [the undersigned] [or] [insert other contact person's name], at [insert telephone number and e-mail address].

Sincerely,

[Contractor's company name]

[Signatory name]

[Signatory's title]

Attachments:

Preliminary list of uncompleted Work items ("punch list"; [##] pages)

Copies:

Brian Yeager, City of Hailey Public Works Director
Bryson Ellsworth, City of Hailey Wastewater Division Manager
Kody Thomas, HDR, Project Engineer

SAMPLE PARTIAL CHECKLIST TO IDENTIFY READINESS FOR FINAL INSPECTION

Project: Woodside WRF – Headworks Improvements

Contract: [_____]

Contractor: [_____]

Item No./Description	Completed/Date	In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
1. All Submittals, including all Shop Drawings and Samples, approved or accepted by Engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
1. Final services completed by Suppliers, including submittal of “Manufacturer Field Service Report” in Section 01 61 03 Equipment - Basic Requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
2. Final Work completed by Subcontractors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
3. Permits closed out and regulatory compliance transitioned from construction to operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
4. All outstanding change issues are addressed and all Change Proposals submitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						

Item No./Description	Completed/Date	In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
5. All Change Proposals and Claims are resolved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
6. All defective Work of which Contractor is aware has been corrected in accordance with the Contract Documents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
7. Issues related to Constituents of Concern and potential Hazardous Environmental Condition have been fully addressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
8. All spare parts, tools, and extra materials have been furnished in accordance with the Contract Documents, and documentation thereof submitted to Engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
9. All final operations & maintenance manuals have been submitted and accepted by Engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						
10. Manufacturer warranties and software license(s) furnished	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Remarks:</i>						

Item No./Description	Completed/Date	In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
11. Instruction and training of operations and maintenance personnel is complete and records of training submitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
12. MBE/WBE/DBE/VBE compliance report(s) submitted (when applicable)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
13. All field engineering Submittals, including survey data, furnished	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
14. All Work on "punch list" is complete in accordance with the Contract Documents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
15. All record documents submitted to and accepted by Engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
16. Contractor is fully demobilized from the Site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
17. All Site restoration is complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						

Item No./Description	Completed/Date	In Progress	Not Started	Not Applicable	Target Date	Responsible Entity/Person
18. Final cleaning of all work areas is complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
19. Releases of Liens and waivers of Lien rights (or acceptable alternative) obtained from Subcontractors and Suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
20. Evidence of Contractor liability insurance furnished for correction period	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
21. All other required Contract closeout documents obtained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						
Remarks:						
22. All other Work and documentation required prior to final payment is complete and provided in accordance with the Contract Documents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Remarks:						

SAMPLE LETTER FOR CONTRACTOR'S USE IN REQUESTING FINAL INSPECTION

SENT VIA E-MAIL AND U.S. CERTIFIED MAIL/RETURN RECEIPT REQUESTED

[Date]

Brad Bjerke
HDR
412 East Parkcenter Boulevard, Suite 100
Boise, Idaho 83706

Subject:
Woodside WRF – Headworks Improvements
Request for Final Inspection

Dear Mr. Bjerke:

The Work under the above-referenced Contract is complete and ready for final payment as of [insert month, day, year on which final completion was achieved]. In accordance with Paragraph 15.05 of the General Conditions, we hereby request that the Engineer schedule and perform the final inspection as soon as possible. Upon successful completion of the final inspection, we will submit our final Application for Payment accompanied by the required Contract closeout documentation in accordance with the Contract Documents.

Should you have questions or comments regarding this notice, please contact [the undersigned] [or] [insert other contact person's name], at [insert telephone number and e-mail address].

Sincerely,

[Contractor's company name]

[Signatory name]
[Signatory's title]

Attachments:
None

Copies:
Brian Yeager, City of Hailey Public Works Director
Bryson Ellsworth, City of Hailey Wastewater Division Manager
Kody Thomas, HDR, Project Engineer

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SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for Contractor-furnished, manufacturers' operation and maintenance (O&M) data, including:
 - a. Required operation and maintenance data groupings into operation and data manuals and timing of such Submittals.
 - b. Requirements for paper copies of operation and maintenance data and related Electronic Documents.
 - c. Content of operation and maintenance data Submittals.

B. Scope:

1. Contractor shall submit operation and maintenance data, and related information, in accordance with this Section and requirements elsewhere in the Contract Documents, as instructional and reference information for use by: (a) Owner's operation and maintenance personnel, and (b) others retained by or working for Owner.
2. In addition to operation and maintenance data expressly required elsewhere in the Contract Documents, also submit operation and maintenance data for:
 - a. All equipment and systems, including facility equipment, conveying equipment, fire suppression systems, plumbing equipment, HVAC equipment, electrical equipment, communications equipment, electronic safety and security systems, utility equipment, transportation equipment, waterway and marine equipment, and process equipment, and other equipment.
 - b. Valves, gates, actuators, and related accessories.
 - c. Instrumentation and control devices and systems.
 - d. Building materials, systems, and finishes that need post-construction troubleshooting, cleaning, or maintenance, such as roofing, doors, windows, louvers, flooring, paint and coatings, other finishes, and other items.

C. Related Requirements:

1. Section 01 31 26 - Electronic Communication Protocols.
2. Section 01 33 00 - Submittal Procedures.
3. Section 01 75 00 - Checkout and Startup Procedures.
4. Section 01 78 36 - Warranties.

1.2 SUBMITTALS

A. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data:
 - a. Submit operation and maintenance data, required by the Contract Documents, grouped into operation and maintenance manual Submittals indicated in Table 01 78 23-A.

- b. Where operation and maintenance data required by the Contract Documents, is not expressly indicated in table 01 78 23-A, obtain written clarification or interpretation from Engineer prior to preparing and transmitting such Submittal.
- c. For each required operation and maintenance manual Submittal, furnish preliminary Submittal and final Submittal. Timing of preliminary and final operation and maintenance manual Submittals, and differences between preliminary and final Submittals, are indicated in this Section.

Table 01 78 23-A
Required Groupings of Operation and Maintenance Data Submittals

Name of O&M Manual/Data	For Materials or Equipment Specified in Section(s)
Building Finish & Appurtenances	05 50 00 – Metal Fabrications 06 82 00 – Fiberglass Reinforced Plastic Fabrication 07 54 25 – Fully Adhered TPO Roofing 08 11 00 – Hollow Metal Doors and Frames 08 33 23 – Steel Rolling Overhead Doors 08 70 00 – Finish Hardware 10 44 33 – Fire Protection Specialties
HVAC Equipment	23 80 00 – HVAC Equipment
Electrical Equipment	26 09 13 – Instrument Transformers and meters 26 22 00 – Low-Voltage Transformers 26 24 16 – Low-Voltage Panelboards 26 24 19 – Low-Voltage Motor Control 26 29 23 – Low-Voltage Adjustable Frequency Drives 26 35 26 – Active Harmonic Filters 26 43 13 – Surge Protective Devices (SPDs) 1000V or Less 26 50 00 - Lighting
Pipes, Pipe Fittings, and Valves	40 05 00 – Pipe and Pipe Fittings – Basic Requirements 40 05 51 – Common Requirements for Process and Utility Valves 40 05 52 – Miscellaneous Valves 40 05 57 – Actuators for Process Valves and Gates 40 05 59 – Fabricated Stainless Steel Slide Gates 40 05 62 – Plug Valves 40 05 63 – Vall Valves 40 05 66 – Check Valves 40 42 00 – Pipe, Duct, and Equipment Insulation
Instrumentation & Controls	40 41 13 – Heat Tracing Cable 40 90 00 – Instrumentation for Process Control – Basic Requirements 40 91 00 – Primary Meters and Transmitters 40 94 43 – Programmable Logic Controller (PLC) Control System 40 96 52 – Configuration Requirements Human Machine Interface (HMI) and Reports 40 97 00 – Control Auxiliaries 40 98 00 – Control Panels and Enclosures
Monorail	41 22 23 – Hoists, Trolleys, and Monorails

Name of O&M Manual/Data	For Materials or Equipment Specified in Section(s)
Submersible Pumps	43 05 21 – Common Motor Requirements for Equipment 43 21 00 – Pumping Equipment – Basic Requirements 43 25 13 – Pumping Equipment – Submersible End-Suction Sewage Pumps
Grit Handling Equipment	43 05 21 – Common Motor Requirements for Equipment 46 12 22 – Grit Classifier with Cyclone 46 21 00 – Grit Removal Units

B. Timing of Submittals and Quantity Required:

1. Preliminary Operation and Maintenance Manual Submittals:
 - a. Paper Copies: Three copies, exclusive of copies required for Contractor's use.
 - b. Electronic Documents: In accordance with Section 01 31 26 - Electronic Communication Protocols.
 - c. Submit to entity indicated in Section 01 33 00 – Submittal Procedures, by the earlier of: 90 days following approval of Shop Drawings and product data Submittals, or 14 days prior to starting training of operation and maintenance personnel, or 14 days prior to field quality control testing at the Site.
 - d. Do not perform checkout, startup, and training without Engineer's acceptance of preliminary operation and maintenance data Submittals for the associated Work.
2. Final Operation and Maintenance Manual Submittals: Furnish final Submittal prior to Substantial Completion of the associated Work, unless submittal is required prior to an interim Milestone.
 - a. Paper Copies: Three copies, exclusive of copies required for Contractor's use.
 - b. Electronic Documents: In accordance with Section 01 31 26 - Electronic Communication Protocols.
 - c. Work will not be eligible for Substantial Completion until associated, required final operation and maintenance data Submittals are accepted by Engineer.
 - d. If Contractor (whether or not via Subcontractor or Supplier), revises program code or configuration files between acceptance of Submittal by Engineer and end of the Contract's correction period and Contractor's general warranty obligation, furnish updated program code and configuration files to Owner. Before modifying program code and configuration files after Substantial Completion, verify with facility manager that Owner- or facility manager modifications of program code or configuration files were incorporated into the modified files, subject to the provisions of this Section.

1.3 PAPER COPIES OF O&M MANUALS

A. Binding and Cover:

1. Bind each operation and maintenance manual in durable, permanent, stiff-cover binder(s), comprising one or more volumes per copy, as necessary.
2. Binders shall be not less than one inch wide and maximum of three inches wide. Binders for each copy of each volume shall be same size and color.
3. Binders shall be locking three-ring ("D"-ring) type, or three-post type. Three-ring binders shall be riveted to back cover and include plastic sheet lifter (page guard) at front and back of each volume.

4. Do not overfill binders.
 5. Covers shall be oil-, moisture-, and wear-resistant, including identifying information on cover and spine of each volume.
 6. Indicate the following information on cover of each volume:
 - a. Title: "OPERATING AND MAINTENANCE INSTRUCTIONS". For submittal of preliminary operation and maintenance data, include the word, "PRELIMINARY" in the title.
 - b. Name or type of material or equipment covered in the manual.
 - c. Volume number, if more than one volume is submitted, listed as "Volume [] of []", with appropriate volume-designating numbers filled in.
 - d. Name of Project and, when applicable, Contract name and number.
 - e. Name of building or structure, as applicable.
 7. Provide the following information on spine of each volume:
 - a. Title: "OPERATING AND MAINTENANCE INSTRUCTIONS". For submittal of preliminary operation and maintenance data, include the word, "PRELIMINARY" in the title.
 - b. Name or type of material or equipment covered in the manual.
 - c. Volume number, when more than one volume is submitted, listed as "Volume [] of []", with appropriate volume-designating numbers filled in.
 - d. Project name and building or structure name.
- B. Pages:
1. Print pages in paper copies of operation and maintenance manuals on 30-pound (minimum) paper, 8.5-inch by 11-inch size.
 2. Reinforce binding holes in each individual paper sheet with plastic, cloth, or metal. When published, separately-bound booklets or pamphlets are part of manuals, reinforcing of pages within booklet or pamphlet is not required.
 3. Furnish each page with binding margin not less than 3/4-inch wide.
 4. Properly punch each paper page with holes suitable for associated binding. Provide not less than 3/8-inch of paper between outer edge of punched holes and edge of paper. Manuals with improperly punched holes will be returned to Contractor as unacceptable.
 5. In paper copies of manuals, each page in each copy shall be properly bound-through by the binder's rings or posts. Paper manuals where some pages are not so bound will be returned to Contractor as unacceptable.
- C. Drawings:
1. Bind into operation and maintenance manuals drawings, diagrams, and illustrations up to and including 11-inch by 17-inch size, with reinforcing and punched holes specified for paper pages.
 2. Drawings or sheets larger than 11-inch by 17-inch shall be:
 - a. Paper Copies: Neatly folded and inserted into clear plastic pockets bound into the manual. Neatly and permanently label each pocket with printed text indicating content and drawing numbers. Include not more than two drawings or sheets per pocket.
 - b. Electronic Documents Copies: Included in electronic file at appropriate location.
- D. Copy Quality and Document Clarity:

1. Provide original-quality copies. Documents in operation and maintenance manuals shall be either original manufacturer-printed documents or first-generation photocopies indistinguishable from originals. If original is in color, copies shall be in color. Manuals with copies that are unclear, not completely legible, off-center, skewed, or where text or drawings are cut by binding holes, are unacceptable. Pages that contain approval or date stamps, comments, or other markings that cover text or drawing are unacceptable.
2. Clearly mark, using ink, to indicate all components of materials and equipment on catalog pages for ease of identification. In standard or pre-printed documents, indicate options furnished and cross out inapplicable content. Using highlighters to so indicate options furnished is unacceptable.

E. Organization:

1. Indexed tabs between major categories of information, such as operating instructions, preventive maintenance instructions, and other major subdivisions of data in each manual.

1.4 ELECTRONIC DOCUMENTS O&M MANUALS

A. Electronic Documents of Operation and Maintenance Manuals:

1. Each Electronic Document copy of operation and maintenance data shall include all information included in the corresponding paper copy.
2. Submit Electronic Documents operation and maintenance data in accordance with Section 01 31 26 - Electronic Communication Protocols, and Section 01 33 00 - Submittal Procedures.
3. File Format:
 - a. Unless otherwise required by Section 01 31 26 - Electronic Communication Protocols, or Section 01 33 00 - Submittal Procedures, operation and maintenance data Electronic Documents shall be "portable document format" (PDF) files.
 - b. Electronic Documents shall be electronically searchable upon delivery.
 - c. Electronic Documents shall not be password-protected and shall not be protected against Owner's or facility manager's copying and printing such files for Owner's or facility manager's use in operating and maintaining the facility.
 - d. Electronic Documents shall open to its first page.
 - e. Submit each operation and maintenance manual as a single Electronic Document file, unless file size is over-large, in which case divide into as few separate files, each with similar filename, as possible.
 - f. Within each Electronic Document, provide bookmarks for the following:
 - 1) Each chapter and subsection indicated in the corresponding printed copy document's table of contents.
 - 2) Each figure.
 - 3) Each table.
 - 4) Each appendix and attachment.

1.5 CONTENT OF OPERATION AND MAINTENANCE MANUALS

A. Operation and Maintenance Manual Content – General:

1. Prepare each operation and maintenance manual specifically for the Project. Include in each manual all pertinent instructions, as-constructed drawings as applicable, bills of materials, technical information, installation and handling requirements, maintenance and repair instructions, and other information required

for complete, accurate, and comprehensive data for safe and proper operation, maintenance, and repair of materials and equipment furnished for the Project. Include in manuals specific information required in the Specification Section for the material or equipment, data required by Laws and Regulations, and data required by authorities having jurisdiction.

2. Provisions of this Article were written for equipment. Where operation and maintenance data are required for building products, such as finishes, openings, thermal and moisture protection, and similar items, comply with this Article to the extent practical and reasonable for the associated item.
 3. Completeness and Accuracy:
 - a. Operation and maintenance manuals that include language stating or implying that the manual's content may be insufficient or stating that the manual's content is not guaranteed to be complete and accurate are unacceptable.
 - b. Operation and maintenance manuals shall be complete and accurate.
 - c. Operation and maintenance manuals shall indicate the specific alternatives and features furnished, and the specific operation and maintenance provisions for the material or equipment furnished.
 4. Provide dividers and Include manufacturer's information, diagrams, schematics, and equipment cutaways. Avoid submitting catalog excerpts unless they are the only document available showing identification or description of particular component of the equipment. Where published documents, included in operation and maintenance data, pertain to multiple models or types, mark the literature to indicate specific material or equipment supplied. Marking may be in the form of checking, arrows, or underlining to indicate pertinent information, or by crossing out or other means of obliterating information that does not apply to the materials and equipment furnished.
 5. Identify each equipment item consistent with names and identification numbers shown or indicated in the Contract Documents, rather than manufacturer's model numbers.
 6. Neatly type data not furnished in computer-printed text. Handwriting, except for strikeouts, arrows, and the like, is unacceptable.
 7. Include copy of warranty in accordance with the Contract Documents, including Section 01 78 36 - Warranties.
 8. Include copy of proposed service contract, when applicable.
 9. When copyrighted material is used in operation and maintenance manuals, obtain copyright holder's written permission to use such material in the operation and maintenance manual.
- B. Differences Between Preliminary and Final Operation and Maintenance Manuals:
1. In preliminary operation and maintenance manuals, include flysheet or placeholder for information to be included in final operation and maintenance manual Submittal.
 2. In final operation and maintenance manuals, include information such as the following, as applicable for the associated materials and equipment:
 - a. Equipment data that requires collection after startup, for example: (1) system and equipment balancing reports, including those for HVAC systems; and (2) final settings for electrical switchgear, automatic transfer switches, and circuit breakers; and (3) materials and equipment field testing results.
 - b. Equipment startup reports and Suppliers' field service reports (the latter on form in Section 01 75 00 - Checkout and Startup Procedures).
- C. Initial Documents in Operation and Maintenance Manuals:

1. Table of Contents:
 - a. Provide table of contents in each volume of each operation and maintenance manual.
 - b. In table of contents and not less than once in each chapter or section, identify materials and equipment by their functional names. Thereafter, abbreviations and acronyms may be used if their meaning is clearly indicated in a table bound at or near beginning of each volume. Using material or equipment model or catalog designations for identifying items is unacceptable.
 2. Equipment Record:
 - a. Provide "Equipment Record" section of operation and maintenance manual immediately following the table of contents. "Equipment Record" section is not required for operation and maintenance data for other than equipment (such as building materials and finishes).
 - b. Provide "Equipment Record" on forms included as this Section's Attachments 1, 2, and 3.
 - c. For instrumentation and control equipment, International Society of Automation (ISA) data sheets are acceptable in lieu of the forms included as this Section's Attachments 1, 2, and 3.
 - d. This Section's Attachments 1, 2, and 3 are available from Engineer as "fillable PDF forms".
 - e. Complete in detail each section of "Equipment Record". Merely referencing the associated equipment's operation and maintenance data for nameplate, maintenance, spare parts, lubricants, or other required information, is unacceptable.
 - f. For equipment or systems with multiple, separate components (for example, motor and gearbox), fully completed "Equipment Record" is required for each component.
 - g. Operation and maintenance data Submittals without complete and accurate "Equipment Record" sheets are unacceptable.
 3. Supplier's Field Service Reports:
 - a. Include in final operation and maintenance manuals copies of associated Supplier's field services reports in accordance with Section 01 75 00 - Checkout and Startup Procedures.
 - b. Include Supplier's completed field service reports in operation and maintenance manual in section immediately following "Equipment Record" section.
- D. Operation and Maintenance Instructions:
1. Safety Considerations:
 - a. Submit written descriptions of safety considerations relating to operation and maintenance procedures for materials and equipment.
 - b. Describe safety devices and alarms provided with materials and equipment and proper operation and use.
 - c. Indicate procedures for proper, safe operating and maintenance of materials and equipment furnished, including manufacturer's recommended personal protection equipment, apparatus, and devices not furnished under the Contract.
 - d. Describe recommended safety-related training for personnel operating and maintaining the subject materials or equipment.

- e. Include in appendix to operation and maintenance manual manufacturers' relevant "safety data sheets" (SDS), formerly "material safety data sheets" (MSDS).
 - f. Engineer's review of operation and maintenance data expressly does not extend to adequacy, completeness, and accuracy of SDS or other safety and protection practices and procedures indicated in the operation and maintenance data.
2. Operation:
- a. Include in operation and maintenance data Submittals complete, detailed written operating instructions for each material or equipment item including: function; operating characteristics; limiting conditions; and regulation and control. Also include, as applicable, written descriptions of alarms generated by equipment and proper responses to such alarm conditions.
 - b. Include pre-startup instructions and checklists and complete startup instructions for each material and equipment item.
 - c. Indicate recommended operating instructions for all operating modes and conditions, with associated recommendations for safe operation.
 - d. Explain available controls and instrumentation and associated function(s).
 - e. Indicate required shutdown checklists and procedures for: normal shutdown, emergency shutdown, and long-term shutdowns.
 - f. Troubleshooting instructions.
3. Maintenance – General:
- a. Include in operation and maintenance data complete, written instructions for necessary and recommended maintenance, including mechanical maintenance and electrical/instrumentation and controls maintenance, as applicable.
 - b. Include in operation and maintenance data complete instructions for necessary assembly, disassembly, installation, re-installation, storage, and shipping for materials and equipment.
 - c. Tools: Include list of required maintenance tools and equipment.
 - d. Spare Parts and Extra Materials:
 - 1) Submit complete instructions for ordering replaceable parts, including reference numbers (such as shop order number or serial number) that will expedite the ordering process.
 - 2) Submit manufacturer's recommended inventory levels for spare parts, extra stock materials, and consumable supplies for the initial two years of operation. Consumable supplies are items consumed or worn by operation of materials or equipment, and items used in maintaining the operation of material or equipment, including items such as lubricants, seals, reagents, and testing chemicals used for calibrating or operating the equipment. Include estimated delivery times, shelf life limitations, and special storage requirements.
 - 3) Also refer to this Article's provision, "Bills of Materials", below, for additional requirements regarding ordering replacement parts.
4. Routine and Preventative Maintenance:
- a. Submit complete, detailed, written instructions for routine and preventive maintenance including all information and instructions to keep materials, equipment, and systems properly lubricated, adjusted, and maintained so that materials, equipment, and systems function economically throughout their expected service life. Instructions shall include:

- 1) Written explanations with illustrations for each routine and preventive maintenance task such as inspection, adjustment, anchor bolt torque checks, lubrication, calibration, cleaning, replacement of filters, and the like.
- 2) Recommended schedule for each routine and preventive maintenance task.
- 3) Lubricants:
 - a) Provide lubrication charts indicating recommended types of lubricants, frequency of application or change, and where each lubricant is to be used or applied.
 - b) Table of alternative lubricants.
5. Major Maintenance:
 - a. Include detailed, written instructions and illustrations for required periodic (non-routine, non-preventative) maintenance.
 - b. Indicate relative level of training and expertise required to perform such maintenance and recommended tools and equipment.
6. Special Maintenance:
 - a. Include maintenance instructions for long-term shutdowns and storage.
- E. Bills of Materials:
 1. Include in operation and maintenance manuals complete bills of material or parts lists for materials and equipment furnished. Lists or bills of material may be furnished on a per-drawing or per-equipment assembly basis. Bills of material shall indicate:
 2. Manufacturer's name, physical address, telephone number, internet website address.
 3. Manufacturer's local service representative's or local parts supplier's name, physical address, telephone number, internet website address, and e-mail addresses.
 4. Manufacturer's shop order and serial number(s) for materials, equipment or assembly furnished.
 5. For each part or piece include the following information:
 - a. Parts cross-reference number. Cross-reference number shall be used to identify the part on assembly drawings, Shop Drawings, or other type of graphic illustration where the part is clearly shown or indicated.
 - b. Part name or description.
 - c. Manufacturer's part number.
 - d. Quantity of each part used in each assembly.
 - e. Current unit price of the part at the time the operation and maintenance manual is submitted. Price list shall be dated.
- F. Record Copy of Shop Drawings, Product data, and Other Previously Approved and Accepted Submittals:
 1. Submit original-quality copies of each approved and accepted (as applicable) Shop Drawing, product data Submittal, written results of source quality control activities, and other Submittals, updated to indicate as-installed condition. Do not include prior Submittals that were not approved or were not accepted. Reduced drawings are acceptable only when reduction is to not less than one-half original size and all lines, dimensions, lettering, and text are completely legible on the reduction.
- G. Electrical Schematics, Diagrams, and Information:

1. Submit complete electrical schematics and wiring diagrams, including complete point-to-point wiring and wiring numbers or colors between all terminal points.
 2. Include as-constructed drawings of layouts of electrical panels (such as switchgear and motor control centers) and control panels.
- H. NFPA 70 (National Electric Code) Documentation:
1. Include in operation and maintenance manuals for electrically-powered equipment documented calculations of: (1) arc-fault current, equipment available fault current and (2) short-circuit current rating (SCCR), provided as part of equipment Submittals.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

- A. The following, bound after this Section's "End of Section" designation, are part of this Section:
1. Attachment 1 - Equipment Data and Spare Parts Summary form (one page)
 2. Attachment 2 - Recommended Maintenance Summary form (one page)
 3. Attachment 3 - Lubrication Summary form (one page)

END OF SECTION

**Equipment Data and Spare Parts Summary**

Project Name: Woodside WRF – Headworks Improvements	Specification Section:
Equipment Name:	Year Installed:

Project Equipment Tag No(s):

Equipment Manufacturer:

Project/
Order No.:

Address

Phone

Website

Web Site

E-mail

Local Representative/Service Center

Address

Phone

Website

E-mail

MECHANICAL NAMEPLATE DATA

Equip.				Serial No.	
Make				Model No.	
ID No.	Frame No.	HP	RPM	Cap.	
Size	TDH	Imp. Size	CFM	PSI	
Other:					

ELECTRICAL NAMEPLATE DATA

Equip.				Serial No.				
Make				Model No.				
ID No.	Frame No.	HP	V.	Amp.	Hertz	PH	RPM	SF
Duty	Code	Ins. Cl.	Type	NEMA	C Amb.	Temp. Rise	Rating	
Other:								

SPARE PARTS PROVIDED PER CONTRACT

Part No.	Part Name	Quantity

RECOMMENDED SPARE PARTS

Part No.	Part Name	Quantity

(Jun 1990; Revised Oct 2001, Revised Nov 2007, Revised 2013) Copyright 1991-2014 HDR Engineering, Inc.

Recommended Maintenance Summary

Equipment Description	Project Equip. Tag No(s).	

[illegible]

* D = Daily W = Weekly M = Monthly Q = Quarterly S = Semiannual A = Annual Hours = Run Time Interval

(Jun 1990; Revised Oct 2001, Revised Nov 2007, Revised 2013) Copyright 1991-2014 HDR Engineering, Inc.



Lubrication Summary

Equipment Description	Project Equip. Tag No(s).
-----------------------	---------------------------

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

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SECTION 01 78 36

WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General requirements for warranties required in the various Specifications.
2. Provisions addressing:
 - a. Suppliers' standard warranties.
 - b. Suppliers' special or extended warranties.
 - c. Implied warranties.
 - d. Commencement and duration of warranties.

1.2 SUBMITTALS

A. General:

1. For each item of equipment furnished under the Contract, submit Supplier's standard warranty, regardless of whether such warranty or Submittal thereof is required by the associated Specifications for that item. Submit such warranties for materials where such Submittal is required in the Specifications for the material.
2. For each item of material or equipment where Supplier's special (or extended) warranty is required by the Contract Documents, submit appropriate special warranty that complies with the Contract Documents.
3. Supplier's warranties shall be specifically endorsed to Owner, Contractor, and the entity purchasing the item (if other than Contractor) by the entity issuing such warranty.
4. Submit Suppliers' standard warranties and special warranties as Submittals in accordance with the Schedule of Submittals accepted by Engineer.

1.3 CONTRACTOR'S GENERAL WARRANTY AND CORRECTION PERIOD OBLIGATIONS

- A. Contractor's General Warranty and Guarantee: Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.
- B. Contractor's Warranty of Title: Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.
- C. Correction Period: Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.

1.4 SUPPLIERS' WARRANTIES FOR MATERIALS AND EQUIPMENT

A. Warranty Types:

1. Required by the General Conditions:
 - a. Warranties specified for materials and equipment shall be in addition to, and run concurrent with, Contractor's general warranty and guarantee and requirements for the Contract's correction period.
 - b. Disclaimers and limitations in specific materials and equipment warranties do not limit Contractor's general warranty and guarantee, nor does such affect or limit Contractor's performance obligations under the correction period.
2. Material or equipment manufacturer's standard warranty is pre-printed, written warranty published by item's manufacturer and specifically endorsed by manufacturer to the entities indicated in this Specifications Section's Article 1.2.
3. Special warranty is written warranty that either extends the duration of material or equipment manufacturer's standard warranty or provides other, increased rights to Owner

and other beneficiaries (if any) of such warranty. Where the Contract Documents indicate specific requirements for warranties that differ from the manufacturer's standard warranty for that item, special warranty is implied.

B. Requirements for Special Warranties:

1. Submit written special warranty document that contains appropriate provisions and identification, ready for signature by material or equipment manufacturer, Owner, and other beneficiaries indicated in Article 1.2 of this Specifications Section. Submit draft warranty with Submittals required prior to fabrication and shipment of the item from the Supplier's facility.
2. Manufacturer's Standard Form: Modified to include Project-specific information and properly signed by product manufacturer and other entities as appropriate.
3. Specified Form: When specified forms for special warranties are included in the Contract Documents, prepare written document, properly signed by item manufacturer, Owner, and other beneficiaries indicated in Article 1.2 of this Specifications Section, using the required form.
4. Refer to the Specifications for content and requirements for submitting special warranties.

1.5 IMPLIED WARRANTIES

A. Warranty of Title and Intellectual Property Rights:

1. Except as may be otherwise indicated in the Contract Documents, implied warranty of title required by Laws and Regulations is applicable to the Work and to materials and equipment incorporated therein.
2. Provisions on intellectual property rights, including patent fees and royalties, are in the General Conditions, as may be modified by the Supplementary Conditions.

B. Warranty of Merchantability:

1. Notwithstanding any other provision of the Contract to the contrary, implied warranties of merchantability required by Laws and Regulations apply to the materials and equipment incorporated into the Work.

C. Warranty of Fitness-for-Purpose:

1. Implied warranty of fitness-for-purpose for materials and equipment to be incorporated into the Work, for which specific material or features are indicated in the Contract Documents, is hereby disclaimed by Owner and Contractor.
2. When Supplier is aware of, or has reason to be aware of, specified materials or features of the Work that are contrary to the intended use, purpose, service, application, or environment in which the material or item will be used, submit request for interpretation in accordance with Section 01 26 00 - Contract Modification Procedures. Where appropriate, such request for interpretation shall indicate the apparent discrepancy and propose appropriate, alternative materials or equipment.

1.6 COMMENCEMENT AND DURATION OF WARRANTIES

A. Commencement of Warranties:

1. Contract correction period and Contractor's general warranty commence as indicated in the General Conditions, as may be modified by the Supplementary Conditions.
2. Suppliers' standard warranties and special warranties commence running on the date that the associated item is certified by Engineer as substantially complete in accordance with the Contract Documents. In no event shall special warranties commence running prior to Engineer's review and acceptance of special warranty Submittal for the item.
3. Implied warranties commence in accordance with Laws and Regulations.

B. Duration of Warranties:

1. Duration of correction period is set forth in the General Conditions, as may be modified by the Supplementary Conditions.

2. Duration of Contractor's general warranty and guarantee is in accordance with Laws and Regulations.
3. Duration of Suppliers' standard warranties is in accordance with the applicable standard warranty document accepted for the Project by Engineer.
4. Duration of required Suppliers' special warranties shall be in accordance with the requirements of the Contract Documents for the subject item.
5. Duration of implied warranties shall be in accordance with Laws and Regulations.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Requirements for Project record documents, to supplement record documents requirements of the General Conditions, as may be modified by the Supplementary Conditions.
- B. Scope:
 - 1. Contractor shall provide all labor, materials, equipment, and services to establish, maintain, continuously update, and submit to Engineer Project record documents in accordance with the Contract Documents.
- C. Related Sections include but are not necessarily limited to:
 - 1. Section 01 29 73 - Schedule of Values.
 - 2. Section 01 29 76 - Progress Payment Procedures.
 - 3. Section 01 31 26 - Electronic Communication Protocols.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Obtain necessary field measurements and record all data required for Project record documents before covering up the Work or building on subsequent phases of the Work.
 - 2. Promptly after obtaining measurements and information, record the data and information on Project record documents.
 - 3. Where a licensed, registered professional land surveyor is retained on the Project, whether by Contractor or others, to perform field measurements and record other data for as-constructed Project or Site conditions, coordinate with such entity and schedule and perform the Work accordingly. Allow surveyor sufficient time and proper conditions for performing surveyor's work. Assist the surveyor as necessary in performance of surveyor's responsibilities.
- B. Monthly Status Evaluation:
 - 1. Not less than once per month, as a condition precedent to submitting Application for Payment, Contractor's site superintendent will meet with either Engineer or Resident Project Representative (RPR) at the Site to review status of Contractor's Project record documents.
 - 2. When Engineer or RPR directs corrections to Project record documents, promptly make such corrections on the Project record documents. Engineer's or RPR's directions or lack thereof do not in any way relieve or mitigate Contractor's sole responsibility for the accuracy, completeness, and clarity of Project record documents.
 - 3. Requirements for review of record documents status as a condition precedent to progress payments is in Section 01 29 73 - Schedule of Values, and Section 01 29 76 - Progress Payment Procedures.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Recorder of Changes and Field Conditions on Project Record Documents:
 - a. Contractor's staff at the Site shall include not less than one person with suitable training and drafting (drawing) experience to record on the Project record documents changes made and field conditions encountered.

- b. Recorder of changes and field conditions on the Project record documents shall possess not less than two semesters of drafting (drawing) training in a classroom, either in high school, college, or bona-fide vocational school.
- c. Upon Engineer's request, submit name of proposed recorder at the Site, resume', or list of relevant experience, and copy of credentials of completion of such drafting (drawing) course(s).
- d. If original recorder of changes and field conditions is replaced, promptly advise Engineer and RPR in writing and submit to Engineer qualifications of proposed replacement.

B. Samples of Similar Prior Work:

- 1. Submit Samples of the personal work of Contractor's designated recorder of changes and field conditions on the Project record documents from not less than two prior projects of similar type(s) of work at the Work. Submit copies of not less than two marked-up drawings from each prior project and copies of two pages of marked-up specifications from each prior project.
- 2. Samples shall be in the same form as proposed for the Project record documents. For example, where Contractor intends to submit hand-drawn mark-ups of the Drawings and Specifications, Samples shall be copies of hand-drawn markups. Where Contractor intends to submit Project record documents in native (executable) file format (such as CAD files), Samples shall be developed using the same software to be used in preparing the Project record documents.
- 3. If original recorder of changes and field conditions is replaced by Contractor, replacement recorder shall provide the same standard of work on Project record documents as indicated in the approved Samples.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

- 1. Samples:
 - a. Sample of field-recorded project record documents from prior projects, in accordance with this Specifications section's "Quality Assurance" Article, to establish quality and style for markups of Project record documents. Submit within 15 days of the date the Contract Times commence running.

B. Informational Submittals: Submit the following:

- 1. Qualifications Statements:
 - a. When requested by Engineer, submit qualifications of proposed recorder of changes and field conditions for Project record documents at Contractor's field office at the Site. Qualifications shall comply with the "Quality Assurance" Article of this Specifications section.

C. Closeout Submittals: Submit the following:

- 1. Record Documentation:
 - a. Prior to readiness for final payment, submit to Engineer one copy of Project's final record documents and obtain Engineer's acceptance of same. Submit complete record documents; do not make partial Submittals without Engineer's concurrence.
 - b. Submit the following Project record documents:
 - 1) Record Drawings, including those issued via Addenda, Change Orders, Work Change Directives, Field Orders, and allowance authorizations.
 - 2) Record project manual, including Specifications, indicating changes made via Addenda, Change Orders, Work Change Directives, Field Orders, and allowance authorizations.
 - c. Submit record documents with transmittal letter on Contractor's letterhead in accordance with requirements in Section 01 33 00 - Submittal Procedures.

2. Certifications:

- a. Record documents Submittal shall include certification, with original signature of official authorized to sign legally-binding contracts on behalf of Contractor, reading as follows:

- 1) (Contractor's legal/contractual entity name) has maintained, continuously updated, and submitted Project record documentation in accordance with the General Conditions and Supplementary Conditions, Section 01 78 39 - Project Record Documents, and other elements of Contract Documents, for the City of Hailey, Idaho, Woodside WRF Headworks Improvements. We certify that each record document submitted is complete, accurate, and legible relative to the Work performed under our Contract, and that the record documents comply with the requirements of the Contract Documents.

By: [] (signature)

Print Name: []

Title: []

1.5 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintain in Contractor's field office, in clean, dry, legible condition, complete sets of the following record documents:
1. Drawings, Specifications, and Addenda;
 2. Shop Drawings, Samples, and other Submittals, including records of test results, approved or accepted as applicable, by Engineer;
 3. Change Orders, Work Change Directives, Field Orders, allowance authorizations;
 4. copies of all interpretations and clarifications issued;
 5. photographic documentation;
 6. survey data; and
 7. all other documents pertinent to the Work.
- B. Provide files and racks for proper storage and easy access to Project record documents. File record documents in accordance with the edition of the Construction Specification Institute's *MasterFormat* used for organizing the project manual, unless otherwise accepted by Engineer or RPR.
- C. Promptly make Project record documents available for observation and review upon request of Engineer, RPR, or Owner.
- D. Do not use Project record documents for any purpose other than serving as Project record. Do not remove Project record documents from Contractor's field office without Engineer's approval.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- A. Recording Changes, Field Conditions, and Other Information – General:
1. At the start of the Project, label each record document to be submitted as, "PROJECT RECORD" using legible, printed letters. Letters on record copy of the Drawings shall be two inches high.
 2. Keep record documents current consistent with the progress of the Work. Make entries on record documents within two working days of receipt of information required to record the change, field condition, or other pertinent information.
 3. Do not permanently conceal the Work until required information has been recorded for Project record documents.
 4. Accuracy of record documents shall be such that future searches for items shown on the record documents may rely reasonably on information obtained from Engineer-accepted Project record documents.

5. Marking of Entries:

- a. Use erasable, colored pencils (not ink or indelible pencil) for marking changes, revisions, additions, and deletions to Project record documents.
- b. Clearly describe the change by graphic line and make notations as required. Use straight-edge to mark straight lines. Writing shall be legible and sufficiently dark to allow scanning of record documents into legible electronic files in "portable document format" (.PDF) files.
- c. Date each entry on record documents.
- d. Indicate changes by drawing a "cloud" around the change(s) indicated.
- e. Mark initial revisions in red. In the event of overlapping changes, use different colors for subsequent changes.

B. Drawings:

1. Record changes on copy of the Drawings. Submittal of Contractor-originated or -produced drawings as a substitute for recording changes on a copy of the Drawings is unacceptable.
2. Record changes on plans, sections, elevations, schematics, schedules, and details as required for clarity, accuracy, and completeness, making reference dimensions and elevations (to Project datum) for complete record documentation.
3. Record actual construction including:
 - a. Depths of various elements of foundation relative to Project datum.
 - b. Horizontal and vertical location of Underground Facilities referenced to permanent surface improvements and Project elevation datum. For each Underground Facility, including pipe fittings, show and indicate dimensions to not less than two permanent, visible surface improvements.
 - c. Location of exposed utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure and, where applicable, to Project elevation datum.
 - d. Changes in structural and architectural elements of the Work, including changes in reinforcing.
 - e. Field changes of dimensions, arrangements, and details.
 - f. Changes made in accordance with Addenda, Change Orders, Work Change Directives, Field Orders, and allowance authorizations.
 - g. Changes in details on the Drawings. Submit additional details prepared by Contractor when required to document such changes.
4. Recording Changes for Schematic Layouts:
 - a. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items are shown schematically and are not intended to portray physical layout. For such cases, the final physical arrangement shall be determined by Contractor subject to acceptance by Engineer.
 - b. Record on the Project record documents all revisions to schematics on the Drawings, including: piping schematics, ducting schematics, process and instrumentation diagrams, control and circuitry diagrams, electrical one-line diagrams, motor control center layouts, and other schematics when included in the Drawings. Show and indicate actual locations of equipment, lighting fixtures, in-place grounding system, and other pertinent data.
 - c. When dimensioned plans and dimensioned sections or elevations on the Drawings show the Work schematically, indicate on the Project record documents, by dimensions accurate to within one inch in the field, centerline location of items of Work such as conduit, piping, ducts, and similar items
 - 1) Clearly identify each item of the Work by accurate notations such as "cast iron drain", "rigid electrical conduit", "copper waterline", and similar descriptions.
 - 2) Show by symbol or by note the vertical location of each item of the Work; for example, "embedded in slab", "under slab", "in ceiling plenum", "exposed", and

similar designations. For piping not embedded, also indicate elevation dimension relative to Project elevation datum.

- 3) Descriptions shall be sufficiently detailed to be related to the Specifications.
- d. Engineer may furnish written waiver of requirements relative to schematic layouts shown on plans, sections, and elevations when, in Engineer's judgment, dimensioned layouts of Work shown schematically will serve no useful purpose. Do not rely on such waiver(s) being issued.
5. Supplemental Drawings:
 - a. In some cases, drawings produced during construction by Engineer or Contractor supplement the Drawings and shall be included with Project record documents submitted by Contractor. Supplemental record drawings shall include drawings or sketches that are part of Change Orders, Work Change Directives, Field Orders, and allowance authorizations and that cannot be incorporated into the Drawings because of space limitations.
 - b. Supplemental drawings submitted with record drawings shall be integrated with the Drawings and include necessary cross-references between drawings. Supplemental record drawings shall be on sheets the same size as the Drawings.
 - c. When supplemental drawings developed by Contractor using computer-aided drafting/design (CAD), building information models (BIM), or civil information models (CIM) software are to be included in record drawings, submit electronic files for such drawings in accordance with Section 01 31 26 – Electronic Communication Protocols, as part of record drawing Submittal. Label such files, "Supplemental Record Drawings", including with Contractor's name, Project name, and Contract designation.
- C. Specifications and Addenda:
 1. Mark each Specifications section to record:
 - a. Manufacturer, trade name, catalog number, and Supplier of each material and equipment item actually furnished.
 - b. Changes made by Addendum, Change Orders, Work Change Directives, Field Orders, and allowance authorizations.

1.7 ELECTRONIC DOCUMENTS FURNISHED BY ENGINEER

- A. CAD, BIM, or CIM files of the Drawings will be furnished by Engineer upon the following conditions:
 1. Contractor shall submit to Engineer a letter on Contractor letterhead requesting CAD, BIM, or CIM files of the Drawings and indicating specific definition(s) or description(s) of how such Electronic Documents will be used by Contractor, and specific description of benefits to Owner (including credit proposal, if applicable) if the request is granted.
 2. Engineer does not guarantee that Electronic Documents are available in the format(s) requested by Contractor. Some projects may have Drawings developed using only CAD software instead of BIM or CIM software. Engineer will not create BIM or CIM files for Contractor if such files do not already exist.
 3. Contractor shall sign Engineer's standard agreement with Contractor for release of Electronic Documents and shall abide by the provisions of such agreement for release of Electronic Documents.
 4. Layering system incorporated in CAD, BIM, and CIM files shall be maintained as transmitted by Engineer. CADD, BIM, and CIM files transmitted by Engineer containing cross-referenced files shall not be bound by Contractor. Drawing cross-references and paths shall be maintained. If Contractor alters layers or cross-reference files, Contractor shall restore all layers and cross-references prior to submitting Project record documents to Engineer.
 5. Contractor shall submit Project record drawings to Engineer in same CAD, BIM, or CIM format that files were furnished to Contractor.

B. Microsoft Word files of Specifications:

1. Requirements for Engineer's potential release of word processing files of the Specifications or other written documents in native format are the same as those for Drawings.
2. When Specifications are released in native format, Contractor shall submit record specifications in the same format, with all changes tracked using Microsoft Word's "track changes" feature.
3. Do not modify the formatting of the native files furnished by Engineer. If formatting changes are made without Engineer's authorization, remedy the formatting to the same condition and status as when the files were first delivered to Contractor. Such remedy shall be at Contractor's expense.
4. Comply with all requirements of this Specifications section regarding record specifications.
5. After delivery of record specifications Submittal to Engineer, delete from Contractor's files the native word processing files. Contractor may retain a PDF version of such files for Contractor's records.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

SECTION 01 79 23
INSTRUCTION OF OPERATION AND MAINTENANCE PERSONNEL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for instruction of operation and maintenance personnel.
2. Qualifications requirements for Suppliers' training personnel.
3. General requirements for training.
4. Schedule of required training sessions.

B. Scope:

1. Contractor shall furnish services of Suppliers' operation and maintenance training specialists to instruct Owner's personnel in recommended operating and maintenance procedures for materials and equipment furnished, in accordance with the Contract Documents.
2. Each Supplier shall provide a combination of classroom and field training at the Site, unless otherwise required elsewhere in the Contract Documents.

Owner reserves the right to record training sessions on video for Owner's later use in instructing Owner's personnel.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Scheduling of Training Sessions:

1. General:

- a. Contractor shall coordinate training services with checkout, startup, and initial operation of materials and equipment on days and times, and in manner, acceptable to Owner, in accordance with the Contract Documents.
- b. Training may be required outside of normal business hours to accommodate schedules of operation and maintenance personnel. Provide training services at the required days and times at no additional cost to Owner.

2. Prerequisites to Training:

- a. Training of facility operation and maintenance personnel shall commence after preliminary operation and maintenance data has been submitted and accepted by Engineer, and the Work required in Section 01 75 00, Checkout and Startup Procedures, is complete.
- b. At option of Owner or Engineer, training may be allowed to take place before, during, or after checkout and startup of materials and equipment.

3. Training Schedule Submittal:

- a. Training Schedule Required: Contractor shall prepare and submit proposed training schedule for review and acceptance by Engineer and Owner. Proposed training schedule shall show and indicate all training required in the Contract Documents, and shall demonstrate compliance with specified training requirements relative to number of hours of training for various elements of the Work, number of training sessions, and scheduling.
- b. Training Schedule Coordination: When Project has multiple prime contracts, prime Contractors shall comply with this Specifications section. All prime Contractors shall coordinate with the General Contractor in developing a single training schedule Submittal for the entire Project, to be submitted by General Contractor. All prime Contractors shall implement training in accordance with the approved training schedule.

- c. Timing of Training Schedule Submittal: Submit initial training schedule not less than 60 days before scheduled start of first training session. Submit final training schedule, incorporating revisions in accordance with Engineer's comments, not later than 30 days prior to starting the first training session.
 - d. Owner reserves the right to modify personnel availability for training in accordance with process or emergency needs at the facility.
- B. Training Scheduling Conference:
- 1. Prior to preparing initial training schedule Submittal, schedule and hold training scheduling conference at the location where progress meetings are held, to review:
 - a. Training requirements indicated in the Contract Documents.
 - b. Work to be completed prior to commencing training.
 - c. Work progress and Progress Schedule relative to startup and training.
 - d. Scheduling constraints for Owner's personnel, relative to days and times of training sessions.
 - e. Preferred days for training.
 - f. Location where training will be performed and facilities available.
 - g. Required Submittals relative to training.
 - h. Other issues relative to training of operation and maintenance personnel.
 - 2. Attendance is mandatory for the following:
 - a. Contractor's project manager.
 - b. Contractor's Site superintendent.
 - c. Project manager of Subcontractors responsible for furnishing materials and equipment for which training of operation and maintenance personnel is required.
 - d. Suppliers invited by Contractor.
 - e. Engineer.
 - f. Resident Project Representative (RPR).
 - g. Owner's Site Representative (OSR).
 - h. Owner's staff responsible for training coordination, and staff responsible for scheduling operation and maintenance personnel.
 - 3. If additional information must be developed to adequately cover agenda items, reconvene conference as soon as possible.
 - 4. Contractor shall prepare minutes summarizing the discussions of conference, decisions made, and agreements and disagreements, and distribute the minutes to each conference attendee and others as appropriate.

1.3 QUALITY ASSURANCE

- A. Qualifications:
- 1. Supplier's Instructors:
 - a. Shall be factory-trained by manufacturer of material or equipment.
 - b. Supplier's instructors shall be proficient and experienced in performing training of the types required.
 - c. Instructors shall be proficient, clear, and easily understandable in spoken and written English language.
 - d. Qualifications of instructors are subject to acceptance by Engineer. If Engineer does not accept qualifications of proposed instructor, provide services of replacement instructor with acceptable qualifications.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Training Schedule: Detailed schedule of training sessions, demonstrating compliance with number of training sessions, hours required in the Contract Documents, and complying with the Contract Times. Submit training schedule Submittals in accordance with time frames specified in this Specifications section.

B. Informational Submittals: Submit the following:

1. Lesson Plan: Acceptable lesson plan for training on each material or equipment item, in accordance with Table 01 79 23-A and the Contract Documents. Lesson plan shall comply with requirements of this Specifications section as may be supplemented by Specifications sections where materials and equipment are specified. Include with lesson plan copy of handouts that will be used during training sessions. Submit lesson plan Submittals in accordance with time frames specified in this Specifications section.
2. Qualifications:
 - a. Credentials of Supplier's proposed operation and maintenance instructor(s). Credentials shall demonstrate compliance with requirements of this Specifications section and shall include brief resume' and specific details of instructor's operating, maintenance, and training experience relative to the specific material and equipment for which instructor will provide training.
3. Minutes of training scheduling conference.

C. Closeout Submittals: Submit the following:

1. Trainee sign-in sheets for each training session. Submit to Owner's training coordinator with copy to Engineer.

1.5 LESSON PLAN

- A. Supplier's lesson plan shall describe specific instruction topics, system components for which training will be provided, and training procedures. Handouts, if any, to be used in training shall be included with the lesson plan. Describe in lesson plan "hands-on" demonstrations planned for training sessions.
- B. Submit acceptable lesson plan not less than 21 days prior to starting associated training.
- C. Indicate in lesson plan estimated duration of each training segment.
- D. Lesson plan shall include the following:
1. Material and Equipment Overview (required for all types of operation and maintenance training):
 - a. Describe material and equipment's operating (process) function and performance objectives.
 - b. Describe material and equipment's fundamental operating principles and dynamics.
 - c. Identify equipment's mechanical, electrical, and electronic components and features. Group related components into subsystems and describe function of subsystem and subsystem's interaction with other subsystems.
 - d. Identify all support materials and equipment associated with operation of subject equipment, such as air intake filters, valve actuators, motors, and other appurtenant items and equipment.
 - e. Identify and describe safety precautions and potential hazards related to operation.
 - f. Identify and describe in detail safety and control interlocks.
 2. Operations Personnel Training:
 - a. Material and Equipment Overview: As described in Paragraph 1.5.D.1 of this Specifications section.

- b. Operation:
 - 1) Describe operating principles and practices.
 - 2) Describe routine operating, startup, and shutdown procedures.
 - 3) Describe abnormal or emergency startup, operating, and shutdown procedures that may apply.
 - 4) Describe alarm conditions and responses to alarms.
 - 5) Describe routine monitoring and recordkeeping procedures.
 - 6) Describe recommended housekeeping procedures.
 - c. Troubleshooting:
 - 1) Describe how to determine if corrective maintenance or an operating parameter adjustment is required.
3. Mechanical Maintenance Training:
- a. Material and Equipment Overview: As described in Paragraph 1.5.D.1 of this Specifications section.
 - b. Material and Equipment Preventive Maintenance:
 - 1) Describe preventative maintenance inspection procedures required to:
 - a) Inspect materials and equipment in operation.
 - b) Identify potential trouble symptoms and anticipate breakdowns.
 - c) Forecast maintenance requirements (predictive maintenance).
 - 2) Define recommended preventative maintenance intervals for each component.
 - 3) Describe lubricant and replacement part recommendations and limitations.
 - 4) Describe appropriate cleaning practices and recommend intervals.
 - 5) Identify and describe use of special tools required for maintenance of materials and equipment.
 - 6) Describe component removal, installation, and disassembly and assembly procedures.
 - 7) Perform “hands-on” demonstrations of preventive maintenance procedures.
 - 8) Describe recommended measuring instruments and procedures, and provide instruction on interpreting alignment measurements, as appropriate.
 - 9) Define recommended torquing, mounting, calibrating, and aligning procedures, tolerances, and settings, as appropriate.
 - 10) Describe recommended procedures to check and test equipment following corrective maintenance.
 - c. Troubleshooting:
 - 1) Define recommended systematic troubleshooting procedures.
 - 2) Provide component-specific troubleshooting checklists.
 - 3) Describe applicable materials and equipment testing and diagnostic procedures to facilitate troubleshooting.
 - 4) Describe common corrective maintenance procedures with “hands-on” demonstrations.
4. Instrumentation/Controls and Electrical Maintenance Training:
- a. Materials and Equipment Overview: As described in Paragraph 1.5.D.1 of this Specifications section.
 - b. Preventative Maintenance and Troubleshooting of Instrumentation and Control Systems: Engineer may grant waiver(s) to allow all training for a given system to be at the location of Owner’s training facility.
 - c. Preventative Maintenance and Troubleshooting of Other Electrical Systems: In accordance with requirements for Paragraph 1.5.D.3 of this Specifications section.

1.6 TRAINING AIDS

- A. Supplier's instructor(s) shall incorporate training aids as appropriate to assist in the instruction. Provide handouts of text, tables, graphs, and illustrations as required. Other appropriate training aids include:
 - 1. Audio-visual aids, such as videos, Microsoft PowerPoint presentations, overhead transparencies, posters, drawings, diagrams, catalog sheets, or other items.
 - 2. Equipment cutaways and samples, such as spare parts and damaged equipment.
 - 3. Tools, such as repair tools, customized tools, and measuring and calibrating instruments.
- B. Handouts:
 - 1. Supplier's instructor(s) shall distribute and use descriptive handouts during training. Customized handouts developed especially for training for the Project are encouraged.
 - 2. Photocopied handouts shall be good quality and completely legible.
 - 3. Handouts shall be coordinated with the instruction, with frequent references made to the handouts.
 - 4. Provide not less than 15 paper copies of each handout for each training session.
- C. Audio-Visual Equipment: Training provider shall provide audio-visual equipment required for training sessions. If suitable equipment is available at the Site, Owner may make available facility's existing audio-visual equipment; however, do not count on facility's existing audio-visual equipment, if any, being available. Audio-visual equipment that training provider shall provide, as required, includes:
 - 1. Laptop computer, presentation software, and suitable projector.
 - 2. Power cords, power strips/surge protectors.
 - 3. As required, extension cords, HDMI cables and other video cabling, and spare bulb for projector.
 - 4. Laser pointer/slideshow remote controller with extra batteries.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 TRAINING DELIVERY

- A. Training Delivery – General:
 - 1. Instructors shall be fully prepared for the training sessions. Training delivery shall be communicative, clear, and proceed according to lesson plan accepted by Engineer, with lesson content appropriate for trainees. If Owner or Engineer deems that training delivery does not comply with the Contract Documents, training shall be postponed, rescheduled, and re-performed in acceptable manner at no additional cost to Owner.
 - 2. Trainee Sign-in Sheets: In format acceptable to Owner, furnish sign-in sheet for trainees for each session. Sign-in sheets shall include the Project name; materials, equipment, or system for which training was provided; and type of training (e.g., operations, mechanical maintenance, instrumentation/controls and electrical maintenance, or other), and full name and operator license number (when applicable) of each trainee. Upon completion of training, submit copy of each sign-in sheet as indicated in Article 1.4 of this Specifications section.
- B. "Hands-on" Demonstrations:
 - 1. Supplier's instructor(s) shall present "hands-on" demonstrations of operation and maintenance of materials and equipment for each training session, in accordance with lesson plan accepted by Engineer.
 - 2. Contractor and manufacturer shall furnish tools necessary for demonstrations.

3.2 SCHEDULE OF REQUIRED TRAINING

- A. Supplier shall provide not less than the hours of training and number of sessions indicated in Table 01 79 23-A of this Specifications Section. Travel time and expenses are responsibility of Supplier and are excluded from required training time indicated in the Contract Documents.
- B. Shifts and Training Sessions Required:
1. Operations at the Site take place 8 hours per day, divided into one shift.
 2. Training Sessions per Shift:
 - a. Operators: Maximum training per day is four hours; sessions longer than four hours shall be spread over multiple, preferably consecutive, days. Provide identical training sessions as follows:
 - 1) Two identical sessions during day shift, each session in a different week.
 - b. Mechanical Maintenance: Provide two identical training sessions during day shift, each session in a separate week, for indicated materials and equipment. Maximum training per day is four hours; sessions longer than four hours shall be spread over multiple, preferably consecutive, days.
 - c. Instrument/Controls and Electrical Maintenance: Provide two identical training sessions during day shift, each session in a separate week, for indicated equipment. Maximum training per day is four hours; sessions longer than four hours will be spread over multiple, preferably consecutive, days.

TABLE 01 79 23-A, TRAINING SUMMARY TABLE

Material or Equipment	Specification Section	Total Training (HRS)	Training Sessions Required		
			Operations	Mechanic Maint.	Instrument/ Controls & Electrical Maint.
HVAC – Fans	23 34 00	6 hours	Zero	2 sessions 2 hours ea	2 sessions 1 hours ea
HVAC – Equipment	23 80 00	10 hours	Zero	2 sessions 4 hours ea	2 sessions 1 hours ea
Electrical – Low-Voltage Adjustable Frequency Drives	26 29 23	18 hours	2 sessions 1 hour ea	2 sessions 4 hours ea	2 sessions 4 hours ea
Electrical – Active Harmonic Filters	26 35 26	4 hours	Zero	Zero	1 session 4 hours ea
Process – Plug Valves	40 05 62	10 hours	2 sessions 1 hour ea	2 sessions 2 hours ea	2 sessions 2 hours ea
Mechanical & Process – Ball Valves	40 05 63	2 hours	Zero	1 session 2 hours ea	Zero
Process – Check Valves	40 05 66	2 hours	Zero	1 session 2 hours ea	Zero
Process – Instrumentation	40 91 10	24 hours	Zero	Zero	6 sessions 4 hours ea
Electrical – HMI	40 96 52	24 hours	3 sessions 4 hours ea	Zero	3 sessions 4 hours ea
Process – Monorails	41 22 23	4 hours	1 session 1 hours ea	1 session 3 hours ea	Zero

Process – Submersible Pumps	43 25 13	16 hours	4 sessions 1 hours ea	2 sessions 4 hours ea	2 sessions 2 hours ea
Process – Grit Classifier	46 12 22	8 hours	1 session 2 hours ea	1 session 3 hours ea	1 session 3 hours ea
Process – Grit Removal Unit	46 21 00	8 hours	1 session 4 hours ea	1 session 4 hours ea	Zero
Total		136 hours	27 hours	46 hours	63 hours

END OF SECTION

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SECTION 01 81 10
WIND AND SEISMIC DESIGN CRITERIA

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. The following types of design criteria for the Project, including Work designed by (a) Engineer and (b) delegated design professional(s) retained by Contractor, Subcontractor, or Supplier and submitted for Engineer's approval under the Contract:
 - a. Wind loading.
 - b. Seismic.
 - c. Snow loading.

B. Scope:

1. Certain Work, expressly indicated, shall be designed, fabricated, and installed in accordance with the wind, snow, and seismic requirements of this Section and Laws and Regulations (including applicable building codes).
2. This Section applies to all the Work. Where wind , snow, and seismic design criteria indicated in this Section conflict with wind , snow, and seismic design criteria set forth elsewhere in the Contract Documents, the more-stringent loading and requirements shall govern, unless clarified in writing by Engineer. Obtain Engineer's written interpretation or clarification of conflicts prior to performing the subject design and other associated Work.
3. Contractor shall provide all labor, materials, equipment, tools, professional services, and incidentals to provide wind , snow, and seismic design for the Work.
4. Such Work includes, but is not necessarily limited to, the following:
 - a. Anchorage of mechanical and electrical equipment and systems.
 - b. Anchorage of supports for piping, electrical conduits and cable trays, and similar Work.
 - c. Work requiring delegated professional design for the final, completed Project.

C. Related Requirements: Include but are not necessarily limited to:

1. Section 01 35 73 - Delegated Design Procedures.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate all wind , snow, and seismic design required of Contractor for the Work.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Civil Engineers / Structural Engineering Institute (ASCE/SEI):
 - a. 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
2. When referenced standards conflict, the most-stringent governs, unless specifically indicated otherwise in the Contract Documents or unless approved otherwise in writing by the Engineer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following as part of the Submittals required in Divisions 02-49 Specifications that require wind , snow, and seismic delegated designs:

1. Delegated Design Professional's "Instruments of Service" Submittals:

- a. Delegated design professional's "certification of compliance" required by Section 01 35 73 - Delegated Design Procedures, regarding structural calculations:
 - 1) Indicate compliance with performance and design criteria indicated in the Contract Documents.
 - 2) Indicate compliance with specific reference standards indicated in the building code and the associated Contract Documents.
 - 3) Indicate other information required for "certification of compliance" in accordance with Section 01 35 73 - Delegated Design Procedures.
- B. Informational Submittals: Submit the following as part of the Submittals required in Divisions 02-49 Specifications that require wind , snow, and seismic delegated designs:
 - 1. Delegated Design Professional's Calculations:
 - a. Such calculations shall include delegated design professional's seal, signature, and date and are to indicate the following, which will not be reviewed by Engineer except for the limited purposes indicated in Section 01 35 73 - Delegated Design Procedures:
 - 1) Indicate basis of design and lateral analysis as necessary and required to derive each loading and to indicate system stability, including compatibility of deflections and compatibility with allowable soil parameters, as applicable.
 - 2) Indicate design load to each connection to structure (where connection will attach to or interface with, or supported by, elements designed by Engineer).
 - 3) Indicate and provide complete lateral load resisting system that transfers all wind and seismic loads through load path to ground.
 - 2. Shop Drawings and Product Data Approved by Delegated Design Professional: The following are required but will be reviewed by Engineer only for the limited purposes indicated in Section 01 35 73 - Delegated Design Procedures:
 - a. Shop Drawings showing and indicating proposed wind , snow, and seismic controls Work designed by delegated design professional.
 - b. Product data showing and indicating proposed wind , snow, and seismic controls Work designed by delegated design professional.

PART 2 - PRODUCTS

2.1 GENERAL DESIGN CRITERIA FOR WIND ,SNOW, AND SEISMIC

- A. This Article 2.1 applies to wind , snow, and seismic design criteria.
- B. Design by delegated design professional retained by Contractor, Subcontractor, or Supplier shall comply with:
 - 1. Performance and design criteria indicated in the applicable Contract Documents, including this Section.
 - 2. Laws and Regulations, including applicable building code.
 - 3. Applicable reference standards indicated in the Contract Documents.
- C. Risk Category: III.
 - 1. Design in accordance with building code load combinations for, at Contractor's option, either service level or factored level.
 - 2. Mechanical and electrical equipment and systems loads are dead loads, except where mechanical elements, such as piping and tanks, are filled with material such as liquid or slurry (in which case the dead load of the pipe's or vessel's contents shall also be included).

2.2 WIND DESIGN CRITERIA

- A. Wind Design Load Criteria:
 - 1. Basic Wind Speed: $V_{ult} = 115$ miles per hour.
 - 2. Allowable Stress Design wind speed: $V_{ASD} = 90$ miles per hour.

3. Exposure Category: C
 4. Topographic Factor: $K_{zt} = 1.0$.
 5. Wind Importance Factor: $I_w = 1.00$
 6. Building description for wind design is Enclosed.
- B. Wind forces must be resisted by direct load transfer through fasteners to wind-resisting elements. Do not use connections that employ friction to transfer wind forces.

2.3 SEISMIC DESIGN CRITERIA

- A. Seismic Design Load Criteria:
1. Design spectral acceleration at short period: $S_{DS} = 0.43$.
 2. Design spectral acceleration at 1-second period: $S_{D1} = 0.22$.
 3. Importance Factor: $I_e = 1.25$.
 4. Seismic Design Category: D.
 5. Component or system amplification factor, (a_P) and component response modification factor (R_P): In accordance with ASCE 7-16, Tables 13.5-1 and 13.6-1.
 6. Component Importance Factor:
 - a. Process Equipment: $I_P = 1.50$.
 - b. Other Components: $I_P = 1.00$.
- B. Seismic forces must be resisted by direct load transfer through fasteners to seismic-resisting elements. Do not use connections that employ friction to transfer seismic forces.

2.4 SNOW DESIGN CRITERIA

- A. Snow Design Load Criteria:
1. Design ground snow load: $p_g = .120$ Pounds per Square Foot
 2. Design exposure factor: $C_e = 0.90$
 3. Design slope factor: $C_s = 1.0$
 4. Design thermal factor: $C_t = 1.0$
 5. Importance Factor: $I_s = 1.10$.
 6. Minimum flat roof snow load: $p_f = 100$ pounds per square foot.
 7. Design considerations for partial loading, unbalanced snow, snow drift in the vicinity of adjacent structures or projections, sliding snow, and other applicable factors shall be considered at locations required by Laws and Regulations, including applicable building codes.
 8. In no event shall snow design load criteria or minimum snow load be less than required by authority having jurisdiction.

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 01 81 33
CYBER SECURITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. General requirements for cyber security measures applicable to all the Work.
2. Requirements to furnish Owner copy of code and configuration files.
3. Supplier and all other parties providing parts and services under this contract are subject to these conditions. This includes hardware and software, licensing, intellectual equipment, patent restrictions and use, copyright, and similar equipment, systems, and appurtenances covered under this Section.
4. Requirements for vendors, suppliers and / or Contractor-furnished equipment with microprocessor-based equipment including:
 - a. Providing full and unrestricted use by the Owner for equipment supplied under this contract including access, review, updates, and modification of software code, firmware and configurations of PLCs, PACs, RTUs, HMIs, DDCs, OITs, or any other microprocessor-based equipment.
 - b. Allowing Owner to transfer to designated agents the right to perform this work on their behalf.
 - c. Furnishing software source code for the system supplied.
 - d. Coordinate with Owner to remove default usernames and passwords, to remove contractor passwords at time of system acceptance, and turn-over of all passwords utilized in the system.
5. Requirements for vendors, suppliers and / or Contractor-furnished items for furnishing program code, passwords, keys, and configuration files upon project milestones and at substantial completion.

B. Scope:

1. This Section indicates cyber security requirements applicable to all equipment, controls, devices, and other items furnished to Owner and Owner-furnished items modified as part of the Work, containing microprocessor based systems and that will be, can be (in the future), or may potentially be (in the future) connected to Owner's network or the internet.
2. This Section applies regardless of whether the subject items were furnished or modified by Contractor, Subcontractor, or Supplier of any tier.
3. By furnishing equipment, controls, devices, or other items for the Work, Suppliers and Subcontractors, if any, are bound by this Section's requirements to same extent Contractor is so bound.
4. Supplier agrees to assist in cybersecurity basic hygiene practices as dictated by best practices included in this section, government regulation at time of bid, and as provided by the Owner's cyber security team. At a minimum, the supplier will coordinate with Owner and assign IP addresses and subnet masking, utilized of managed switches with unused ports disabled, provide all equipment with latest firmware at time of field installation.
5. All equipment supplied will be current and not be obsolete or subject to a manufacturer's end-of-life notice of less than 2 years after startup.
 - a. Provide any notices of manufacturer's end-of-life notices for all equipment at the time of submittal for approval of equipment. This shall include searching equipment websites during the submittal process to ensure the products are not nearing end of life.
6. At Substantial Completion, the Owner shall be granted full use of equipment and services provided by equipment and its associated automation under this Section and shall include:

- a. Full access and use of supplied software within any equipment supplied including PLCs, OIT, networking and communications equipment, gateways, and HMI code (including fully documented source code), internal function blocks or code shall be ceded to the Owner for their exclusive use at the location(s) of the equipment. These rights shall transfer to future locations or owners.
 - b. Right to modify, enhance or make changes to the equipment as deemed necessary or desired by the Owner, including hardware, software, networking settings, passwords or other information or settings that the Owner may change for maintenance, upgrade, or cybersecurity reasons.
 - c. Full release of claims to Intellectual Equipment, Trade Secrets, or Sensitive Information as supplied with this equipment as may be claimed by the supplier or any of their subcontractors, subconsultants and the like as regards equipment or services provided herein to the Owner.
 - d. No provisions for Non-Disclosure Agreements (NDAs) or other restrictions to restrict or prevent the Owner from obtaining or using information, licenses, electronic data, software are allowable.
- 7. The supplier shall furnish software source code for the equipment supplied. The code or any part of the system may not be hidden or protected by encryption, passwords, or other means without providing these passwords or access to the Owner's designated personnel.
 - 8. The supplier shall take measures to limit the distribution of information on Owner's system information to the minimum personnel required. The supplier shall not publish to public facing media this information at any time.
- C. Related Requirements:
- 1. Section 01 31 26 - Electronic Communication Protocols.
 - 2. Section 01 33 00 - Submittal Procedures.
 - 3. Section 01 75 00 - Checkout and Startup Procedures.
 - 4. Section 01 78 36 - Warranties.

1.2 SUBMITTALS

- A. Action Submittals: Submit the following:
- 1. Comprehensive asset inventory of all networked components:
 - a. Provide in Excel spreadsheet format.
 - b. Submit in accordance with the Requirements of 01 31 26 - Electronic Communication Protocols.
 - c. Include:
 - 1) Device ID.
 - 2) Manufacturer.
 - 3) Model Number.
 - 4) Serial Number.
 - 5) MAC Address.
 - 6) IP Address.
 - 7) Device Use description.
 - 8) Firmware Version.
 - 2. Network Diagrams:
 - a. Provide in both AUTO CAD and PDF formats.
 - b. Coordinate with the Owner or Engineer to determine the preferred method of delivery to assure security of information contained in Network Diagrams.
 - c. Logical Network Diagram(s):
 - 1) Depict information flow through network(s), and include:
 - a) Major network devices, subnets, and VLANs.

- b) Include all wireless communication devices.
 - c) Include the following information for each networked device:
 - (1) Device ID.
 - (2) Device description.
 - (3) Manufacturer/model number.
 - (4) MAC address.
 - (5) IP address.
 - (6) Ports and Protocols
 - d. Physical Network Diagram(s):
 - 1) Show all network components, ports, protocols, connections and cables.
 - a) Include all wireless communication devices.
- B. Close-out Submittals: Submit the following:
 - 1. Password Turn-over: Coordinate with Owner to securely transmit directly to Owner list of usernames and passwords applied to replace factory and Supplier's defaults.
 - 2. Network-Capable Device Asset Inventory: Furnish, as unlocked, editable Microsoft Excel file listing all network-capable devices furnished or modified under this Section. List shall include:
 - a. Device name.
 - b. Device location (in network and physical location).
 - c. Manufacturer name.
 - d. Product name and model designation.
 - e. Manufacturer's serial number on device.
 - f. Mac address (when device is IP-addressable).
 - g. IP address (when device is IP-addressable).
 - h. Edition of revision number of installed firmware or operating system.
 - 3. Backup of Application Software: Furnish directly to Owner Electronic Document copy of each software application and equipment configuration file necessary for Owner's Facility Manager to restore functionality of system after a system disaster or other such event.
 - a. Software source code for all PLCs, HMIs, OITs and other devices.
 - b. Configuration files, encryption information and other sensitive information for the full project scope.
 - 4. Work will not be eligible for final payment until all closeout submittals, including required program code and configuration submittals, are received and accepted by Engineer.
- C. Timing: Submittals will be required at the following project stages:
 - 1. Network Diagrams and Asset Inventory – with control panel submittals.
 - 2. Draft Software and Configuration Files, and As-Manufactured Network Diagrams – Available at Factory Acceptance Testing.
 - 3. All documents available on-site upon equipment delivery to the project site.
 - 4. All documents contained within Operation & Maintenance manuals.
 - 5. Close-Out submittals at project closeout.

1.3 COPIES OF PROGRAM CODE AND CONFIGURATION FILES

- A. Copies of Program Code and Configuration Files – General:
 - 1. Submit as Electronic Documents only. Paper Submittals are not required for program code and configuration files.
 - 2. Files to be securely transferred with limited distribution as requested by the Owner or supplier to protect sensitive information. Provide proof of file transfer for submittal record purposes.

3. In accordance with the Contract Documents, following Substantial Completion, Owner and facility manager shall have right to: (a) modify program code and configuration files, (b) update software and firmware, (c) revise system security settings, such as passwords, IP addresses, and other security settings, and (d) implement related modifications, without restriction or interference from Contractor, Subcontractor, Supplier, and others.
4. Owner and facility manager agree to use program code and configuration files only with Owner's facilities, as may be transferred to Owner's successors and assigns.
5. Owner and facility manager will not be subject to any Supplier-requested non-disclosure agreement that is not part of the Contract Documents.
6. Engineer agrees to not distribute program code and configuration files obtained under the Project, except in exchanging such files with Owner, facility manager, or their successors and assigns. Engineer will not be party to any Supplier-requested non-disclosure agreement.

B. Configuration Files:

1. Submit copies of system configuration prepared for the Project, such as setpoints for programmable controllers, facility SCADA display configurations, and similar configuration files.
2. Files to be securely transferred with limited distribution as requested by the Owner or supplier to protect sensitive information. Provide proof of file transfer for submittal record purposes.
3. Submit as separate files configuration files for each separate control and monitoring device for which configuration files are furnished. Clearly distinguish the device(s) associated with each file.
4. Contractor (including Subcontractors and Suppliers) is not responsible for configurations and control setpoints subsequently changed by Owner, facility manager, or others for whom either is responsible, not in accordance with Supplier's written recommendations and operation and maintenance instructions.

C. Program Code:

1. Submit copies of program code for programmable logic controllers (PLC), human-machine interfaces (HMI), operator interface terminals (OIT), and other programmable controllers, subject to the following:
 - a. Submit for all PLCs, HMI, OITs, and other programmable controllers furnished as part of the Work, and where Owner's existing devices were modified as part of the Work, regardless of whether such program code is manufacturer's standard, or developed specifically for the Project, or a combination of manufacturer's standard program code and Project-specific program code. Contractor and associated Subcontractors and Suppliers are not responsible for program code modifications made by Owner or facility manager (or third parties retained by Owner or facility manager) that result in improper operation of materials, equipment, or systems or that invalidate applicable warranties and manufacturer's recommended operating instructions.
 - b. Third-party, licensed, commercially available software (such as, but not limited to, Microsoft operating system software sold at retail, and commercial SCADA system software platforms, PLC programming software) is excluded from requirements of this Article. Furnish copies of commercially available, licensed, third-party software, where required, in accordance with the Contract Documents.
2. Submit annotated copies of complete PLC software programs:
 - a. In native-format file including all applicable formats (ladder logic, function block diagram, sequential function chart, instruction list, structured text).
 - b. In PDF-format file with fully annotated PLC code that can be read without the native configuration and programming environment on electronic media (DVD or USB drive).
3. Format Requirements:

- a. For ladder diagram logic, include complete cross-referencing of all logic elements. Annotate all elements with clearly understandable tags or descriptive labels.
 - b. For function block diagram, label each function block with understandable tags or descriptive labels. Describe purpose and action of each function block.
 - c. For sequential function chart, include extensive comments for each step to describe program step function.
 - d. For instruction list and structured text, include extensive comments for each program line to describe program line function.
4. Submit complete programmable logic controller listing of all input/output address assignments, tag assignments, and pre-set constant values, with functional point descriptions.
 5. Submit complete manufacturer's program code manuals.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 CONTRACTOR ACCESS TO INSTALLED EQUIPMENT

- A. Unless specifically included within the plans and specifications, remote access appliances for interaction with programmable devices will not be accepted during construction or operation. Where remote access is required, vendor shall submit RFI for allowable methods and describe the specific remote access needs (i.e. programming, view only data, emergency support) and coordinate with Owner/Engineer on acceptable solution which achieves the owner's cybersecurity risk tolerance.
- B. Suppliers who require the ability to monitor the furnished system may be permitted on a case-by-case basis.
 1. Monitoring: The following process must be followed to allow monitoring:
 - a. Case justification as to how this monitoring benefits the Owner
 - b. Risks and mitigation methods surrounding this monitoring methods.
 - c. List alternatives including email reports by SCADA HMI report master from HMI historian data or other methods. Provide detailed explanation as to why these alternative methods will not be sufficient for the required data.
 - d. The Owner will provide written access permissions and conditions that must be followed, or the monitoring will be denied, and further actions may occur, if the request is approved.
 2. Remote access or control: The following process must be followed to allow remote access or control:
 - a. Case justification as to how this remote access benefits the Owner.
 - b. Risks and mitigation methods surrounding this online access.
 - c. Provide a procedure for how the remote access will occur. The following steps must be included at a minimum.
 - 1) Connectivity is LIMITED to times required to perform troubleshooting or fixing an issue only.
 - 2) Supplier must send a request to connect with reasons for the remote access and goal of the session prior to connecting. This request must be approved prior to connecting.
 - 3) Supplier to include risks, expected time to be on the system and other factors for Owner's consideration and approval.
 - 4) Owner may then at their sole discretion, grant approval and schedule a time that fits Owner's operations. The Owner must provide written (email) access permissions

and conditions that must be followed, or the remote access will be denied and further actions may occur.

- 5) Owner will designate a representative that the Vendor must call prior to remoting in.
 - 6) At the agreed time, or shortly prior, Supplier to call the Owner's designated representative and identify themselves. The phone must have the individuals number displayed so this may be recorded by the Owner. The Supplier shall state what they are doing, how long this will take and if this will resolve the issue.
 - 7) The Owner's representative will then decide if the remote session is allowed.
 - a) If the session is allowed, the Owner's representative will connect the gateway to allow the Supplier to remote in and perform the work.
 - b) If the remote session is not allowed, the Owner's representative will explain that operational conditions will not allow the session to occur and seek to reschedule.
 - 8) The Vendor will advise the Owner's representative when the work is completed and if the issue is corrected and ready to test the fix or if the problem is not resolved or any other issues with the system.
 - 9) The Vendor and Operations will test the fix if possible.
 - 10) The session will be summarily be terminated without warning if any of the following occur:
 - a) The Vendor does not remain in communication with the Owner's representative.
 - b) System operation becomes erratic or changes without any prior notification from Vendor.
 - c) The allotted time for remote access passes and Owner's representative cannot be contacted.
 - 11) Once the session has ended, the Owner's representative will physically (or logically) disconnect the access to the system.
 - 12) If there are issues or unexpected situations, the Vendor shall report these issues with complete candor to the Owner immediately and without reservation.
- d. The Owner will provide written access permissions and conditions that must be followed, or the remote access will be denied, and further actions may occur, if the request is approved.

3.2 CONTRACTOR ACCESS TO CLIENT NETWORK WHILE ON-SITE

- A. Contractor laptops utilized for programming and startup of programmable devices will not be allowed to connect to Owner's programmable device network.
- B. Owner cybersecurity requirements do not allow for contractor laptops to be connected to networks or devices at any time, coordinate with owner to request use of owner provided laptop at least 4 weeks prior to site activities.

3.3 CLOSEOUT ACTIVITIES:

- A. Update firmware of programmable devices to Supplier's current version at time of Substantial Completion.
- B. Usernames and Passwords:
 1. Change Supplier's default usernames and passwords in coordination with requirements of Owner's or facility manager's (as applicable) personnel, reference submittals section for password submission requirements.
 2. Remove each username and password established or used by Contractor, Subcontractor, or Supplier prior to Substantial Completion of equipment or system.
- C. Programmable Operator Interface Terminals (OIT) and Other Graphical Interface Terminals:

1. For equipment that supports multiple levels of security, configure the following security levels:
 - a. View.
 - b. Operate.
 - c. Supervisor.
 - d. Administrator.
2. For equipment that supports only view/operate levels of security, provide password protection and furnish directly to Owner or facility manager (as applicable) passwords necessary to operate functions.
3. Coordinate directly with Owner and facility manager passwords and furnish password turn-over Submittal required in this Section's "Submittals" Article.

END OF SECTION

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DIVISION 02

EXISTING CONDITIONS



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SECTION 02 41 00

DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General provisions applicable to all demolition and removals.
2. Civil/site demolition and removals.
3. Architectural and structural demolition and removals.
4. Mechanical demolition and removals
5. Electrical demolition and removals.
6. Disposal of demolition debris, materials, and equipment.

B. Scope:

1. Contractor shall provide all labor, materials, equipment, tools, and incidentals as shown, specified and required for demolition, removals, and disposal Work.
2. The Work under this Specifications section includes, but is not necessarily limited to:
 - a. Demolition and removal of existing materials and equipment as shown or indicated in the Contract Documents. The Work includes demolition of structural concrete, foundations, walls, doors, windows, structural steel, metals, roofs, masonry, attachments, appurtenances, piping, electrical and mechanical systems and equipment, pavement, curbs, sidewalks, gutters, fencing, and similar existing materials, equipment, and items.
 - b. Demolition and removal of all above-grade piping and facilities and Underground Facilities underneath, building(s) and structures shown or indicated for demolition, unless the Underground Facilities or above-grade facilities are shown or indicated as to remain.
 - c. Remove from slabs, foundations, walls, and footings that are to be demolished all utilities and appurtenances embedded in such construction.
3. Demolitions and removals indicated in other Specifications sections shall comply with requirements of this Specifications section.
4. Perform demolition Work within areas shown or indicated.
5. Pay all costs associated with transporting and, as applicable, disposing of materials and equipment resulting from demolition and removals Work.
 - a. Contractor shall dispose of all demolished materials and equipment except as otherwise indicated in Drawings or as directed by Owner.

C. Related Requirements:

1. Section 31 10 00 - Site Clearing.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. National Fire Protection Association (NFPA):
 - a. 241, Safeguarding Construction, Alteration, and Demolition Operations.

B. Regulatory Requirements:

1. Demolition, removals, and disposal Work shall be in accordance with 29 CFR 1926.850 through 29 CFR 1926.860 (Subpart T – Demolition), and all other Laws and Regulations.
2. Comply with requirements of authorities having jurisdiction.

C. Qualifications:

1. Electrical Removals: Entity and personnel performing electrical removals shall be electrician(s) legally qualified to perform electrical construction and electrical work in the jurisdiction where the Site is located.
2. Plumbing Removals: Entity and personnel performing plumbing removals shall be plumber(s) legally qualified to perform plumbing construction and plumbing work in the jurisdiction where the Site is located.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Comply with Section 01 14 16 - Coordination with Owner's Operations.
2. Review procedures under this and other Specifications sections and coordinate the Work that will be performed with or before demolition and removals.

1.4 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Procedure Submittals:
 - a. Demolition and Removal Plan: Not less than ten days prior to starting demolition Work, submit acceptable plan for demolition and removal Work, including:
 - 1) Plan for coordinating shut-offs, capping, temporary services, and continuing utility services.
 - 2) Other proposed procedures as applicable.
 - 3) Equipment proposed for use in demolition operations.
 - 4) Recycling/disposal facility(ies) proposed, including facility owner, facility name, location, and processes. Include copy of appropriate permits and licenses, and compliance status.
 - 5) Planned demolition operating sequences.
 - 6) Detailed schedule of demolition Work in accordance with the Schedule accepted by Engineer.
2. Notification of Intended Demolition Start: Submit in accordance with Paragraph 3.1.A of this Specifications Section.
3. Field Quality Control Test Results:
 - a. Results of megger-testing of existing motors to remain Owner's property.
4. Qualifications Statements:
 - a. Name and qualifications of entity performing electrical removals, including copy of licenses required by authorities having jurisdiction.
 - b. Name and qualifications of entity performing plumbing removals,

1.5 SITE CONDITIONS

- #### **A. Owner makes no representation of condition or structural integrity of area(s) to be demolished or where removals are required by the Contract Documents.**

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

A. Notification:

1. Not less than 48 hours prior to commencing demolition or removal, advise Engineer in writing of planned start of demolition Work. Do not start removals without permission of Engineer.
2. Where demolition or removals has potential to affect adjacent properties, occupants, streets, or other public thoroughfare, transportation facilities, and utilities, furnish required

notices to owners and occupants of properties, buildings, and structures that may be affected by the demolition or removal.

3. In accordance with Laws and Regulations, furnish to authorities having jurisdiction, including emergency services as necessary, appropriate notices of planned demolition and removals.
4. Submit to Engineer copies of notices furnished to adjacent property owners, occupants, and authorities having jurisdiction.

B. Protection of Adjacent Areas and Facilities:

1. Perform demolition and removal Work in manner that prevents damage and injury to property, structures, occupants, the public, and facilities. Do not interfere with use of, and free and safe access to and from, structures and properties unless allowed by the Contract Documents otherwise allowed in writing by Owner.
2. Closing or obstructing of roads, drives, sidewalks, and passageways adjacent to the Work is not allowed unless indicated otherwise in the Contract Documents. Conduct the Work with minimum interference to vehicular and pedestrian traffic.
3. Provide temporary partitions between demolition work areas and (a) areas that will be occupied during demolition and removals, and (b) areas accessible to the public or visitors. Temporary partitions shall be sturdy, braced plywood in good condition, of dimensions sufficient to adequately screen demolition work from view of occupants, public, and visitors. Maintain temporary partitions in place until demolition and removals work in the subject area is complete or until other Work requires removal of temporary partitions.
4. Provide appropriate temporary barriers, lighting, sidewalk sheds, and other necessary protection.
5. Repair damage to facilities that are to remain which such damages results from Contractor's operations.

C. Existing Utilities: In addition to requirements of the General Conditions, Supplementary Conditions, and Division 01 Specifications, perform the following:

1. Should unforeseen, unknown, or incorrectly shown or indicated Underground Facilities be encountered, Contractor responsibilities shall be in accordance with the General Conditions as may be modified by the Supplementary Conditions. Cooperate with utility owners in keeping adjacent services and facilities in operation.
2. Sanitary Sewerage: Before proceeding with demolition, locate and cap all sewer lines and service laterals discharging from the building or structure being demolished.
3. Storm Water Sewerage: Existing storm water system shall remain in place until demolition of existing building or structure is complete. Upon completing demolition, cut and cap storm sewerage at locations shown on the Drawings. Remove existing storm water piping and related structures between points of cutting, and backfill, restore to grade, and stabilize the area over the removed facilities in accordance with the Contract Documents.
4. Water Piping and Related Facilities: Before proceeding with demolition, locate and cap all potable and non-potable waterlines and service laterals serving the building or structure being demolished. Ensure compliance with Laws and Regulations regarding water quality.
5. Other Utilities: Before proceeding with demolition, locate and cap as required all other utilities, such as fuel and gas; compressed air; heating, ventilating, and air conditioning; electric; and communications; and service laterals serving the building or structure being demolished.
6. Shutdown of utility services shall be coordinated by Contractor, assisted by Owner as required relative to contacting utility owners.

D. Remediation:

1. If unanticipated Hazardous Environmental Condition is believed to be encountered during demolition and removals, comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.

3.2 DEMOLITION - GENERAL

- A. Locate construction equipment used for demolition Work and remove demolished materials and equipment to avoid imposing excessive loading on supporting and adjacent walls, floors, framing, facilities, and Underground Facilities.
- B. Pollution Controls:
 - 1. Use water sprinkling, temporary enclosures, and other suitable methods to limit emissions of dust and dirt to lowest practical level. Comply with Section 01 57 05 - Temporary Controls, and Laws and Regulations.
 - 2. Do not use water when water may create hazardous or objectionable conditions such as icing, flooding, or pollution.
 - 3. Clean adjacent structures, facilities, properties, and improvements of dust, dirt, and debris caused by demolition Work, in accordance with the General Conditions and Section 01 74 00 - Cleaning.
- C. Explosives:
 - 1. Explosives are not allowed at the Site. Do not use explosives for demolition and removal Work.
- D. Comply with Section 01 73 29 - Cutting and Patching and NFPA 241.
- E. Building or Structure Demolition and Removals:
 - 1. Unless otherwise approved by Engineer, proceed with demolition from top of building or structure to the ground. Complete demolition Work above each floor or tier before disturbing supporting members of lower levels.
 - 2. Demolish concrete and masonry in small sections.
 - 3. Remove structural framing members and lower to ground using hoists, cranes, or other suitable methods. Do not throw or drop to the ground.
 - 4. Break up and remove foundations, mats, and slabs-on-grade unless otherwise shown or indicated as remaining in place.
 - 5. Temporary Bracing and Supports:
 - a. Provide temporary bracing and supports sufficient to maintain safety, stability, and resist all loads to which the structure may be subject during demolition and removals, until entirety is permanently removed or permanently stabilized.
 - b. Temporary bracing and supports shall be sufficient for associated dead load, live load, transient loading, and dynamic loads such as wind, seismic, and other loads to which the temporary bracing or support may be subject.
 - c. Where appropriate, retain a professional structural engineer, duly licensed and registered in the same jurisdiction as the Site, to design temporary bracing and supports.
- F. Salvage and Ownership:
 - 1. Materials and equipment to remain Owner's property shall be:
 - a. Carefully removed and appropriately handled by Contractor to avoid damage and invalidation of warranties in effect. Brace motors attached to flexible mountings until reinstallation or delivery to Owner's storage location. Fully remedy to pre-construction condition or replace items damaged during removal or handling by Contractor.
 - b. Removed as functional units, together with all appurtenances required for operation.
 - c. Cleaned, listed, and tagged for storage.
 - d. Protected from damage.
 - e. Delivered to designated storage location at the Site or other site indicated in the Contract Documents, at place designated by Engineer or Owner.
 - 2. Items to be and delivered to Owner are as indicated in Table 02 41 00-A.

Table 02 41 00-A – Items to be Salvaged

Equipment Name/ Designation	Equipment Location	Deliver to Owner's Location
Demolished Cable/Wiring	All work areas	Administration Building
Existing Headworks Natural Gas Meter	Grit Chamber Area	Administration Building
Grit Air Lift Blower & Control Panel	Underneath Grit Chamber Area Staircase	Filter/UV Building

3. Preparation of Owner's existing equipment for storage:

- a. Where appropriate, identify each component with markings or tags to indicate its position in the assembly and the assembly of which it is part.
- b. Place small parts in appropriate, durable boxes and clearly mark contents on the outside of box or container.
- c. Remove oil from oil-lubricated bearings and gear boxes and replace with storage oil.
- d. Grease grease-lubricated bearings.
- e. Replace breather plugs with solid plugs.
- f. Megger-test motor windings: Attach report of the test results to the associated motor and submit copy to Engineer.
- g. Attach unit to suitable crate bottom.
- h. Enclose unit in polyethylene film and seal all seams and the film to the base of the unit with tape.
- i. Construct crate of wood slats around top and sides of unit.
- j. Attach permanent instruction tag to outside of crate stating "This unit has been prepared for storage. Replace oil, vent plugs, and lubricant in accordance with manufacturer's instructions before start-up."

- G. Finishing of Surfaces Exposed by Removals: Unless otherwise shown or indicated in the Contract Documents, surfaces of walls, floors, ceilings, and other areas exposed by removals, and that will remain as finished surfaces, shall be repaired and re-finished with materials that match existing adjacent surface, or as otherwise approved by Engineer.

3.3 STRUCTURAL REMOVALS

- A. Remove structures to lines and grades shown or indicated, unless otherwise directed by Engineer. Where limits are not shown or indicated, limits shall be four inches outside item to be installed. Removals beyond limits shown or indicated shall be at Contractor's risk and expense and such excess removals shall be reconstructed to satisfaction of Engineer without additional cost to Owner.
- B. Recycling and Reuse of Demolition Materials:
 1. All concrete, brick, tile, masonry, roofing materials, reinforcing steel, structural metals, miscellaneous metals, plaster, wire mesh, and other items contained in or upon building or structure to be demolished shall be removed, transported, and disposed of away from the Site, unless otherwise approved by Engineer.
 2. Do not use demolished materials as fill or backfill adjacent to structures, in pipeline trenches, or as subbase under structures or pavement.
- C. After removing concrete and masonry walls or portions thereof, mats, slabs, and similar construction that ties in to the Work or to existing construction, neatly repair the junction point to leave exposed only finished edges and finished surfaces.
- D. Where parts of existing structures are to remain in service following demolition, remove the portions shown or indicated for removal, repair damage, and leave the building or structure in proper condition for the intended use.

1. Remove concrete and masonry to the lines shown or indicated by sawing, drilling, chipping, and other suitable methods. Leave the resulting surfaces true and even, with sharp, straight corners that will result in neat joints with new construction and be satisfactory for the purpose intended.
 2. Do not damage reinforcing bars beyond the area of concrete and masonry removal. Do not saw-cut beyond the area to be removed.
 3. Reinforcing bars that are exposed at surfaces of removed concrete and masonry that will not be covered with new concrete or masonry shall be removed to 1.5 inches below the final surface. Repair the resulting hole, with repair mortar for concrete and grout for masonry, to be flush with the surface.
 4. Where existing reinforcing bars are shown or indicated to extend into new construction, remove existing concrete so that reinforcing bars are clean and undamaged.
- E. Removal of Anchorages and Protruding Metals:
1. Where equipment or material anchored to concrete or masonry are removed and anchors are not to be re-used, and where existing metals (and to be removed) protrude from concrete, remove the anchors and other metal to not less than 1.5 inches beneath surface of concrete or masonry member. Repair the resulting hole, using repair mortar for concrete and grout for masonry, to be flush with the surface.
 2. Alternately, when the anchor is stainless steel, the anchor may be cut flush with the surface of the concrete or masonry, when so approved by Engineer.
- F. Jambs, sills and heads of windows, passageways, doors, or other openings (as applicable) cut-in to the Work or to existing construction shall be dressed with masonry, concrete, or metal to provide smooth, finished appearance.
- G. Where anchoring materials, including bolts, nuts, hangers, welds, and reinforcing steel, are required to attach the Work to existing construction, provide such materials under this Specifications section, unless specified elsewhere in the Contract Documents.

3.4 MECHANICAL REMOVALS

- A. Mechanical demolition and removal Work includes dismantling and removing existing:
1. Piping systems and ductwork systems.
 2. Mechanical equipment and appurtenances.
 3. Mechanical elements of instrumentation and control systems, such as sensors and transmitters and similar items.
 4. Mechanical removals include cutting and capping as required, except that cutting of existing piping and ductwork to make connections is included under Section 01 73 29 - Cutting and Patching; Specifications sections in which requirements for coordination with Owner's operations are indicated; and applicable Specifications of Division 22 - Plumbing, Division 23 - Heating, Ventilating, and Air Conditioning, Division 40 - Process Interconnections, and others as applicable.
 5. Mechanical removals as required herein apply to systems exposed to view, hidden from view, and Underground Facilities. Mechanical removals may require work in spaces that may be classified confined spaces.
- B. Life-Safety Systems:
1. Retain existing life-safety systems, including but not limited to fire suppression systems, in place for as long as possible prior to performing associated demolition and removals.
 2. Where demolishing buildings or structures equipped with life-safety systems, remove or deactivate life-safety systems only in the area where active demolition operations are in progress.
- C. Demolition and Removals of Piping, Ductwork, and Similar Items:
1. Scope:

- a. Safety purge piping and tanks (as applicable) of chemicals, fuel, solids, liquids, and gases (as applicable) and make safe for removal and capping. Discharge contents of existing piping appropriately while avoiding damaging property; restricting access to or use of property; and cresting unsafe, unsanitary, nuisances, and noisome conditions.
 - b. To the extent shown or indicated, remove existing piping conveying water (potable and non-potable), waste and vent, fuel (liquids and gases), heating fluids (such as water-glycol solutions), chemicals, solids and slurries, sludge, wastewater, other fluids, and processes gases, and other piping.
 - c. Remove piping to the nearest structurally sound (or "solid") piping support, and provide caps on ends of remaining piping.
 - d. Where piping to be demolished passes through existing walls to remain, cut off and cap pipe on each side of the wall.
2. Caps, Closures, Blind Flanges, and Plugs – General (All Piping and Ducts):
 - a. Provide closure pieces, such as blind flanges and caps, where shown or required to complete the Work.
 - b. Where used in this Specifications section, the term "cap" means the appropriate type closure for the piping or ductwork being closed, including caps, blind flanges, and other closures.
 - c. Caps shall be compatible with the piping or ductwork on which the cap is installed, fluid-tight and gastight, and appropriate for the fluid or gas conveyed in the pipe or duct.
 - d. Unless otherwise shown or indicated, caps shall be mechanically fastened, fused, or welded to pipe or duct. Plug piping with means other than specified in this Specifications section only when expressly so shown or indicated in the Contractor Documents or when allowed by Engineer.
 3. Underground Facilities:
 - a. When Underground Facilities are altered or removed, properly cut and cap piping left in place, unless otherwise shown or indicated.
 4. Waste and Vent Piping; Ductwork:
 - a. Remove waste and vent piping, and ductwork to extent shown and cap as required.
 - b. Where demolished vent piping, stacks, and ductwork passes through existing roofing, patch the roof with the same or similar materials as existing, and fully compatible with existing materials. Completed patch shall be watertight and comply with roofing manufacturer's recommendations.
 5. Potable Water Piping; Plumbing; Fire Suppression Piping and Systems; Heating Piping:
 - a. Modifications to potable water piping, fire suppression systems, other plumbing piping, and heating system piping shall comply with Laws and Regulations.
 - b. All portions of potable water systems that have been modified or opened shall be hydrostatically tested and disinfected in accordance with the Contract Documents, and Laws and Regulations. Hydrostatically test other, normally-pressurized, plumbing and fire suppression piping and heating piping systems.
- D. Equipment Demolition and Removals:
1. To the extent shown or indicated and as required for the Work, remove existing mechanical equipment, including (but not limited to):
 - a. Facility equipment, such as food service equipment, laundry equipment, dumbwaiters, and similar facility items.
 - b. Conveying equipment such as elevators, escalators, and similar general-use conveying systems.
 - c. Fire suppression and plumbing equipment.
 - d. Heating, ventilating, and air conditioning equipment.
 - e. Standby power generators.
 - f. Security systems equipment.

- g. Transportation-related equipment.
 - h. Flow control gates and valves.
 - i. Hoisting equipment.
 - j. Bulk materials conveying equipment.
 - k. Process heating and cooling equipment.
 - l. Blowers, compressors, air filters, air dryers, and similar equipment.
 - m. Pumps.
 - n. Tanks.
 - o. Process equipment, including purification equipment, pollution control and solid waste equipment, and treatment process equipment.
 - p. Turbines.
 - q. Appurtenances (including motors, drive systems, controls, cooling water and seal water systems) as shown, indicated, and required for completion of the Work.
2. Where required, disassemble equipment to avoid imposing excessive loading on supporting walls, floors, framing, facilities, and Underground Facilities. Disassemble equipment as required for access through and egress from building or structure. Disassembly and removal shall comply with Laws and Regulations. Provide required means to remove equipment from building or structure.
 3. Remove control panels, operator stations, and instruments associated with equipment being removed, unless shown or indicated otherwise.
 4. Tanks and Equipment Containing Process Material:
 - a. Purge contents in accordance with Paragraph 3.5.A of this Specifications Section and other requirements of the Contract Documents, as applicable.
 - b. When removing generators, remove associated fuel storage tanks unless otherwise indicated to remain.
 - c. Where contents of tank or equipment item may pose a potential hazard, such as hydrocarbon fuels or chemicals, properly dispose of contents in accordance with Laws and Regulations and the Contract Documents.
 - d. Where tank or equipment contains wastewater or liquid sludge, and the Site is a wastewater treatment facility, transport and dispose of stored contents onsite at location acceptable to Owner and facility manager (if other than Owner) unless otherwise indicated in the Contract Documents. If Site is other than a wastewater treatment facility, dispose of contents appropriately in accordance with Laws and Regulations.
 - e. Where tank or equipment contains solid or slurry-type material, remove, handle, and transport the contents and appropriately dispose of the materials offsite in accordance with Laws and Regulations, unless otherwise indicated in the Contract Documents.
 5. Remove equipment supports as applicable, anchorages, base, grout, and piping. Remove anchorage systems in accordance with the "Structural Removals" Article in this Specifications section.
 6. Remove small-diameter piping back to header unless otherwise indicated.
 7. Remove access platforms, ladders, and stairs related to equipment being removed, unless otherwise shown or indicated.
 8. Instrumentation and Control Systems Removal:
 - a. Remove instrumentation and controls equipment in accordance with this Specifications section's requirements for mechanical removals and electrical removals.
 9. Reuse and Sale of Removed Equipment:
 - a. Entities indicated below may be interested in acquiring removed equipment:
 - 1) D.H. Griffin Companies Used Equipment Sales division, Greensboro, North Carolina.
 - 2) EcReCon, Inc., Penn's Grove, New Jersey.
 - 3) Federal Equipment Company, Cleveland, Ohio.

- 4) Phoenix Equipment Corporation, Red Bank, New Jersey.
- b. Comply with this Specifications section's "Disposal of Demolition Debris" Article for restrictions on sales of removed items.

3.5 ELECTRICAL REMOVALS

- A. Electrical demolition Work includes removing existing:
 1. Disconnecting cabling from motors, electrical sources, control panels, control stations, instrumentation and control items, and similar devices and equipment.
 2. Conduits, raceways, cable trays, hangers and supports, cabling, and related items.
 3. Switches, panelboards, control stations, and similar items.
 4. Transformers, distribution switchboards, control panels, motors, starters, variable speed controllers, and similar items.
 5. Lighting fixtures and related items.
 6. Utility poles, site lighting standards, and overhead cabling.
 7. Appurtenances and miscellaneous electrical equipment, as shown, specified, or required.
- B. Electrical Removals – General:
 1. Comply with Laws and Regulations, including the National Electric Code.
 2. Lock Out and Tagging:
 - a. Contractor shall lock out and tag circuit breakers and switches operated by Owner and shall verify that affected cabling are de-energized to ground potential before commencing electrical removals Work.
 - b. Upon completion of electrical removals Work, remove the locks and tags and promptly advise Resident Project Representative (RPR) or Engineer and Owner that existing facilities are available for use.
 3. Remove existing electrical equipment, fixtures, and systems to avoid damaging systems to remain, to keep existing systems in operation, and to maintain integrity of grounding systems.
 4. Disconnect and remove motors, control panels, and other electrical gear where shown or indicated.
 5. Store removed motors, microprocessors and electronics, and other electrical gear to be reused in accordance with its manufacturer's recommendations and requirements of the Contract Documents.
- C. Motor Control Centers and Switchgear:
 1. Remove or modify motor control centers and switchgear as shown or indicated.
 2. Modified openings shall be cut square and dressed smooth to dimensions required for installation of equipment.
- D. Removal of Cabling, Conduits, Raceways and Similar Items:
 1. Verify the function of each cable before disconnecting and removing.
 2. Remove cabling, conduits, hangers and supports, and similar items back to the power source or control panel, unless otherwise shown or indicated.
 3. Remove cabling, conduits, and similar items where shown or indicated for removal. Abandoned conduits concealed in floor, ceiling slabs, or in walls shall be cut flush with the slab or wall (as applicable) at point of entrance, suitably capped, and the area repaired in a flush, smooth manner acceptable to Engineer.
 4. Disassemble and remove exposed conduits, junction boxes, other electrical appurtenances, and their supports.
 5. Repair all areas of the Work to prevent rusting on exposed surfaces.
 6. Underground Electric:

- a. Conduits in Underground Facilities not scheduled for reuse shall be suitably capped watertight where each enters building or structure to remain.
 - b. Where shown or indicated, remove direct-burial cabling. Openings in buildings for entrance of direct-burial cabling shall be patched with repair mortar or other material approved by Engineer for such purpose, and made watertight.
- E. Electrical Service Entrances and Outdoor, Overhead Electrical Utilities:
 - 1. Existing poles and overhead cabling shall be removed or abandoned as shown and specified.
 - 2. Completely remove from the Site poles not owned by electric utility, including site lighting standards and appurtenances, shown or indicated for removal.
 - 3. Existing substation(s) and poles owned by electric utility will be removed by the electric utility.
 - 4. Make necessary arrangements with electric utility owner for removal of utility owner's transformers and metering equipment after new electrical system has been installed and energized.
- F. Lighting fixtures, wall switches, receptacles, starters, and other miscellaneous electrical equipment, not designated as remaining as Owner's property, shall be removed and properly disposed off-Site as required in accordance with Laws and Regulations.

3.6 DEMOLITION OF SITE IMPROVEMENTS

- A. Pavement, Sidewalks, Curbs, and Gutters:
 - 1. Demolition of asphalt or concrete pavement, sidewalks, curbs, and gutters, as applicable, shall terminate at cut edges. Edges shall be linear and have a vertical cut face.
 - 2. To cut pavement, sidewalks, curbs, and gutters, use machinery or tools that provides a smooth-cut edge, appropriate for the required. Where cut edges are not smooth, repair the cut edge to remain to provide a smooth, even appearance.
- B. Fencing, Guardrails, and Bollards:
 - 1. Remove to the limits shown or indicated on the Drawings.
 - 2. Completely remove below-grade posts and concrete.
- C. Manholes, Vaults, Chambers, and Handholes:
 - 1. Remove to the limits shown or indicated on the Drawings.
 - 2. If not shown or indicated on the Drawings, remove to not less than three feet below finished grade indicated on the Drawings.
- D. Underground Facilities Other than Manholes, Vaults, Chambers, and Handholes:
 - 1. Remove to the extent shown or indicated on the Drawings.
 - 2. Unless otherwise shown or indicated, cap ends of piping to remain in place in accordance with the "Mechanical Removals" Article in this Specifications section.
- E. Landscaping: Comply with Section 31 10 00 - Site Clearing.
- F. Other Site Improvements: When the Contract Documents require removal of other site improvements not addressed above, copy with Contract requirements for removal of buildings or structures.

3.7 DISPOSAL OF DEMOLITION DEBRIS

- A. Disposal – General:
 - 1. Promptly remove from the Site all debris, waste, rubbish, material, and equipment resulting from demolition and removal operations. Promptly upon completion of demolition and removal operations, remove from the Site construction equipment used in demolition Work.

2. Do not sell at the Site demolition materials or removed equipment. If materials, equipment or debris will be sold by Contractor, remove the items from the Site and perform the sale or transaction elsewhere, in accordance with Laws and Regulations.
 3. Cleaning and Removal of Debris: Comply with the General Conditions, Supplementary Conditions, and Section 01 74 00 - Cleaning.
- B. Transportation and Disposal:
1. Non-Hazardous Materials, Equipment, and Debris: Properly transport and dispose of non-hazardous demolition materials, equipment, and debris at appropriate landfill or other suitable location, in accordance with Laws and Regulations. Non-hazardous material does not contain Constituents of Concern such as (but not limited to) asbestos, PCBs, petroleum, hazardous waste, radioactive material, or other material designated as hazardous in Laws or Regulations.
 2. Hazardous Materials, Equipment, and Debris: When handling and disposal of items containing Constituents of Concern is included in the Work, properly transport and dispose of such items in accordance with the Contract Documents and Laws and Regulations.
- C. Submit to Engineer information required in this Specification Section on proposed facility(ies) where demolition materials, equipment, and debris will be recycled. Upon request, Engineer or Owner, shall be allowed to visit recycling facility(ies) to verify adequacy and compliance status. During such visits, recycling facility operator shall cooperate and assist Engineer and Owner.

END OF SECTION

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DIVISION 03

CONCRETE



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SECTION 03 01 30
REPAIR AND REHABILITATION OF EXISTING CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparation and assessment of existing concrete for repair and rehabilitation:
 - a. Concrete removal for repairs.
 - b. Preparation of exposed reinforcing steel.
 - c. Preparation for joint sealant installation.
2. Repair of damaged (and deteriorated) concrete.
 - a. Application of repair mortar.
 - b. Repair of exposed items embedded in concrete.
3. Expansion joint repair.

B. Scope:

1. Contractor shall provide all materials, equipment, labor, tools, services, and incidentals necessary to repair and rehabilitate existing concrete, whether damaged or deteriorated, at locations shown on the Drawings or at locations indicated by Engineer, in accordance with the Contract Documents.
2. Re-sealing concrete joints as shown on the Drawings, and at other locations directed by Engineer, and indicated in this Section.
 - a. Included in the unit price(s) for joint sealant Work are repairs of existing concrete adjacent to the associated joint sealant Work, in accordance with this Section.
3. Surface repairs of new concrete Work are addressed in Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.

C. Related Requirements: Include but are not necessarily limited to:

1. Section 03 15 19 - Anchorage to Concrete.
2. Section 03 21 00 - Reinforcement.
3. Section 07 92 00 - Joint Sealants.

1.2 PRICE AND PAYMENT PROCEDURES

A. Unit Prices:

1. The Work of this Section is Unit Price Work unless otherwise shown or indicated. Work covered by this Section but not eligible for payment under Unit Price Work bid/pay items shall be performed at Contractor's expense.
2. Bid/pay item classifications of Unit Price Work addressed in this Section are indicated in the Bid Form, the Agreement (or an exhibit thereto), and Section 01 22 00 - Measurement and Payment.
3. Unit Price Work of this Section is classified as follows:
 - a. Concrete Surface Repair - Type I (Thin): Repair of spalled, delaminated, or deteriorated concrete up to 1.5 inches deep below concrete's original surface.
 - b. Concrete Surface Repair - Type II (Moderate): Repair of spalled, delaminated, or deteriorated concrete greater than 1.5 inches deep to 3 inches below original concrete surface.
 - c. Concrete Surface Repair - Type III (Severe): Repair of spalled, delaminated, or deteriorated concrete greater than 3 inches below original concrete surface.

- d. Expansion Joint Repair - Type A: Replacement of existing expansion joint material including removing existing backer rod, joint filler, and sealant and providing new materials and repair, in accordance with this Section. Expansion joint repair not designated in the Contract Documents as other types is Type A unless directed otherwise by Engineer.
- e. Expansion Joint Repair - Type B: Provide where shown or indicated on the Drawings or where directed by Engineer. Includes sealing existing expansion joints by providing new epoxy resin adhesive sealant system over existing expansion joints.
- f. Expansion Joint Repair - Type C: Provide where shown or indicated on the Drawings or where directed by Engineer. Includes sealing existing expansion joints by providing new polyurethane joint sealing system over existing expansion joints.

B. Measurement:

- 1. Criteria for measurement for payment of this Section's Unit Price Work are in the General Conditions (as may be modified by the Supplementary Conditions), Section 01 22 00 - Measurement and Payment, and this Section.
- 2. Quantities of this Section's Unit Price Work:
 - a. Unit Price Work of this Section shall be measured for payment prior to commencement of the associated Work in each work area.
 - b. Work not measured in advance for payment will not be eligible for payment by Owner.
 - c. Owner's Engineer will observe the associated concrete repair and rehabilitation Work performed. Such Work shall be in accordance with the Contract Documents for to such Work to be eligible for payment by Owner, even when such Work was measured (for payment) in advance.
- 3. Repair of new concrete Work provided by Contractor is not eligible for payment under the Unit Price Work bid/pay items covered by this Section. Such repairs are included in the Work of the associated bid/pay item under which the subject new concrete Work was provided.

1.3 REFERENCES

A. Terminology:

- 1. This provision indicates terminology used in this Section and in other Contract Documents that coordinate with this Section. Such terminology may or may not be indicated using initial capital letters and, when used in relation to the Work of this Section, have the meanings indicated below.
- 2. "Existing concrete damage" means damage to existing concrete surfaces deeper than 1/8 inches, such as:
 - a. Concrete corrosion.
 - b. Corroded items embedded within concrete or through the concrete surface.
 - c. Spalls.
- 3. "Installer" means the entity installing or applying repair materials at the Site. The terms "installer" and "applicator" have the same meaning. Installer or applicator may be Contractor or Subcontractor.
- 4. "MPII" means, "manufacturer's printed installation instructions".
- 5. "Rehabilitation" means repairing and restoring concrete to structurally-sound, durable condition suitable for the structure's intended purpose as determined by Engineer, including repair of existing concrete damage in accordance with this Section and other applicable provisions of the Contract Documents.
- 6. "Water-bearing structure" means concrete structure with a surface that is normally, or may be, in contact with water or process fluids or slurries during typical operation of the completed Project, including, but not limited to: tanks, channels, wet wells, distribution chambers, dams, and the like. Also, where specifically indicated on the Drawings, "water-

bearing structures” includes basements and structures extending below the ordinary, wet-season groundwater surface.

7. Other terminology used in this Section is consistent with terminology of ACI CT.

B. Reference Standards:

1. American Concrete Institute (ACI):
 - a. CT, Concrete Terminology.
 - b. 117, Specification for Tolerances for Concrete Construction and Materials.
 - c. 308, Standard Practice for Curing Concrete.
2. ASTM International (ASTM):
 - a. C150, Standard Specification for Portland Cement.
 - b. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - c. C881, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - d. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
 - e. D1682, Breaking Load and Elongation of Textile Fabric.
 - f. D1876, Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
 - g. D4060, Abrasion Resistance of Organic Coatings by the Taber Abraser.
 - h. D4258, Standard Practice for Surface Cleaning Concrete for Coating.
 - i. D4259, Standard Practice for Abrading Concrete.
 - j. D4263, Indicating Moisture in Concrete by the Plastic Sheet Method.
 - k. D7234, Standard Test Method for Pull-off Adhesion Strength of Coatings on Concrete Using Portable Pull-off Adhesion Tests.
3. International Concrete Repair Institute (ICRI).
 - a. 310.1R, Guide for Surface Preparation.
 - b. 310.1R, Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Steel Corrosion.
4. Society for Protective Coatings/NACE International (SSPC/NACE):
 - a. SP 13/NACE No. 6, Surface Preparation of Concrete.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
 - a. Installer of materials for rehabilitation of existing concrete shall possess not less than five years of relevant experience performing concrete rehabilitation of similar type, scope, and complexity to that required for this Project.
 - b. Certification or Approval by Materials Manufacturer:
 - 1) Installer (as either business entity or individual) of materials associated with rehabilitation of existing concrete shall be certified or expressly approved in writing, by manufacturer of materials to be provided.
 - 2) As an option, installer may be certified or approved, in writing, at the Site during initial Work of this Section, in accordance with this Section's Paragraph 3.4.D.
 - c. Submit documentation of qualifications and experience in sufficient detail to demonstrate to Engineer's satisfaction compliance with requirements of this Section's qualifications requirements.
2. Structural Concrete Repairer:
 - a. This provision is in addition to qualifications requirements applicable to installers of the Work under this Section. This provision applies to business entities physically performing rehabilitation of structural concrete.

- b. Structural concrete repairer shall have not less than five years' current, relevant experience in repairing and rehabilitating concrete structures in facilities of generally similar environmental exposures as the Work of this Section for this Project
 - c. Submit documentation of qualifications and experience in sufficient detail to demonstrate to Engineer's satisfaction compliance with requirements of this Section's qualifications requirements.
- 3. Joint Sealant System Installer:
 - a. This provision is in addition to qualifications requirements applicable to all installers of the Work of this Section. This provision applies to entities performing concrete joint sealant system repair or rehabilitation Work.
 - b. Entity performing joint sealant system Work shall possess not less than 10 years' relevant experience in waterproofing concrete joints, crack and leak repair, and concrete coating application on projects of similar size, complexity, and environment as the concrete joint sealing Work on this Project.
 - c. Entity performing concrete joint sealant system Work shall have completed not less than five projects of size, type, and complexity similar to the Work under this Section within the most-recent period indicated in the paragraph immediately above, on structures that have been in service for not less than three years each. Projects shall have utilized the required type of joint sealant system materials indicated for the Work.
 - d. Entity performing concrete joint sealant system Work shall be certified or approved, in writing, by joint sealant system manufacturer (whose product is used in the Work) to furnish and install the required concrete joint sealant system materials.
 - e. Submit documentation of qualifications and experience in sufficient detail to demonstrate to Engineer's satisfaction compliance with requirements of this Section's qualifications requirements

B. Mock-Ups:

- 1. Mock-ups are Samples that, when approved by Engineer, indicate minimum standard of quality for the associated Work. Standard of quality of mock-ups shall be not less than that required by the Contract Documents.
- 2. If so approved by Engineer, mock-ups may become part of completed Work.
- 3. Maintain, segregate, identify, and protect mock-ups during performance of the Work to allow Engineer to readily compare the Work with approved mock-up.
- 4. When mock-up is not part of the completed Work, remove mock-ups when directed by Engineer. If mock-up is part of the completed Work, remove protection and indication of mock-up when so directed by Engineer.
- 5. Provide mock-up for each type of concrete rehabilitation required by this Section for which the Contract has an associated bid/pay item, including finish.
- 6. Size of each mock-up shall be acceptable to Engineer. Concrete surface repair mock-ups shall be not less than 2 feet by 2 feet each. Expansion joint repair mock-ups shall be not less than 3 feet long, each.
- 7. Where mock-ups will be part of the completed Work, Contractor and Engineer will jointly select the location of each mock-up.
- 8. Concrete surface repair mock-ups shall include:
 - a. Sample of patched tie or bughole.
 - b. Sample of all jointing specified.
 - c. Sample of mortar repair.
- 9. Expansion joint repair mock-ups shall include:
 - a. Repaired expansion joint.
 - b. Expansion joint seal.
 - c. Rehabilitation of adjacent concrete surfaces.

10. Also provide concrete surface repair mock-up of wall having polymer-modified cementitious coating.
 - a. Mock-up shall be stepped to show surface preparation, repairs and coating in all stages of application.
11. Mock-up areas shall be readily identifiable during construction. Provide appropriate temporary signage indicating status as mock-up and protect the mock-up.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
 - a. Schedule (table) indicating, for each type of concrete rehabilitation Work required by this Section, the material type and product manufacturer proposed for each application.
2. Product Data:
 - b. Manufacturer's published, technical data for each manufactured material proposed for use in the Work of this Section.
 - c. Manufacturer's written certification that proposed materials comply with associated reference standards cited in this Section.
3. Samples:
 - a. Advise Engineer in writing when required mock-ups will be provided and the location proposed for each.
4. Test Procedures:
 - e. Procedure for pre-repair condition survey required in this Section's Article 3.1, including method for recording results of survey.
 - f. Written method of performing pull-off testing of repair material and testing equipment information and accessory materials proposed for use in testing.

B. Informational Submittals: Submit the following:

1. Certifications:
 - a. Laboratory test reports (for previously-tested materials identical to those to be furnished) and material manufacturer's certificates verifying that ingredients comply with the Contract Documents and have a minimum of six months' residual shelf life at the time of shipment to the Site.
 - b. Certification from Supplier stating that material is suitable for the intended use on this Project.
 - c. Certification that materials proposed for use are compatible with each other, when such materials will contact each other, and will not interfere with bonding of future floor or wall finishes.
2. Test and Evaluation Reports:
 - a. Results of pre-rehabilitation condition survey required in this Section's Article 3.1.
3. Manufacturer's Instructions:
 - a. Manufacturer's instructions for all concrete rehabilitation materials, for handling, storing, and installing materials.
4. Field Quality Control Submittals:
 - a. In-situ pull-off test results for joint sealant system.
5. Qualifications Statements:
 - a. Installer: Documentation of qualifications in accordance with this Section's "Quality Assurance" Article.
 - b. Manufacturer's written approval of installer or certification of training performed at the Site in accordance with Paragraph 3.4.D of this Section.
 - 1) Affidavit, signed by either materials manufacturer or by installer's business entity, indicating that manufacturer of rehabilitation materials has instructed installer in

proper handling and installation of each rehabilitation material to be used in the Work.

- c. Entity performing structural concrete repair Work.
- d. Entity performing joint sealant system Work.

C. Closeout Submittals: Submit the following:

- 1. Affidavit of compliance from joint sealant system manufacturer, certifying that sealants were installed at the Site in accordance with manufacturer's written instructions and recommendations.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with material manufacturer's written instructions and recommendations regarding delivery, handling, and storage of materials to be incorporated into the Work.
- B. Storage:
 - 1. Store materials in tightly-sealed, original containers, off the ground and in dry location with humidity controls.
 - 2. Do not store in direct sunlight.
 - 3. Protect materials from temperature extremes and avoid freezing temperatures.

PART 2 - PRODUCTS

- A. Subject to compliance with Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Anti-Corrosion Bonding Agent:
 - a. Sika Corporation.
 - b. Euclid Chemical Company.
 - c. Master Builders Solutions.
 - d. Or equal..
 - 2. Epoxy Bonding Adhesive:
 - a. Sika Corporation.
 - b. Euclid Chemical Company.
 - c. Or equal.
 - 3. Repair Mortar:
 - a. Master Builders Solutions.
 - b. Euclid Chemical Company.
 - c. Five Star Products, Inc.
 - d. Sika Corporation.
 - e. Or equal.

2.2 MATERIALS

- A. Materials that will be in direct contact with potable water or water that will be treated to become potable shall be certified in accordance with ANSI/NSF 61 and suitable for prolonged immersive exposure to chlorinated water with a total residual of up to 5 mg/l.
- B. Bonding Agents:
 - 1. Bonding agents and adhesives shall have pot life that allows proper placement of new material against existing material in accordance with manufacturer's written instructions.
 - 2. For repair of existing concrete damage, when no reinforcing steel is exposed, and where specifically shown or indicated on the Drawings, use epoxy bonding adhesive.
 - 3. For repair of existing concrete damage, when reinforcing steel is exposed, and where specifically shown or indicated on the Drawings, use anti-corrosion bonding agent.

4. For repair of new concrete: Comply with Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
- C. Water:
1. Potable.
 2. Clean and free from deleterious substances.
 3. Free of oils, acids and organic matter.
- D. Reinforcing Steel: In accordance with 03 21 00 - Reinforcement.
- E. Epoxy Patch Seal:
1. For use as seal on patches at repair of existing concrete damage and as otherwise shown or specified in the Contract Documents.
 - a. Sikadur 32 Hi-Mod LPL by Sika Corporation.
 - b. Or equal.
- F. Anti-Corrosion Bonding Agent:
1. Three-component, moisture tolerant, cementitious bonding agent manufactured for purpose of bonding fresh concrete to hardened concrete and providing anti-corrosion coating to embedded reinforcing materials.
 - a. Sika Armatex 110 EpoCem by Sika Corporation.
 - b. Duralprep A.C. by Euclid Chemical Company.
 - c. Or equal.
- G. Epoxy Bonding Adhesive:
1. For use where bonding new concrete or patch material to existing concrete.
 2. Two-component, moisture insensitive adhesive manufactured for purpose of bonding fresh concrete to hardened concrete.
 - a. Sikadur 32 Hi-Mod LPL by Sika Corporation.
 - b. Euco No. 452 MV by Euclid Chemical Company.
 - c. Or equal.
- H. Repair Mortar:
1. Pre-packaged cement-based, modified (polymer or latex) product specifically formulated for repair of concrete surface defects, with the following properties:

Physical Property	Value	ASTM Standard
Compressive strength (minimum)		C109
at one day	2000 psi	
at 28 days	6000 psi	
Bond strength (minimum)		C882 (*)
at 28 days	1800 psi	

(*) Modified for use with repair mortars.

2. Trowelable, selection based on horizontal, vertical, or overhead application.
3. Where the least dimension of the placement, in width or thickness, exceeds 1.5 inches, repair mortar shall be extended by addition of aggregate per MP11.
4. Acceptable Products:
 - a. Five Star Structural Concrete by Five Star Products, Inc.
 - b. SikaRepair SHA, SikaTop 123 Plus, SikaTop 111 Plus by Sika Corporation.
 - c. Verticoat by Euclid Chemical Company.

- d. Emaco S88-CI, Emaco S66-CI by BASF Corporation.
 - e. Or equal.
- I. Epoxy Coating:
- 1. Use as a coating over concrete repairs and at repaired embedded items in concrete where shown or indicated on the Drawings.
 - 2. Pigmented, two-component, 100% solids, moisture-tolerant epoxy resin specifically formulated to serve as a protective, corrosion-resistant coating to all common structural substrates.
 - 3. Acceptable Products:
 - a. Sikagard 62 by Sika Corporation.
 - b. Or equal.
- J. Epoxy Resin Adhesive Sealing System:
- 1. Provide sealing system consisting of the following components:
 - a. Epoxy Resin Adhesive:
 - 1) Two-component, 100% solids, high-strength, non-sag structural epoxy paste adhesive.
 - 2) Color: Gray.
 - 3) Minimum Pot Life: 30 minutes.
 - 4) Acceptable Products:
 - a) Sikadur 31 Hi-Mod Gel .
 - b) Or equal.
 - b. Hypalon Sheeting:
 - 1) Composed of Hypalon rubber with perforations along bonding edges of sheeting to provide mechanical key.
 - a) Shall have the ability to be vulcanized with aromatic hydrocarbon solvent to allow its adhesion to an epoxy resin adhesive.
 - b) Sheet Dimensions: 8 inches wide and 40 mils thick.
 - c) Provided with a removable center expansion strip.
 - c. Activating Solvent:
 - 1) Aromatic hydrocarbon with a specific gravity of 0.86.
 - 2) All sealing system components shall be fully compatible with each other.
 - 3) Acceptable Products:
 - a) Sikadur Combiflex System by Sika Corporation.
 - b) Or equal.
- K. Polyurethane Joint Sealing System:
- 1. Provide high-solids, two-component liquid, cold-applied, asphalt extended urethane elastomer that cures to durable abrasion-resistant film, forming flexible, water-impermeable barrier.
 - 2. Provide all components from a single manufacturer to ensure compatibility of components with each other, except for hydrophobic polyurethane grout material.
 - 3. Concrete Surface Primer: Acceptable products:
 - a. CIM 61BG Epoxy Primer, by CIM Industries.
 - b. Or equal.
 - 4. Tack Coat and Top Coat: Acceptable products:
 - a. CIM 1061, by CIM Industries.
 - b. Or equal.
 - 5. Joint/Crack Filler: Acceptable products:

- a. CIM 1000TG, by CIM Industries.
 - b. CIM 1000TG Cartridges, by CIM Industries.
 - c. Or equal.
- 6. Cant Strip Material: Acceptable products:
 - a. CIM 1000 TG Cartridges, by CIM Industries
 - b. Or equal..
- 7. Reinforcing Fabric (Scrim): Acceptable Products:
 - a. CIM Scrim, by CIM Industries.
 - b. Or equal.
- 8. Bonding Agent (for re-application of CIM 1061 if recoat window exceeded):
 - a. Acceptable products:
 - 1) CIM Bonding Agent, by CIM Industries.
 - 2) Or equal.
 - b. Material:
 - 1) Organo-silane compound dispersed in isopropyl alcohol.
- 9. Hydrophobic Polyurethane Grout: Acceptable products:
 - a. SikaFix HH LV, by Sika Corporation.
 - b. De Neef Hydro Active Flex LV, by GCP Applied Technologies.
 - c. Or equal.
- L. Expansion Joint Sealant and Backer Rod:
 - 1. Provide in accordance with Section 07 92 00 - Joint Sealants.

PART 3 - EXECUTION

3.1 PREPARATION AND ASSESSMENT

- A. As indicated in Article 1.1 of this Section, repair of surface defects in new concrete provided under the Contract and repair of cracks in concrete are addressed in other Specification Sections.
- B. Condition Survey:
 - 1. Contractor and Owner's Site Representative shall jointly perform condition survey of each existing concrete structure included in the scope of the concrete repair Work before scheduling and performing the associated repair Work.
 - 2. Contracting and payment for specialty inspections and tests by third-parties will be by Owner.
 - 3. Prior to Condition Survey:
 - a. Submit to Engineer, and obtain Engineer's acceptance, of procedure for performing condition survey. Indicate proposed date(s) of the condition survey and other procedures for inspecting and documenting extent of concrete repair Work to be performed.
 - b. Prior to the condition survey, power-wash all concrete surfaces within the scope of the concrete repair Work. Power-wash at not less than 4,000 psi using orbital nozzle.
 - 4. Condition survey shall include, but is not necessarily limited to:
 - a. Visual inspection for:
 - 1) Deficiencies in joints.
 - 2) Cracks.
 - 3) Leakage and efflorescence.
 - 4) Scaling.
 - 5) Spalling

- 6) Exposed reinforcing.
 - 7) Previous repairs.
- b. Extent of chemical attack using phenolphthalein.
- c. Delamination survey.
- d. Half-cell measurements for corrosion potential of reinforcing.
- 5. Results of Condition Survey:
 - a. Submit written results of condition survey to Engineer promptly following the condition survey at the Site.
 - b. Condition survey results shall clearly indicate the location, nature, size, length, width, and depth of all deficiencies in existing concrete in the area(s) surveyed.
 - c. Engineer will use results of condition survey to determine extent of repair Work required.
- 6. Engineer's Direction to Contractor:
 - a. After consulting with Owner as necessary, Engineer will transmit to Contractor written direction on extent of concrete repairs required.
 - b. Engineer will issue such direction promptly after Engineer's receipt of acceptable results of condition survey. Allow in the Progress Schedule 14 days for issuance of Engineer's written direction.
 - c. Where such Work would either exceed Contract quantities of associated Unit Price Work or requires Work not in the Contract's bid/pay items, an appropriate Contract modification will be issued.
- C. Concrete Removal:
 - 1. Remove all loose and unsound concrete from areas to be repaired, in accordance with ICRI Guideline 310.1R, as modified by the Contract Documents.
 - 2. Removals:
 - a. At areas of damage or deterioration of existing concrete, saw-cut the perimeter of unsound concrete surface areas, to depth of not less than 1/2 inches.
 - b. Saw-cuts to be perpendicular to or slightly undercutting existing concrete surface. Concrete removal boundaries shall be straight and aligned parallel to opposite boundary edges resulting in repair areas that are approximately rectangular.
 - c. Remove all existing concrete from within the saw-cut repair boundary to of not less than 1/2 inches.
 - d. Feathered edges are unacceptable.
 - 3. Clean surfaces of repair areas in accordance with ASTM D4258 to remove dust, dirt, grease, and other contaminants prior to abrasive blasting, chipping, grinding or wire brushing.
 - 4. Abrasive-blast surfaces in accordance with ASTM D4259 and SSPC SP 13/NACE No. 6 to completely open defects down to sound concrete and remove laitance.
 - 5. Chip concrete substrate to obtain a surface profile of 1/16 inches to 1/8 inches deep with new fractured aggregate surface. The area to be repaired shall not be less than 1/2 inches in depth.
 - 6. Concrete removal shall extend along any exposed existing reinforcing to locations along the bar that are free of bond inhibiting corrosion and where the bar is well-bonded to surrounding concrete.
 - 7. Rinse surface with clean water and allow surface water to evaporate prior to repairing the surface.
- D. Preparing Exposed Steel Reinforcing:
 - 1. Clean and prepare exposed embedded steel reinforcing in accordance with ICRI Guideline 310.1R and the Contract Documents.

2. Where one-half or more of the steel reinforcing diameter is exposed, either by existing conditions or concrete removal, bond between concrete and steel reinforcing is inhibited or lost completely, or corrosion is present, remove concrete to provide not less than 1 inch clearance around the entire perimeter and along the entire exposed length of the steel reinforcing.
 3. If existing, exposed steel reinforcing is cut through, cracked, or cross-sectional area is reduced by more than 20%, provide new steel reinforcing bar the same size as existing steel reinforcing. Lap the new bar with existing in accordance with ACI requirements. Coat all new and existing steel reinforcing with anti-corrosion bonding agent, as specified in this Section. Abrasive-blast exposed reinforcing to remove contaminants and corrosion to provide white-metal, bright steel finish.
- E. Preparation for Joint Sealant System Installation:
1. Provide adequate surface preparation in area of each joint sealant repair, to not less than 6 IN from face of joint, on each side of joint.
 2. Surface preparation shall remove existing concrete laitance, loose material, oil, grease, and shall expose tops of underlying aggregate to an ICRI concrete surface profile of 4-6. The following methods may be used:
 - a. Abrasive-blasting in accordance with ASTM D4259.
 - b. High-pressure water blasting at not less than 5,000 psi, in accordance with ASTM D4259.
 - c. Shot-blasting in accordance with ASTM D4259, at horizontal surfaces only.
 3. Concrete joint areas to receive joint sealant system shall be fully dried prior to application of joint sealant system. Test substrate moisture at not less than three locations per structure to confirm moisture. The following methods may be used to determine moisture:
 - a. Plastic Sheet Method (ASTM D4263): Pass/fail.
 - b. Relative Humidity Test (ASTM F2170): Less than 85%.
 - c. Calcium Chloride Test: Less than 5 pounds per 1000 square feet per 24 hours.
 - d. Radio Frequency Test: Less than 5% moisture.
 4. Perform adhesion tests at not less than three locations per structure in mock-up (non-joint) areas to verify adequacy of the joint surface preparation. Perform modified T-Peel (ASTM D1876) field test:
 - a. Apply duct tape on substrate.
 - b. Apply the coating top coat material to the substrate, fully lapping onto the duct tape.
 - c. After coating material has fully cured, cut 1 inch wide strips through coating material, perpendicular to duct tape strip: a minimum of three pull tests per testing location.
 - d. Peel up the outside edge of duct tape and provide tarp clip.
 - e. Hook a fish weighing or similar scale through the tarp clip and pull perpendicular to the substrate to point of coating adhesion failure and record the load at failure. Scale used for this field measurement shall be calibrated immediately prior to testing.
 - f. Minimum acceptable coating adhesion force at failure shall be 15 pounds; no test performed shall demonstrate adhesion below this threshold for surface preparation to be acceptable.
 5. Inspect concrete surfaces in area of surface preparation and repair as follows:
 - a. Blast/expose all bug-holes to eliminate blind side surfaces.
 - b. Cracks less than 1/16 inches wide that extend through the joint coating areas do not require special treatment.
 - c. Cracks 1/16 inches to 1/8 inches wide that extend through the joint coating areas shall be stripe-coated for not less than 2 inches on each side and filled with CIM (trowel grade) prior to application of the joint sealant system (after moisture content and surface preparation are acceptable in accordance with the Contract Documents)

- d. Cracks greater than 1/8 inches wide and cracks that experience movement (that extend through the joint coating areas) shall be reinforced with scrim material, similar to the joint coating, prior to sealing the joints.
 - e. Cracks greater than 1/4 inches wide: Provide backer rod, in addition to complying with the paragraph immediately above.
 - f. In areas of joint coatings, patch surface spalls and other concrete defects in accordance with requirements for concrete repairs indicated in this Section.
- 6. Inspect existing joint filler material. If defects in existing joint filler material extend greater than 1/2 inches deep, or if determined by sealant installer to be unsatisfactory, remove not less than 1 inch of existing filler material and pack joint with appropriately sized backer rod soaked in polyurethane grout. Trim grout foam/backer rod flush with surface of concrete once cured. Joints to be coated shall be filled according to this provision and trimmed flush prior to application of coating system.
 - 7. Provide and tool 1 inch minimum cant strips at wall-slab and slab-column joints to be coated. Allow cant strips to cure prior to applying coating system.
 - 8. Perform surface preparation, substrate moisture field tests, adhesion test results, treatment of defects in joint coating areas, and filling (as required) of existing joints for approved by coating manufacturer's technical representative prior to installing joint coating system.

3.2 INSTALLATION AND APPLICATION

A. Environmental Conditions for Installation:

- 1. Comply with material manufacturer's written instructions for substrate temperature and moisture content, ambient temperature, and ambient humidity, ventilation, and other conditions affecting performance of concrete repair materials.
- 2. Do not repair existing concrete damage when ambient temperature is or is expected to be below 50 degrees F. If necessary to maintain the progress Schedule, enclose and heat area to between 50 and 70 degrees F during repair of surface defects and curing of patching material. Use only indirect fired heating using clean-burning fuel.
- 3. If proper environmental conditions do not comply with the Contract Documents and manufacturer's instructions, do not perform the Work until such conditions are acceptable. Provide means to bring conditions into compliance by providing temporary environmental controls, enclosures, and other temporary construction and temporary facilities.
- 4. Contractor is not eligible for changes in Contract Times or Contract Price for delays or costs incurred to bring environmental conditions for installation into compliance.

B. Existing Concrete Damage Repair:

- 1. Type I Repair:
 - a. Provide epoxy bonding adhesive and repair mortar.
- 2. Type II Repair:
 - a. Provide epoxy bonding adhesive, if no reinforcing steel is exposed. Use anti-corrosion bonding agent, if reinforcing steel is exposed.
 - b. Prepare exposed reinforcing steel in accordance with Paragraph 3.1.D of this Section.
 - c. Provide repair mortar:
 - 1) Provide 3/8 inches aggregate in accordance with MP11.
- 3. Type III Repair:
 - a. Provide anti-corrosion bonding agent.
 - b. Prepare exposed steel reinforcement per the requirements of Paragraph 3.1.B.
 - c. Provide new adhesive anchor dowels as shown on the Drawings and as indicated in Section 03 15 19 - Anchorage to Concrete.
 - d. Provide repair mortar:
 - 1) Provide 3/8 inches aggregate in accordance with MP11.

C. Repair Mortar Application:

1. Comply with MPII for mixing and placement of repair mortar.
 2. After initial mixing of repair mortar, do not introduce additional water to change consistency. Discard repair mortar if consistency becomes too stiff to place.
 3. Place repair mortar to not less than recommended minimum thickness indicated in the MPII and in no event less than 3/8 inches.
 - a. Apply repair mortar in accordance with the following minimum requirements:
 - 1) Not less than 3/8 inches over existing sound, exposed coarse aggregate.
 - 2) Not less than 2 inches of cover (unless otherwise required) over exposed reinforcing steel.
 4. At horizontal applications, repair mortar shall be screeded and bullfloated to the proper elevation, to ensure all surface moisture will drain freely and properly without puddle areas.
 5. Provide repair mortar in even, uniform plane to restore the concrete member to its original surface finish and plane.
 - a. Tolerance for being out-of-plane shall be such that gap between a 1 foot straight edge and repair mortar surface shall not exceed 1/4 inches, and gap between a 4 feet straight edge and repair mortar surface shall not exceed 3/8 inches. This shall apply to straight edges placed in any orientation at any and all location on the repair mortar surface.
 6. Prevention of Drying:
 - a. Prevent exposed plastic mortar surfaces from drying. Provide windbreaks, foggers, and evaporation retarders, as necessary, during finishing.
 - b. Foggers shall maintain humidity at height of 2 feet to 3 feet above surface of concrete.
 - c. If necessary, apply evaporation retarder between finishing operations.
 7. Repair mortar shall receive steel troweled finish.
- D. Repair of Exposed Embedded Items in Concrete:
1. This provision addresses repair and rehabilitation of corroded metal items embedded in existing concrete and to other locations as expressly shown or indicated on the Drawings. Existing concrete damage by corrosion of embedded metal shall be repaired in accordance with this Section's Paragraph 3.2.B.
 2. Preparation:
 - a. Fully expose extent of metal corrosion within each embedded item by chipping to sound material. Where specifically shown or indicated on the Drawings, completely remove exposed metal item to extent shown or indicated.
 - b. Prepare exposed reinforcing steel attached to or adjacent to embedded, corroded metal items in accordance with this Section's Paragraph 3.1.D.
 - c. If existing concrete has been removed during chipping and repair of metal item, prepare repair area in accordance with this Section's Paragraph 3.1.C.
 - d. Remove corrosion on embedded metal item and corrosion on exposed reinforcing steel by abrasive blasting to a white-metal finish.
 3. Repair:
 - a. Where no existing concrete has been removed or damaged adjacent to embedded metal item:
 - 1) On surface of embedded metal item, provide two coats of epoxy coating in accordance with coating manufacturer's recommendations.
 - a) Color of First Coating: Red.
 - b) Color of Second Coating: Gray.
 - 2) Before applying second coat, allow first coat of epoxy coating to fully cure in accordance with coating manufacturer's recommendations.
 - b. Where areas of existing concrete have been removed or damaged adjacent to embedded metal item:

- 1) Patch area of removed or damaged concrete in accordance with this Section's Paragraph 3.2.B.
 - 2) Provide on surface of embedded metal item two coats of epoxy coating in accordance with coating manufacturer's recommendations.
 - a) Color of First Coat: Red.
 - b) Color of second Coat: Gray.
 - 3) Before applying second coating, allow first coat of epoxy coating to fully cure in accordance with coating manufacturer's recommendations.
- E. Extend existing control, construction, and expansion joints through concrete repairs.
- F. For repairs of existing concrete damage, finish of repaired areas shall match the finish of existing adjacent concrete surface.
- G. Expansion Joint Repair – Type A:
1. Provide materials and installation methods in accordance with sealant manufacturer recommendations and the Contract Documents.
 2. Provide sealant and backer rod at moderate, reasonably stable, concrete temperature to optimize repair performance.
 3. Comply with Section 07 92 00 - Joint Sealants.
- H. Expansion Joint Repair – Type B:
1. Provide epoxy resin adhesive sealing system, in accordance with joint sealant system manufacturer's instructions and the Contract Documents, at locations shown or indicated on the Drawings:
 - a. Existing sealant, backer rod, and joint filler material in acceptable condition are to remain in-place at existing joint locations to receive sealing system.
 - b. Concrete substrate on both sides of existing joint must be clean, dry, sound, and free of surface contaminants to not less than 10 inches wide strip centered on existing joint or greater when recommended by sealant manufacturer.
 - 1) Remove dust, laitance, grease, oils, curing compounds, form release agents, and foreign matter by sandblasting or other mechanical means acceptable to Engineer.
 - c. Mix epoxy resin adhesive and install hypalon sheeting in accordance with adhesive manufacturer's printed installation instructions and the Contract Documents.
 - d. Cleanup:
 - 1) Leave finished Work and work area in a neat, clean condition without evidence of spillovers on adjacent surfaces.
 - 2) Clean uncured epoxy resin adhesive with approved solvent appropriate for the application and area.
 - 3) Remove cured epoxy resin adhesive only by mechanical means.
- I. Expansion Joint Repair – Type C (Joint Sealant System):
1. Installation of joint coating system shall comply with applicable material manufacturer's published recommendations and the Contract Documents.
 2. Do not install concrete joint coating when substrate is in a rising-temperature mode.
 3. Substrate, air, and coating material temperatures shall comply with applicable material manufacturer's recommendations and the Contract Documents.
 4. Primer:
 - a. Provide epoxy primer to concrete prior to installing final coating materials.
 - b. Applied Thickness: 5 to 10 wet mils.
 - c. Reapply coating as necessary to achieve pinhole/holiday-free surface

5. Comply with material manufacturer's recoat time. If recoat time(s) are exceeded, comply with material manufacturer's recommended procedures for surface abrasion, cleaning, and application of bonding agent.
6. Application of Coatings:
 - a. Provide primer, base coat, scrim, and top coat in accordance with material manufacturer's requirements, as shown in the Drawings, and in accordance with other Contract Documents.
 - b. Install primer (see item 4 above)
 - c. Provide initial tack coat at thickness of 10 to 20 wet mils, to 6 inches on each side of joints to be coated.
 - d. Push scrim material evenly into wet tack coat and allow to cure one to four hours, as recommended by coating manufacturer.
 - e. Provide not less than thickness of 60 wet mils of top coat over scrim material.
 - f. Protect and cure in accordance with material manufacturer's recommendations and the Contract Documents.
7. Should substrate temperatures be less than sealant system manufacturer's written recommended minimum temperature, comply with material manufacturer's modified procedures provide materials approved by Engineer and suitable for installation in cold conditions.

3.3 CURING

A. Curing of Repair Mortar:

1. Perform curing of repair mortar immediately after final finishing.
2. Perform curing by combination of covering repair Work with wet burlap and applying liquid membrane-forming curing compound.
3. Employ methods and sequence to maintain moisture for not less than seven days.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. In-Situ Pull-Off Tests:
 - a. Perform in-situ pull-off tests on repaired areas at locations indicated by Engineer.
 - 1) Perform not less than one pull-off test, in accordance with ASTM C1583, for each surface (wall, roof, floor, and other). In event of unacceptable pull-off test, repair the defective Work in accordance with the Contract Documents and perform additional test(s) at location(s) indicated by Engineer.
 - b. Submit written results of testing, indicating: date of test, entity performing testing, personnel present during testing, time of test, location of test, pertinent results recorded, and other relevant observations.
 - c. Criteria for Acceptance: Pull-off test will be deemed as passing (acceptable results) when failure occurs within the existing concrete substrate (cohesive concrete failure). If failure occurs at the joint surface with existing concrete (bond failure), within the repair material, or at connection to testing device, pull-out test will be deemed as passing (acceptable results) when the unit tensile stress acting on the core cross section at failure exceeds 300 psi. If failure occurs within the repair material, additional test samples of the repair material in the area of the test shall be taken for compressive testing to verify strength of repair material.
 - d. Remedy all damage resulting from in-situ testing, in accordance with the Contract Documents.

B. Observations and Inspections:

1. Owner will witness surface preparation, substrate moisture conditions, and installation of materials indicated in this Section. Such observations do not relieve Contractor from obligation to comply with the Contract Documents.

2. Owner-retained special inspector shall be present while material manufacturer's technical representatives are at the Site instructing Contractor's structural concrete repair personnel, Contractor's joint sealant system personnel, and installers in the use of the associated material(s).

C. Defective Work:

1. Defective Repair:

- a. Any and all repairs are defective Work when one or more of the following occurs:
 - 1) Pull-off test fails.
 - 2) When grout cube tests yield results less than 3500 psi for repair mortars in seven days.
 - 3) Repair is not properly finished and in accordance with specified tolerances.
- b. Promptly remove and remedy defective concrete repair Work in accordance with the Contract Documents.

2. Damaged Work:

- a. Before acceptance of the Work (following final inspection in accordance with the General Conditions and other Contract Documents), neatly repair damaged surfaces, corners of concrete, and finish.
- b. When performing surface remedial repairs, finish areas to smooth, dense watertight condition.
- c. Replace unsatisfactory concrete patching Work.

3. Corrective Work:

- a. If correction of defective Work (under this Section) is necessary, remove defective Work. Key area to be remedied, clean, and soak surface with water and patch with approved materials. Patch concrete to match existing adjacent concrete surfaces.
- b. Clean surface cavities resulting from form ties, other holes, honeycomb spots, broken corners and edges, and other effects. Saturate with water and point with a mortar of patching material paste. Comply with patching material manufacturer's recommendations concerning placement, pot life, and curing.
- c. Prepare pointing material not more than 30 minutes prior to use. Cure mortar patches properly. Carefully tool contraction and articulated joints in completed Work and keep them free of concrete. Where necessary, leave joint filler exposed for its full length with clean and true edges.
- d. Tolerance deviations and other surface defects may also be corrected, when approved by Engineer, by grinding high areas of swales.
- e. Where remedial work is unsatisfactory, completely remove such Work and replace with new Work in accordance with the Contract Documents.

4. Special inspection of remedial work is required. Special inspection will be performed after completion of surface preparation and during installation of remedial Work. Refer to the Structural Statement of Special Inspections for additional requirements.

5. Defective Joint Sealant System Work:

- a. Any and all locations where joint sealant system has separated from concrete or exhibits cracking or tearing is defective Work.
- b. Remove defective joint sealant system Work, clean the surface, and re-provide new joint sealant system materials.
- c. Unless directed otherwise by Engineer, when area of defective joint sealant Work exceeds 25% of total area of joint sealant system Work provided, replace all joint sealant system Work in accordance with the Contract Documents.

D. Suppliers' Services:

1. Manufacturers' factory-trained technical representatives of concrete repair materials and joint sealant system shall be at the Site prior to and during first installation of the materials furnished under this Section to review surface preparation, surface moisture conditions and

adhesion testing, and proposed installation methods. Joint sealant system manufacturer's representative shall also inspect the entire completed installation and submit, through Contractor, an affidavit of compliance certifying that installed materials comply with manufacturer written instructions and recommendations. Compensation for which is part of the associated unit price for such Work.

3.5 POST-CONSTRUCTION OBLIGATIONS

A. Warranty Inspection:

1. Perform warranty inspections during eleventh month after Substantial Completion of the Work of this Section.
2. For the inspections, Owner will dewater and reasonably clean water-bearing structures.
3. Operational constraints preclude removing all water-bearing structures from service simultaneously for warranty inspection. It is anticipated that one separate warranty inspections will be necessary due to operational constraints, each on different, non-consecutive days.
4. One warranty inspection of each joint sealed is required, unless defective Work is evident. When defective joint sealant Work is apparent, an additional warranty inspection of the repaired joint is required in the eleventh month after the defective joint sealant is remedied.
5. Contractor, joint sealant Subcontractor (if any), joint sealant system manufacturer's technical representative, and Owner, shall be present at each warranty inspection.
6. Contractor shall promptly remedy and replace defective Work, whether evident during the warranty inspection or otherwise, in accordance with the Contract Documents.
7. If contractor is unable or unavailable to remedy defective Work promptly when water-bearing structures are dewatered and cleaned for the warranty inspection, Owner may place such structures back into service and Contractor will be responsible for appropriately dewatering and cleaning the structure to perform the necessary remedial Work.
8. Regarding remedy of defective joint sealant system Work, refer to this Section's Paragraph 3.4.C.

B. Item – Concrete Surface Repair - Type I (Thin):

1. Measurement will be the area, in square feet, of existing, concrete surface area repaired, measured in one or more appropriate geometric shapes such as rectangles, squares, triangles, and trapezoids, at the concrete surface.
2. Item Includes (all in accordance with the Contract Documents):
 - a. As indicated in Section 03 01 30 - Repair and Rehabilitation of Existing Concrete.
3. Not included in this bid/pay item:
 - a. As indicated in Section 03 01 30 - Repair and Rehabilitation of Existing Concrete.
4. Payment: Unit price per square foot for this item will be full compensation for Work for surface repair of the type indicated for existing concrete, and all related Work, performed under this item, complete in accordance with the Contract Documents, and not specifically included under other bid/pay items or contracts.

C. Item – Expansion Joint Repair - Type A:

1. Measurement will be the length, in linear feet, of existing, concrete expansion joint repaired, measured at the concrete surface.
2. Item Includes (all in accordance with the Contract Documents):
 - a. As indicated in Section 03 01 30 - Repair and Rehabilitation of Existing Concrete.
3. Not included in this bid/pay item:
 - a. As indicated in Section 03 01 30 - Repair and Rehabilitation of Existing Concrete.
4. Payment: Unit price per linear foot for this item will be full compensation for all expansion joint repair Work of the type indicated, and all related Work, performed under this item, complete in accordance with the Contract Documents, and not specifically included under other bid/pay items or contracts.

END OF SECTION

SECTION 03 05 05
CONCRETE TESTING AND INSPECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Contractor requirements for testing of concrete and grout.
 - 2. Definition of Owner provided testing.
 - 3. Acceptance criteria for concrete.
 - 4. Materials and concrete testing as required to establish concrete mix design.
 - 5. Testing of concrete during construction for compliance with Contract Documents.
 - 6. In-place testing of concrete, if required.
 - 7. Mortar, grout for masonry, and concrete masonry unit testing as required by Specification Section 04 05 13 and Specification Section 04 22 00.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 03 21 00 - Reinforcement.
 - 2. Section 03 31 30 - Concrete, Materials and Proportioning.
 - 3. Section 03 31 31 - Concrete Mixing, Placing, Jointing and Curing.
 - 4. Section 03 41 33 - Precast and Prestressed Concrete.
 - 5. Section 04 05 13 - Cement and Lime Mortars.
 - 6. Section 04 22 00 - Concrete Masonry.

1.2 RESPONSIBILITY AND PAYMENT

- A. Owner will hire an independent Testing Agency/Service Provider to perform the following testing and inspection and provide test results to the Engineer and Contractor.
 - 1. Testing and inspection of concrete and grout produced for incorporation into the work during the construction of the Project for compliance with the Contract Documents.
 - 2. Additional testing or retesting of materials occasioned by their failure, by test or inspection, to meet requirements of the Contract Documents.
 - 3. Strength testing on concrete required by the Engineer or Special Inspector when the water-cement ratio exceeds the water-cement ratio of the typical test cylinders.
 - 4. In-place testing of concrete as may be required by Engineer when strength of structure is considered potentially deficient.
 - 5. Other testing services needed or required by Contractor such as field curing of test specimens and testing of additional specimens for determining when forms, form shoring or reshoring may re-removed.
 - 6. Owner will pay for services defined in Paragraph 1.2A.1.
 - 7. See Specification Section 01 42 00.
- B. Hire a qualified testing agency to perform the following testing and provide test results to the Engineer.
 - 1. Testing of materials and mixes proposed by the Contractor for compliance with the Contract Documents and retesting in the event of changes.
 - 2. Additional testing and inspection required because of changes in materials or proportions requested by Contractor.
 - 3. Pay for services defined in Paragraphs 1.2B.1. and 1.2B.2.
 - 4. Reimburse Owner for testing services defined in Paragraphs 1.2A.2., 1.2A.3., 1.2A.4. and 1.2A.5.

5. See Specification Section 01 42 00.

C. Duties and Authorities of Testing Agency/Service Provider:

1. Any Testing Agency/Service Provider or agencies and their representatives retained by Contractor or Owner for any reason are not authorized to revoke, alter, relax, enlarge, or release any requirement of Contract Documents, nor to reject, approve or accept any portion of the Work.
2. Testing Agency/Service Provider shall inform the Contractor and Engineer regarding acceptability of or deficiencies in the work including materials furnished and work performed by Contractor that fails to fulfill requirements of the Contract Documents.
3. Testing Agency to submit test reports and inspection reports to Engineer and Contractor immediately after they are performed.
 - a. All test reports to include exact location in the work at which batch represented by a test was deposited.
 - b. Reports of strength tests to include detailed information on storage and curing of specimens prior to testing.
4. Owner retains the responsibility for ultimate rejection or approval of any portion of the Work.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Concrete Institute (ACI):
 - a. 318, Building Code Requirements for Structural Concrete.
2. ASTM International (ASTM):
 - a. ASTM Cement and Concrete Reference Laboratory (CCRL).
 - b. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - c. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - d. C42, Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - e. C94, Standard Specification for Ready-Mixed Concrete.
 - f. C143, Standard Test Method for Slump of Hydraulic-Cement Concrete.
 - g. C157 Standard Test Method for Length Change of Hardened Hydraulic-CementMortar and Concrete.
 - h. C172, Standard Practice for Sampling Freshly Mixed Concrete.
 - i. C1019, Standard Test Method for Sampling and Testing Grout.
 - j. C1218, Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
 - k. E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

B. Qualifications:

1. Contractor's Testing Agency:
 - a. Meeting requirements of ASTM E329 and ASTM C94.
 - b. Provide evidence of recent inspection by CCRL of NBS, and correction of deficiencies noted.

C. Use of Testing Agency and approval by Engineer of proposed concrete mix design shall in no way relieve Contractor of responsibility to furnish materials and construction in full compliance with Contract Documents.

1.4 DEFINITIONS

- A. Testing Agency/Service Provider: An independent professional testing/inspection firm or service hired by Contractor or by Owner to perform testing, inspection or analysis services as directed, and as provided in the Contract Documents.

1.5 SUBMITTALS

A. Shop Drawings:

1. Product technical data including:
 - a. Concrete materials and concrete mix designs proposed for use.
 - 1) Include results of all testing performed to qualify materials and to establish mix designs.
 - 2) Place no concrete until approval of mix designs has been received in writing.
 - 3) Submittal for each concrete mix design to include:
 - a) Sieve analysis and source of fine and coarse aggregates.
 - b) Test for aggregate organic impurities.
 - c) Proportioning of all materials.
 - d) Type of cement with mill certificate for the cement.
 - e) Brand, quantity and class of fly ash proposed for use along with other submittal data as required for fly ash by Specification Section 03 31 30.
 - f) Slump.
 - g) Brand, type and quantity of air entrainment and any other proposed admixtures.
 - h) Shrinkage test results.
 - i) Total water soluble chloride ion concentration in hardened concrete from all ingredients determined per ASTM C1218.
 - j) 28-day compression test results and any other data required by Specification Section 03 31 30 to establish concrete mix design.
2. Certifications:
 - a. Testing Agency qualifications.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 TESTING SERVICES TO BE PERFORMED SERVICE PROVIDER/TESTING AGENCY

- A. The following concrete testing will be performed by the Service Provider/Testing Agency:
1. Concrete strength testing:
 - a. Secure concrete samples in accordance with ASTM C172.
 - 1) Obtain each sample from a different batch of concrete on a random basis, avoiding selection of test batch other than by a number selected at random before commencement of concrete placement.
 - b. For each strength test, mold and cure cylinders from each sample in accordance with ASTM C31.
 - 1) Record any deviations from requirements on test report.
 - 2) Cylinder size: Per ASTM C31.
 - a) 4 inches cylinders shall not be used for concrete mixes with maximum aggregate size larger than 1 inch.
 - b) Use the same size cylinder for all tests for each concrete mix.
 - 3) Quantity:
 - a) 6 inches diameter by 12 inches high: Five cylinders.
 - b) 4 inches diameter by 8 inches high: Six cylinders.
 - c. Field cure one cylinder for the seven day test.
 - 1) Laboratory cure the remaining.
 - d. Test cylinders in accordance with ASTM C39.

- 1) 6 inches diameter cylinders:
 - a) Test two cylinders at 28 days for strength test result and the one field cured sample at seven days for information.
 - b) Hold remaining cylinder in reserve.
- 2) 4 inches diameter cylinders:
 - a) Test three cylinders at 28 days for strength test result and the one field cured cylinder at seven days for information.
 - b) Hold remaining cylinders in reserve.
- e. Strength test result:
 - 1) Average of strengths of two, 6 inches diameter cylinders or three, 4 inches diameter cylinders from the same sample tested at 28 days.
 - 2) If one cylinder in a test manifests evidence of improper sampling, molding, handling, curing, or testing, discard and test reserve cylinder(s); average strength of remaining cylinders shall be considered strength test result.
 - 3) Should all cylinders in any test show any of above defects, discard entire test.
- f. Frequency of tests:
 - 1) Concrete sand cement grout: One strength test for each 4 hour period of grout placement or fraction thereof.
 - a) Test grout in accordance with ASTM C1019.
 - 2) Concrete topping, concrete fill and lean concrete: One strength test for each 60 CUYD of each type of concrete or fraction thereof placed.
 - 3) Precast concrete: Frequency per Specification Section 03 41 33.
 - 4) All other concrete:
 - a) One strength test to be taken not less than once a day, nor less than once for each 60 cubic yards or fraction thereof placed in any one day.
 - b) Once for each 5000 square feet of slab or wall surface area placed each day
 - c) If total volume of concrete on Project is such that frequency of testing required in above paragraph will provide less than five strength tests for each concrete mix, tests shall then be made from at least five randomly selected batches or from each batch if fewer than five batches are provided.
2. Slump testing:
 - a. Determine slump of concrete sample for each strength test.
 - 1) Determine slump in accordance with ASTM C143.
 - b. If consistency of concrete appears to vary, the Engineer or Owner's Representative shall be authorized to require a slump test for each concrete truck.
 - 1) This practice shall continue until three consecutive batches are determined to be consistent and meet the slump requirements specified.
3. Air content testing: Determine air content of concrete sample for each strength test in accordance with ASTM C231 , ASTM C173 , or ASTM C138.
4. In-place concrete testing (if required).

3.2 SPECIAL INSPECTIONS

A. Formwork Special Inspections:

1. Shape, location, and dimensions.
 - a. Inspect in accordance with dimensions and details on Drawings.
 - b. Frequency: Inspect prior to each concrete pour.

B. Reinforcing Special Inspections:

1. Reinforcing size, spacing, lap length and concrete cover.
 - a. Inspect in accordance with Drawings and Specification.

- b. Frequency: Inspect prior to each concrete pour.
 - 2. Reinforcing adhesive anchoring system:
 - a. Inspect in accordance with ICC-ES report.
 - b. Frequency:
 - 1) Inspect all adhesive anchors for the first 4 hours of installation.
 - 2) Inspect approximately 25% of adhesive anchors thereafter.
 - 3) Additional inspection will be required for different installer or if the quality of installation appears to vary.
 - 3. Mechanical splices:
 - a. Inspect in accordance with ICC-ES report.
 - b. Frequency:
 - 1) Inspect all mechanical splices prior to placing concrete.
 - 2) Inspect approximately 25% of mechanical splices thereafter.
 - 3) Additional inspection will be required for different installer or if the quality of installation appears to vary.
- C. Mixing, Placing, Jointing, and Curing Special Inspections:
 - 1. Perform concrete tests per the requirements of this Specification Section.
 - 2. Verification of proper mix design.
 - a. Frequency: Periodically, prior to each concrete pour.
 - 3. Proper concrete placement techniques.
 - a. Inspect per requirements of Section 03 31 31.
 - b. Frequency: During each concrete pour.
 - 4. Proper curing temperature and techniques.
 - a. Inspect per requirements of Section 03 31 31.
 - b. Frequency: Periodically, but not less than every third day.
 - 5. Joints:
 - a. Inspect joints for proper joint type, dimensions, reinforcing, dowel alignment, surface preparation and location.
 - b. Frequency: Prior to each concrete pour.
 - 6. Waterstops:
 - a. Visually inspect waterstops for proper location, continuity, installation to prevent displacement, cleanliness and damage to waterstop.
 - b. Frequency:
 - 1) Prior to each concrete pour.
- D. Anchorage to Concrete Special Inspection:
 - 1. Post installed anchors as required by the building code, ICC-ES Evaluation Reports, and as specified by the Engineer.
 - a. Frequency: Per ICC-ES Report.
 - 2. Cast-in-place concrete anchors, including anchor size, embedment, material and location.
 - a. Frequency: Prior to each concrete pour.

3.3 SAMPLING ASSISTANCE AND NOTIFICATION FOR OWNER

- A. To facilitate testing and inspection, perform the following:
 - 1. Furnish any necessary labor to assist Testing Agency in obtaining and handling samples at site.
 - 2. Provide and maintain for sole use of Testing Agency adequate facilities for safe storage and proper curing of test specimens on site for first 24 hours as required by ASTM C31.

3. Take samples at point of placement into concrete member.
- B. Notify Engineer and Owner's Testing Agency sufficiently in advance of operations (minimum of 24 hours) to allow for assignment of personnel and for scheduled completion of quality tests.

3.4 ACCEPTANCE

- A. Completed concrete work which meets applicable requirements will be accepted without qualification.
- B. Completed concrete work which fails to meet one or more requirements but which has been repaired to bring it into compliance will be accepted without qualification.
- C. Completed concrete work which fails to meet one or more requirements and which cannot be brought into compliance may be accepted or rejected as provided in these Contract Documents.
 1. In this event, modifications may be required to assure that concrete work complies with requirements.
 2. Modifications, as directed by Engineer, to be made at no additional cost to Owner.
- D. Dimensional Tolerances:
 1. Formed surfaces resulting in concrete outlines smaller than permitted by tolerances shall be considered potentially deficient in strength and subject to modifications required by Engineer.
 2. Formed surfaces resulting in concrete outlines larger than permitted by tolerances may be rejected and excess material subject to removal.
 - a. If removal of excess material is permitted, accomplish in such a manner as to maintain strength of section and to meet all other applicable requirements of function and appearance.
 3. Concrete members cast in wrong location may be rejected if strength, appearance or function of structure is adversely affected or misplaced items interfere with other construction.
 4. Inaccurately formed concrete surfaces exceeding limits of tolerances and which are exposed to view, may be rejected.
 - a. Repair or remove and replace if required.
 5. Finished slabs exceeding tolerances may be required to be repaired provided that strength or appearance is not adversely affected.
 - a. High spots may be removed with a grinder, low spots filled with a patching compound, or other remedial measures performed as permitted or required.
- E. Appearance:
 1. Concrete surfaces exposed to view with defects which, in opinion of Engineer, adversely affect appearance as required by specified finish shall be repaired by approved methods.
 2. Concrete not exposed to view is not subject to rejection for defective appearance unless, in the opinion of the Engineer, the defects impair the long-term strength or function of the member.
- F. High Water-Cement Ratio:
 1. Concrete with water in excess of the specified maximum water-cement ratio will be rejected.
 2. Remove and replace concrete with high water-cement ratio or make other corrections as directed by Engineer.
- G. Strength of Structure:
 1. Strength of structure in place will be considered potentially deficient if it fails to comply with any requirements which control strength of structure, including but not necessarily limited to following:
 - a. Low concrete strength:

- 1) Test results for standard molded and cured test cylinders to be evaluated separately for each mix design.
 - a) Such evaluation shall be valid only if tests have been conducted in accordance with specified quality standards.
 - b) For evaluation of potential strength and uniformity, each mix design shall be represented by at least three strength tests.
 - c) A strength test shall be the average of two, 6 inches diameter cylinders or three, 4 inches diameter cylinders from the same sample tested at 28 days.
- 2) Acceptance:
 - a) Strength level of each specified compressive strength shall be considered satisfactory if both of the following requirements are met:
 - (1) Average of all sets of three consecutive strength tests equal or exceed the required specified 28 day compressive strength.
 - (2) No individual strength test falls below the required specified 28 day compressive strength by more than 500 psi.
 - b. Reinforcing steel size, configuration, quantity, strength, position, or arrangement at variance with requirements in Specification Section 03 21 00 or requirements of the Contract Drawings or approved Shop Drawings.
 - c. Concrete which differs from required dimensions or location in such a manner as to reduce strength.
 - d. Curing time and procedure not meeting requirements of this Specification Section.
 - e. Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.
 - f. Mechanical injury, construction fires, accidents or premature removal of formwork likely to result in deficient strength.
 - g. Concrete defects such as voids, honeycomb, cold joints, spalling, cracking, etc., likely to result in deficient strength or durability.
2. Structural analysis and/or additional testing may be required when strength of structure is considered potentially deficient.
3. In-place testing of concrete may be required when strength of concrete in place is considered potentially deficient.
 - a. Testing by impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer to determine relative strengths at various locations in the structure or for selecting areas to be cored.
 - 1) Such tests shall not be used as a basis for acceptance or rejection.
 - b. Core tests:
 - 1) Where required, test cores will be obtained in accordance with ASTM C42.
 - a) If concrete in structure will be dry under service conditions, air dry cores (temperature 60 to 80 degrees F, relative humidity less than 60%) for seven days before test then test dry.
 - b) If concrete in structure will be wet or subjected to high moisture atmosphere under service conditions, test cores after immersion in water for at least 40 hours and test wet.
 - c) Testing wet or dry to be determined by Engineer.
 - 2) Three representative cores may be taken from each member or area of concrete in place that is considered potentially deficient.
 - a) Location of cores shall be determined by Engineer so as least to impair strength of structure.
 - b) If, before testing, one or more of cores shows evidence of having been damaged subsequent to or during removal from structure, damaged core shall be replaced.

- 3) Concrete in area represented by a core test will be considered adequate if average strength of three cores is equal to at least 85% of specified strength and no single core is less than 75% of specified strength.
- 4) Fill core holes with non-shrink grout and finish to match surrounding surface when exposed in a finished area.
4. If core tests are inconclusive or impractical to obtain or if structural analysis does not confirm safety of structure, load tests may be required and their results evaluated in accordance with ACI 318, Chapter 20.
5. Correct or replace concrete work judged inadequate by structural analysis or by results of core tests or load tests with additional construction, as directed by Engineer, at Contractor's expense.
6. Contractor to pay all costs incurred in providing additional testing and/or structural analysis required.

H. Shrinkage Tests:

1. Shrinkage tests shall be performed on all concrete with specified shrinkage limits in Specification Section 03 31 30. Shrinkage tests are required for mix design approval and for approval of concrete in the field.
 - a. Mix design shrinkage test:
 - 1) The maximum concrete shrinkage limit for the laboratory mix design tests shall be as specified in Specification Section 03 31 30. Standard deviation shall be considered as specified in ASTM C157. The submitted mix design proportions must be the same proportions used for the laboratory mix design shrinkage test. Shrinkage test to indicate concrete meets the specified shrinkage limit.
 - 2) Concrete shrinkage for laboratory cast specimens for mix design approval shall conform to ASTM C157 inches its entirety.
 - a) Laboratory cast specimens for mix design approval shall be stored as specified by ASTM C157 for Water Storage.
 - 3) Laboratory cast specimens for mix design approval shall be stored as specified by ASTM C157 for Water Storage.
 - b. Field approval shrinkage tests:
 - 1) Required for the first field placement of each mix of concrete that is specified as requiring shrinkage testing in Specification Section 03 31 30.
 - 2) If excessive cracking or other symptoms that are potentially related to shrinkage occur during construction, Engineer may require additional field shrinkage tests during construction to verify compliance with these Specifications.
 - 3) The initial field shrinkage testing will establish a baseline for the shrinkage of the specified mixes that represents the concrete as placed and cured in the field
 - 4) Concrete test specimens for field shrinkage test shall be taken to the lab in their molds prior to 24 hours $\pm 1/2$ hour, whereupon they shall be removed from the molds and the initial comparator reading shall be taken in accordance with ASTM C157. Then the specimens shall be returned to the field and cured with the same curing method used in the field. At 28 days after casting of the field specimens, they will be considered to be cured for the purpose of this testing.
 - a) Field test specimens shall be stored and comparator readings shall be made as specified for Air Storage in ASTM C157.
2. Shrinkage specimens shall be fabricated, cured, dried, and measured in accordance with ASTM C157 and as modified herein. All specimens shall 11-1/4 inches $\pm 1/8$ inches for an effective gauge length of 10 inches.
 - a. Shrinkage specimens for mixes with 100% of the aggregate passing the 1 inch sieve shall be 3 inches by 3 inches in cross section.
 - b. For mixes with aggregates larger than 1 inch and with 100% passing a 2 inches sieve, drying shrinkage specimens shall be 4 inches by 4 inches in cross section.

3. Report shrinkage test results at intervals as specified for the type of test, either laboratory or field, according to ASTM C157 and the type of storage, water or air respectively.
 - a. The field test shrinkage shall not exceed the laboratory mix shrinkage requirement by more than 50% on the initial placement of each class of concrete required to be shrinkage tested.
 - b. If the required field shrinkage limitation is not met, all aspects of concrete mixing, placing, sampling and curing will be subject to review. If this review points toward a solution, participate in a solution of making changes as required to establish compliance. These changes may include, but are necessarily limited to the following:
 - 1) Changing the curing methods.
 - 2) Changing the source of aggregates.
 - 3) Changing the amount of crushed or fractured coarse aggregate.
 - 4) Changing cement quantity and/or admixtures.
 - 5) Use of a shrinkage reducing admixture.
 - 6) Reducing water/cement ratio.
 - 7) Making changes to sampling practices
 - 8) Possible consideration by the Engineer of modifying the field shrinkage acceptance criteria.
 - 9) Other actions designed to minimize shrinkage and to provide better quality assurance.
4. Once the initial field shrinkage testing requirement is met, subsequent shrinkage testing, done, if needed, during the remainder of the construction period shall use the field test result from each initial field shrinkage test as a base line for acceptance.
 - a. If the base line acceptance criteria is not met, then the provisions of Paragraph 3.3 H.6.b above shall be enacted to re-establish compliance.

END OF SECTION

PROJECT REVISION LOG	
DATE	DESCRIPTION
01/01/20XX	PACKAGE #XX - ISSUED FOR CONSTRUCTION
01/01/20XX	ADDENDUM 1
01/01/20XX	RFI #66

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SECTION 03 11 13

FORMWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formwork requirements for concrete construction.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 03 05 05 - Concrete Testing and Inspection.
 - 2. Section 03 31 31 - Concrete Mixing, Placing, Jointing, and Curing.
 - 3. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. CT-13, Concrete Terminology.
 - b. 117, Specification for Tolerances for Concrete Construction and Materials.
 - c. 347R, Guide to Formwork for Concrete.
- B. Qualifications:
 - 1. Formwork, shoring and reshoring to be designed by a licensed professional engineer currently registered or having a minimum of three years of experience in this type of design work.
 - a. Above qualifications apply to slabs and beams not cast on the ground.
- C. Miscellaneous:
 - 1. Design and engineering of formwork, shoring and reshoring as well as its construction is the responsibility of the Contractor.
 - 2. Design requirements:
 - a. Design formwork for loads, lateral pressures and allowable stresses outlined in ACI 347R and for design considerations, wind loads, allowable stresses and other applicable requirements of the controlling local building code.
 - 1) Where conflicts occur between the above two standards, the more stringent requirements shall govern.
 - b. Design formwork to limit maximum deflection of form facing materials reflected in concrete surfaces exposed to view to 1/240 of span between structural members.
 - 3. For slabs and beams not cast on the ground, develop a procedure and schedule for removal of shores and installation of reshores and for calculating the loads transferred to the structure during this process in accordance with ACI 347R.
 - a. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon. Calculations shall be performed by a licensed professional engineer.
 - b. When developing procedure, schedule and structural calculations, consider the following at each stage of construction:
 - 1) The structural system that exists.
 - 2) Effects of all loads during construction.
 - 3) Strength of concrete.

- 4) The influence of deformations of the structure and shoring system on the distribution of dead loads and construction loads.
- 5) The strength and spacing of shores or shoring systems used, as well as the method of shoring, bracing, shore removal, and reshoring including the minimum time intervals between the various operations.
- 6) Any other loading or condition that affects the safety or serviceability of the structure during construction.

1.3 DEFINITIONS

- A. Words and terms used in these Specifications are defined in ACI CT-13.
- B. SCC: Self-Consolidating Concrete.

1.4 SUBMITTALS

- A. Shop Drawings:
 1. Product technical data including:
 - a. Manufacturer and type of proposed form ties.
- B. Samples:
 1. A 12 inches SQ sample of each of the following form finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Void forms:
 - a. SureVoid Products, Inc.
 - b. Deslauriers, Inc.
 2. Stay-in-place forms:
 - a. Alabama Metal Industries Corporation.

2.2 MATERIALS

- A. Forms for Surfaces Exposed to View:
 1. Wood forms:
 - a. 5/8 or 3/4 inches 5-ply structural plywood of concrete form grade.
 - b. Built-in-place or prefabricated type panel.
 2. Metal forms:
 - a. Metal forms may be used except for aluminum in contact with concrete.
 - b. Forms to be tight to prevent leakage, free of rust and straight without dents to provide members of uniform thickness.
- B. Forms for Surfaces Not Exposed to View:
 1. Wood or metal sufficiently tight to prevent leakage.
 2. Do not use aluminum forms.

2.3 ACCESSORIES

- A. Form Ties:
 1. Commercially fabricated for use in form construction.
 - a. Field fabricated ties are unacceptable.
 2. Constructed so that ends or end fasteners can be removed without causing spalling at surfaces of the concrete.

3. Embedded portion of ties to be not less than 1-1/2 inches from face of concrete after ends have been removed.
 4. Cone size:
 - a. 3/4 inches minimum diameter cones on both ends.
 - b. Depth of cone not to exceed the concrete reinforcing cover.
 5. Provide ties with built-in waterstops in all walls that will be in contact with process liquid during plant operation.
 6. Through-wall ties that are designed to be entirely removed are not allowed in all walls that will be in contact with liquids during plant operation.
- B. Form Release Material:
1. If project contains self-consolidating concrete, provide reactive, vegetable based product, not barrier type.
- C. Void Forms:
1. Constructed from double faced corrugated cardboard or fiberboard which is wax impregnated and laminated with moisture-resistant adhesive.
 2. Capable of resisting moisture with no loss of load carrying strength or change in depth or configuration.
- D. Stay-In-Place Forms:
1. Ribbed expanded metal leave-in-place concrete forms commercially fabricated to provide an intentionally rougher surface.
 2. Hot-dipped galvanized.
 3. Stay-in-place forms shall be sized to support wet concrete for the span and thickness indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Form Surface Treatment:
1. Before placing of reinforcing steel or concrete, cover surfaces of forms with an approved release material that will effectively prevent absorption of moisture and prevent bond with concrete, will not stain concrete or prevent bonding of future finishes.
 - a. A field applied form release agent or sealer of approved type or a factory applied nonabsorptive liner may be used.
 2. Do not allow excess form release material to stand in puddles in forms nor in contact with hardened concrete against which fresh concrete is to be placed.
- B. Apply form release material to minimize bugholes and pinholes. Follow manufacturer's printed installation instructions specific to the form facing material.
- C. Provide temporary openings at base of column and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed, and to limit height of free fall of concrete to prevent aggregate segregation.
1. Temporary openings to limit height of free fall of concrete shall be spaced no more than 8 feet apart.
- D. Clean surfaces of forms, reinforcing steel and other embedded materials of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed.

3.2 ERECTION

- A. Install products in accordance with manufacturer's instructions.
- B. Tolerances:

1. Conform to ACI 117.
2. Variation from plumb:
 - a. In lines and surfaces of columns, piers, walls, and in risers.
 - 1) Maximum in any 10 feet of height: 1/4 inches.
 - 2) Maximum for entire height: 1/2 inches.
 - b. For exposed corner columns, control-joint grooves, and other exposed to view lines:
 - 1) Maximum in any 20 feet length: 1/4 inches.
 - 2) Maximum for entire length: 1/2 inches.
3. Variation from level or from grades specified:
 - a. In slab soffits, ceilings, beam soffits and in arises, measured before removal of supporting shores.
 - 1) Maximum in any 10 feet of length: 1/4 inches.
 - 2) Maximum in any bay or in any 20 feet length: 3/8 inches.
 - 3) Maximum for entire length: 3/4 inches.
 - b. In exposed lintels, sills, parapets, horizontal grooves, and other exposed to view lines:
 - 1) Maximum in any bay or in 20 feet length: 1/4 inches.
 - 2) Maximum for entire length: 1/2 inches.
4. Variation of linear structure lines from established position in plan and related position of columns, walls, and partitions:
 - a. Maximum in any bay: 1/2 inches.
 - b. Maximum in any 20 feet of length: 1/2 inches.
 - c. Maximum for entire length: 1 inch.
5. Variation in sizes and location of sleeves, floor openings, and wall openings: Maximum of +1/2 inches.
6. Variation in horizontal plan location of beam, column and wall centerlines from required location: Maximum of +1/2 inches.
7. Variation in cross sectional dimensions of columns and beams and in thickness of slabs and walls: Maximum of -1/4 inches, +1/2 inches.
8. Footings and foundations:
 - a. Variations in concrete dimensions in plan: -1/2 inches, +2 inches.
 - b. Misplacement or eccentricity:
 - 1) 2% of footing width in direction of misplacement but not more than 2 inches.
 - c. Thickness:
 - 1) Decrease in specified thickness: 5%.
 - 2) Increase in specified thickness: No limit except that which may interfere with other construction.
9. Variation in steps:
 - a. In a flight of stairs:
 - 1) Rise: +1/8 inches.
 - 2) Tread: +1/4 inches.
 - b. In consecutive steps:
 - 1) Rise: +1/16 inches.
 - 2) Tread: +1/8 inches.
10. Establish and maintain in an undisturbed condition and until final completion and acceptance of Project, sufficient control points and benchmarks to be used for reference purposes to check tolerances.
11. Regardless of tolerances listed allow no portion of structure to extend beyond legal boundary of Project.

12. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork prior to hardening of concrete.
- C. Make forms sufficiently tight to prevent loss of mortar from concrete.
- D. Place 3/4 inches chamfer strips in exposed to view corners of forms to produce 3/4 inches wide beveled edges.
- E. At construction joints, overlap contact surface of form sheathing for flush surfaces exposed to view over hardened concrete in previous placement by at least 1 inch.
 1. Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain a true surface.
 2. Where possible, locate juncture of built-in-place wood or metal forms at architectural lines, control joints or at construction joints.
- F. Where circular walls are to be formed and forms made up of straight sections are proposed for use, provide straight lengths not exceeding 2 feet wide.
 1. Brace and tie formwork to maintain correct position and shape of members.
- G. Construct wood forms for wall openings to facilitate loosening, if necessary, to counteract swelling.
- H. Anchor formwork to shores or other supporting surfaces or members so that movement of any part of formwork system is prevented during concrete placement.
- I. Provide runways for moving equipment with struts or legs, supported directly on formwork or structural member without resting on reinforcing steel.
- J. Provide positive means of adjustment (wedges or jacks) of shores and struts and take up all settlement during concrete placing operation.
 1. Securely brace forms against lateral deflection.
 2. Fasten wedges used for final adjustment of forms prior to concrete placement in position after final check.
- K. Stay-In-Place Forms:
 1. Support stay-in-place forms as required to maintain the formwork in proper position.
 2. Hold the edge of stay-in-place forms back a minimum of 2 inches from all smooth formed concrete surfaces.
 3. Stay-in-place forms may be used at the Contractor's option at:
 - a. Surfaces that will be backfilled with soil.
 - 1) Maintain a minimum of 3 inches of concrete cover over all reinforcing.
 - b. Roughened construction joints.
 - c. Other locations approved by Engineer.

3.3 REMOVAL OF FORMS

- A. No construction loads shall be supported on, nor any shoring removed from, any part of the structure under construction except when that portion of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its weight and loads placed thereon.
- B. When required for concrete curing in hot weather, required for repair of surface defects or when finishing is required at an early age, remove forms as soon as concrete has hardened sufficiently to resist damage from removal operations or lack of support.
- C. Remove top forms on sloping surfaces of concrete as soon as concrete has attained sufficient stiffness to prevent sagging.
 1. Perform any needed repairs or treatment required on such sloping surfaces at once, followed by curing specified in Specification Section 03 31 31.

- D. Loosen wood forms for wall openings as soon as this can be accomplished without damage to concrete.
- E. Formwork for columns, walls, sides of beams, and other parts not supporting weight of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal.
 - 1. For walls of water containing structures, leave forms in place for a minimum of 48 hours.
- F. Where no reshoring is planned, leave forms and shoring used to support weight of concrete in place until concrete has attained its specified 28-day compressive strength.
 - 1. Where a reshoring procedure is planned, supporting formwork may be removed when concrete has reached the concrete strength required by the formwork designer's structural calculations.
- G. When shores and other vertical supports are so arranged that non-load-carrying form facing material may be removed without loosening or disturbing shores and supports, facing material may be removed when concrete has sufficiently hardened to resist damage from removal.

3.4 RESHORING

- A. No construction loads shall be supported on, nor any shoring removed from, any part of the structure under construction except when that portion of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its weight and loads placed thereon.
- B. While reshoring is underway, no superimposed dead or live loads shall be permitted on the new construction.
- C. During reshoring do not subject concrete in structural members to combined dead and construction loads in excess of loads that structural members can adequately support.
- D. Place reshores as soon as practicable after stripping operations are complete but in no case later than end of working day on which stripping occurs.
- E. Tighten reshores to carry their required loads without overstressing.
- F. Shoring, reshoring and supporting formwork may be removed when concrete has reached the concrete strength required by the formwork designer's structural calculations.
- G. For floors supporting shores under newly placed concrete leave original supporting shores in place or reshore.
 - 1. Reshoring system shall have a capacity sufficient to resist anticipated loads.
 - 2. Locate reshores directly under a shore position above.
- H. In multi-story buildings, extend reshoring over a sufficient number of stories to distribute weight of newly placed concrete, forms, and construction live loads in such a manner that design superimposed loads of floors supporting shores are not exceeded.

3.5 FIELD QUALITY CONTROL

- A. Special Inspection:
 - 1. See Section 03 05 05.

END OF SECTION

SECTION 03 15 19
ANCHORAGE TO CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for anchorages in concrete, including: cast-in-place anchor bolts, anchor rods, reinforcing anchorage adhesive, and post-installed concrete anchors required for the Project but not specified elsewhere in the Contract Documents.
2. Delegated design requirements for concrete anchors not expressly shown or indicated on the Drawings or elsewhere in the Contract Documents, including, but not limited to, anchorages in concrete for the following structural and nonstructural components:
 - a. Structural members and accessories.
 - b. Metal, wood, and plastic fabrications.
 - c. Architectural Work, including building components, finishes, specials, facility equipment and conveying equipment, furnishings, and special construction Work.
 - d. Mechanical and electrical Work, including process-mechanical Work, site and infrastructure Work, electrical Work, communications Work, electronic safety and security systems Work, and others.
 - e. Fire suppression, plumbing, and HVAC Work.
 - f. Other components requiring anchorages to concrete.

B. Related Requirements: Include but are not necessarily limited to:

1. Section 01 35 73 - Delegated Design Procedures.
2. Section 01 81 10 - Wind and Seismic Criteria
3. Section 03 05 05 - Concrete Testing and Inspection.
4. Section 09 96 00 - High Performance Industrial Coatings.
5. Section 40 05 07 - Pipe Support Systems.

1.2 REFERENCES

A. Definitions and Terminology:

1. This provision presents definitions and terminology, which have the meanings indicated in this provision, applied to the singular or plural thereof, and without regard to use of initial capital letters.
 - a. Adhesive Anchors:
 - 1) Post-installed anchors developing their strength primarily from chemical bond between the concrete and the anchor.
 - 2) Includes anchors using acrylics, epoxy and other similar adhesives.
 - b. Anchor Bolt: Any cast-in-place anchorage that is made of a headed (i.e. bolt) material.
 - c. Anchor Rod: Any cast-in-place or post-installed anchorage made from unheaded, threaded, rod or deformed bar material.
 - d. Concrete Anchor: Generic term for either an anchor bolt or an anchor rod.
 - e. Galvanizing: Hot-dip galvanizing in accordance with ASTM A123, ASTM A153 or ASTM F2329 with minimum coating of 2.0 ounces of zinc per square foot of metal (average of specimens) unless noted otherwise or dictated by reference standard.
 - f. Hardware: As defined in ASTM A153.
 - g. MPII: Manufacturer's printed installation instructions.
 - h. Mechanical Anchors:

- 1) Post-installed anchors developing their strength from attachment other than thru adhesives or chemical bond to concrete.
 - 2) Includes expansion anchors, expansion sleeve, screw anchors, undercut anchors, specialty inserts and other similar types of anchorages.
 - 3) Drop-in anchors and other similar non-ICC ES approved anchors are unacceptable.
- i. Post-Installed Anchor: Adhesive or mechanical anchor installed into previously placed and adequately cured concrete.

B. Reference Standards:

1. American Concrete Institute (ACI):
 - a. 318, Building Code Requirements for Structural Concrete and Commentary.
2. American Concrete Institute/Concrete Reinforcing Steel Institute (ACI-CRSI):
 - a. Adhesive Anchor Installation Certification Program: Adhesive Anchor Installer.
3. American Institute of Steel Construction (AISC):
 - a. 303, Code of Standard Practice for Steel Buildings and Bridges.
 - b. 355.2, Seismic Testing of Post-Installed Concrete and Masonry Anchors in Cracked Concrete.
 - c. 355.4, Qualification of Post-Installed Adhesive Anchors in Concrete.
4. ASTM International (ASTM):
 - a. A36, Standard Specification for Carbon Structural Steel.
 - b. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 - c. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - d. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - e. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - f. A496, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - g. A563, Standard Specification for Carbon and Alloy Steel Nuts.
 - h. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - i. F436, Standard Specification for Hardened Steel Washers.
 - j. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - k. F594, Standard Specification for Stainless Steel Nuts.
 - l. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
 - m. F2329, Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
5. International Code Council Evaluation Service (ICC-ES):
 - a. AC193, Acceptance Criteria for Mechanical Anchors in Concrete Elements.
 - b. AC308, Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. For post-installed anchors and other anchorages installed in existing concrete, comply with Section 01 73 29 - Cutting and Patching.
2. Comply with coordination requirements in Section 01 35 73 - Delegated Design Procedures.

B. Pre-Design Conference:

1. Pre-design conference for anchorages to concrete (where such anchorages are delegated design Work) is not required.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Code-required Special Instructions:
 - a. Special Inspection is required in accordance with the building code for all concrete anchorages.
 - b. Notify the Special Inspector that an inspection is required prior to concrete placement (or during post-installed anchorage installation).
 - c. See the "Field Quality Control" Article in "Part 3 – Execution" of this Section for additional requirements.

B. Qualifications:

1. Delegated Design Professional:
 - a. Delegated design professional's qualifications and responsibilities shall be in accordance with Section 01 35 73 - Delegated Design Procedures.
2. Installer:
 - a. Installer for post-installed anchors shall be trained by the manufacturer or certified by a training program approved by the Engineer.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
 - a. Submit schedule (table or listing) of types, sizes (diameter, length, embedment length), material, finish, and proposed manufacturers of anchorages to concrete to be provided. Apportion by Project-specific application (for example, "Anchorage for cooling water pumps in basement") and indicate where anchorages are fully-designed by Engineer and those for which final design was prepared by delegated design professional.
 - b. Engineer's approval of such Shop Drawing will be only for anchorages fully designed by Engineer. For anchorages for which final design is by delegated design professional, include on such Shop Drawing delegated design professional's approval stamp.
2. Product Data: Submit as Action Submittals product data for anchorages to concrete fully designed by Engineer. For anchorages to concrete for which final design is by delegated design professional, submit as Informational Submittals bearing approval stamp of delegated design professional.
 - a. Manufacturer's express, written acknowledgement that proposed items comply with referenced standards indicated in this Section and, as applicable, by delegated design professional.
 - b. Manufacturer published data and information for each anchor.
 - 1) Clearly indicate items that are proposed for the Work. Neatly strike out or obscure materials and products not proposed.
 - c. Manufacturer's published installation instructions and instructions for code-required special inspections and tests.
 - d. Post-Installed Anchors: In addition, submit for each post-installed anchor system current ICC-ES report, indicating the following:
 - 1) Manufacturer's certification that anchors comply with requirements indicated in the Contract Documents.
 - 2) Performance data indicating that anchor is approved by its manufacturer for use in cracked concrete.
 - 3) Seismic design categories for which anchor system is approved by ICC-ES report.
- e. Anchorage layout drawings and details:

- 1) Drawings showing location, configuration, spacing and edge distance.
3. Delegated Design Professional's Instruments of Service Submittals: Submit, in accordance with this Section and Section 01 35 73 – Delegated Design Procedures, for each anchorage to concrete for which final design is by delegated design professional:
 - a. Certification of compliance, in accordance with Section 01 35 73 – Delegated Design Procedures. Indicate design tension and shear loads used for anchor design.
 - b. Delegated design professional's drawings.
 - c. Delegated design professional's specifications, if any, when prepared by delegated design professional.
 - d. Post-Installed Anchors (for which final design is by delegated design professional): Submittal shall also include the following for post-installed anchors for which final design was by delegated design professional:
 - 1) Show diameter, embedment depth and edge distance of each anchor.
 - 2) Indicate compliance with ACI 318 Chapter 17, , ACI 350-20 Appendix E,.
 - 3) Type of post-installed anchor system used.
 - a) Provide manufacturer's ICC-ES report for the following:
 - (1) Mechanical anchorage per ICC-ES AC193.
 - (2) Adhesive anchorage per ICC-ES AC308.
4. Samples:
 - a. Submit representative Samples of anchorages to concrete, when requested by Engineer. Engineer's approval of Samples will be for type and finish only.
- B. Informational Submittals: Submit the following:
 1. Shop Drawings and Product Data Approved by Delegated Design Professional:
 - a. Submit with delegated design professional's approval stamp those Shop Drawings and product data Submittals indicated in this Article but for which final design was performed by delegated design professional.
 2. Calculations by Delegated Design Professional:
 - a. Submit sealed and signed calculations for sizing and determining embedment length of anchorages to concrete not fully designed by Engineer.
 - b. Post-Installed Anchors Designed by Delegated Design Professional: In addition, also submit design calculations:
 - 1) Indicate design load to each anchor.
 - 2) When design load is not indicated on the Drawings, include calculations to develop anchor forces based on performance and design criteria indicated in this Section.
 3. Supplier's Instructions:
 - a. Submit manufacturer's published instructions for installation.
 4. Field Quality Control Submittals:
 - a. Submit written results of required field quality control activities indicated in this Section.
 5. Reports of Supplier's Visits to Site:
 - a. Submit each written report of visit to the Site by Supplier's factory trained representative and delegated design professional. For each, indicate date and time of visit, purpose of visit, observations made, decisions made, problems encountered, and other pertinent information.
 6. Qualifications Statements:
 - a. Delegated design professional.
 - b. Each installer.

PART 2 - PRODUCTS

2.1 MATERIALS – ALL ANCHORAGES

A. Materials – General:

1. This Article applies to all anchorages to concrete, regardless of whether fully designed by Engineer or delegated design professional. Requirements for delegated designs are in the following Article.
2. Additional requirements for anchorages fully designed by Engineer are indicated in the Article following requirements for delegated design anchorages.
3. For structural applications, do not use powder actuated fasteners and other types of bolts or fasteners not specified in this Section unless approved by Engineer or otherwise required by the Contract Documents.

B. Description:

1. Provide anchorages to concrete, of the types shown or indicated, to secure to concrete materials, equipment, and appurtenances installed as part of the Work.
2. Locations where anchorages are required are generally shown or indicated on the Drawings. Where not shown or indicated on the Drawings provide anchorages or the types required for materials, equipment, and systems where such materials, equipment, and systems are shown on the Drawings.
3. Anchorages required include those for materials, equipment, and systems shown on the structural Drawings and Drawing other than the structural Drawings.
4. Design loads for concrete anchorages are shown or indicated on the Drawings for anchorages where design responsibility is delegated to Contractor's delegated design professional. For such anchorages, embedment depths are not shown or indicated.

C. Cast-in-place Concrete Anchors:

1. Buildings, non-building structures, and equipment, unless otherwise specified:
 - a. ASTM F1554, Grade 36 or Grade 55 with weldability supplement S1 for galvanized threaded rods.
 - b. ASTM A307, Grade A for galvanized headed bolts.
2. All other cast-in-place concrete anchors:
 - a. Stainless steel with matching nut and washer.
 - b. Submerged application: ASTM F593, Type 316, minimum yield strength of 45,000 psi.
 - c. Non-submerged application: ASTM F593, Type 304 or Type 316, minimum yield strength of 45,000 psi.

D. Post-Installed Mechanical and Adhesive Concrete Anchors:

1. Submerged application: ASTM F593, Type 316, minimum yield strength of 45,000 psi with matching nut and washer.
2. Non-submerged application: ASTM F593, Type 304 or Type 316, minimum yield strength of 45,000 psi with matching nut and washer.
3. Post-installed anchors and related materials shall be listed by ICC-ES or Engineer-approved equivalent.

E. Reinforcing: Comply with Section 03 21 00 - Reinforcement.

F. Headed Studs: ASTM A108 with a minimum yield strength of 50,000 psi and a minimum tensile strength of 60,000 psi.

G. Deformed Bar Anchors: ASTM A496 with minimum yield strength of 70,000 psi and a minimum tensile strength of 80,000 psi.

H. Washers:

1. ASTM F436 unless indicated otherwise, finish to match bolt.

2. When stainless steel anchorage is provided for cast-in-place anchorages, provide washers of the same material and alloy as in the associated anchorage.
 3. Plate washers: Minimum 1/2 inch thick fabricated ASTM A36 square plates as required.
 4. Comply with manufacturer's written instructions for all post-installed anchorages.
- I. Nuts:
1. ASTM A563 for cast-in-place anchorages.
 2. When stainless steel anchorages are provided for cast-in-place anchorages, nuts shall comply with ASTM F594 and shall match material and alloy of the associated anchorage.
 3. Follow manufacturer's requirements if using post-installed anchorage.
- J. Galvanizing Repair Paint:
1. High zinc dust content paint for regalvanizing welds and abrasions.
 2. ASTM A780.
 3. Zinc content: Minimum 92 percent in dry film.
 4. Products and Manufacturers: "ZRC Cold Galvanizing", by ZRC; or "High Performance Zinc Spray", by Clearco; or equal.
- K. Dissimilar Materials Protection: Comply with Section 09 96 00 - High-Performance Industrial Coatings.

2.2 DELEGATED DESIGN ANCHORAGES TO CONCRETE

- A. Manufacturers:
1. Post-installed anchor systems for indicated manufacturers are acceptable only when a current ICC-ES evaluation report is furnished as a Submittal and the subject anchorage system is approved by delegated design professional.
 - a. Hilti.
 - b. Dewalt.
 - c. Simpson Strong-Tie.
 - d. Or equal.
- B. Description: Perform delegated design for anchorages when one or more of the following applies:
1. Design load for concrete anchorage is shown or indicated on the Drawings and anchorage embedment depth is not shown or indicated.
 2. When specifically required by the Contract Documents.
 3. When an anchorage is necessary but is not shown or indicated on the Drawings.
 4. Anchorages shown on the Drawings other than the structural Drawings.
- C. Performance and Design Criteria for Delegated Design Anchorages:
1. Determine design loads, including wind and seismic loads, in accordance with applicable building code and other Laws and Regulations.
 2. For anchorage of equipment and non-structural components, use actual dead load and operating loads obtained by Contractor or delegated design professional from manufacturer. Design loads shall include operating conditions when equipment or element of the Work is in operation, dynamic loads, and other loads as appropriate or required by the building code or other Laws or Regulations.
 3. Design assuming cracked concrete.

2.3 ANCHORAGES FULLY DESIGNED BY ENGINEER

- A. When size, length, and details of anchorage are shown or indicated on the structural Drawings, such anchorages are considered as fully designed by Engineer and delegated design of such anchorage is not required.

B. Manufacturers:

1. For post-installed anchor systems regardless of whether proposed manufacturer is indicated below, furnish as Submittal current evaluation agency report and anchor system is certified by ICC-ES for cracked concrete conditions.
2. Mechanical Anchors:
 - a. Hilti:
 - 1) Kwik Bolt TZ (ICC-ES ESR-1917).
 - b. Dewalt:
 - 1) Power-Stud+ SD1 (ICC-ES ESR-2818).
 - c. Simpson Strong-Tie:
 - 1) Strong-Bolt 2 (ICC-ES ESR-3037).
 - d. Or equal.
3. Adhesive Anchors for Concrete:
 - a. Hilti:
 - 1) HIT RE 500 V3 (ICC ESR-3814).
 - b. Dewalt:
 - 1) PURE110+ (ICC-ES ESR-3298).
 - c. Simpson Strong-Tie:
 - 1) SET-3G (ICC ES 4057)
 - d. Or equal.
4. Screw Anchors for Concrete:
 - a. Hilti:
 - 1) Kwik HUS-EZ Screw (ICC-ES ESR-3027).
 - b. Dewalt:
 - 1) Screw-Bolt+ (ICC-ES ESR-3889).
 - c. Simpson Strong-Tie:
 - 1) Titen HD (ICC-ES ESR-2713).
 - d. Or equal.
5. Requests, if any, for Engineer's approval of "or-equals" or substitutes shall indicate proposed anchor has at least the same tension and shear strength as the associated anchorage products indicated by name in this Article.

PART 3 - EXECUTION

3.1 PREPARATION

- A. For cast-in-place concrete anchorages, allow adequate time for proper installation, inspection, and observation prior to placing concrete.
- B. Prior to installation, inspect and verify areas and conditions under which concrete anchorages will be installed.
 1. Notify Engineer of conditions detrimental to proper and timely completion of the Work.
 2. Do not proceed with the Work until unsatisfactory conditions are properly remedied.

3.2 INSTALLATION

- A. Installation Requirements - General:
 1. Install items in accordance with the Contract Documents, manufacturer's written instructions, and Laws and Regulations. Where such requirements conflict, obtain interpretation or clarification from Engineer prior to commencing the associated Work.
 2. Perform the following unless shown or indicated otherwise:

- a. Provide stainless steel anchorages for connecting aluminum and steel members to concrete and masonry. Provide dissimilar materials protection in accordance with Section 09 96 00 – High-Performance Industrial Coatings.
 - b. Provide washers for all anchorages.
 - c. Where exposed, extend threaded anchorage a maximum of 0.75 inch and a minimum of 0.5 inch above top of fully-engaged nut. If anchorage is cut off to required maximum height, dress the threads to allow nuts to be removed without damage to nuts.
 3. Tightening of nuts: Do the following after nuts are snug-tightened down:
 - a. Upset anchorage threads to prevent nuts from backing off. Provide double nut or lock nut in lieu of upset threads for items that may require future removal.
 - b. For cast-in-place anchorages (excluding post-installed anchorages), tighten nuts an additional 1/8 turn beyond snug tight to prevent nuts from backing off.
 - c. When two nuts are used per concrete anchor above the base plate, tighten top nut an additional 1/8 turn to "lock" the two nuts together.
 - d. For post-installed anchorages, comply with MPII.
 4. Secure architectural components to avoid aesthetic distortion and to avoid overstressing fasteners from expansion, contraction, or installation.
- B. Cast-in-Place Anchorages:
1. Provide where anchor rods or anchor bolts are indicated on the Drawings, unless another anchor type is approved by Engineer.
 2. Provide concrete anchorages as shown on the Drawings or as required to secure the Work to concrete.
 3. Tie cast-in-place anchorage in position to embedded reinforcing steel using wire.
 4. Tack welding of anchorage is prohibited.
 5. Chase threads as required and coat projected portion of carbon steel anchors and nut threads with a heavy coat of clean grease after concrete has cured.
 6. Anchorage location Tolerance: in accordance with AISC 303.
 7. Provide steel or durable wood templates for all column and equipment anchorages. Place templates above top of concrete; do not impede proper concrete placement and consolidation.
- C. Mechanical Anchorages:
1. Use only where specifically indicated on the Drawings or when approved for use by the Engineer.
 2. Do not use where subjected to vibration.
 3. May be used in overhead applications.
 4. Contact Engineer for clarification when anchors will not be installed in compliance with manufacturer's printed installation requirements.
- D. Post-installed Anchorages:
1. For post-installed anchors, comply with MPII regarding hole diameter and depth required to fully develop the tensile strength of anchor or reinforcing bar.
 2. Use hammer drills to create holes.
 3. Properly clean out holes in accordance with the associated ICC-ES report using non-metallic, fiber bristle brush and compressed air, or as otherwise necessary to remove all loose material from each hole prior to installing anchor in the presence of Special Inspector.
 4. Adhesive Anchorages:
 - a. Provide only where specifically indicated on the Drawings or when approved for use by Engineer.
 - b. May be provided where subjected to vibration or at buried or submerged locations.

- c. Do not install for overhead applications or sustained tension loading conditions such as utility hangers.
 - d. Install adhesive anchors in concrete aged not less than 21 days.
- E. Finishes:
 - 1. Coat aluminum surfaces in contact with dissimilar materials in accordance with Section 09 96 00 – High-Performance Industrial Coatings.
 - 2. Repair of damaged galvanized surfaces:
 - a. Prepare damaged surfaces by abrasive blasting or power sanding.
 - b. Repair damaged galvanized surfaces in accordance with ASTM A780.
 - c. Apply galvanizing repair paint to not less than 6 mils dry film thickness in accordance with galvanizing repair material manufacturer's instructions and ASTM A780.
- F. Ensure that embedded items are protected from damage and are not filled in with concrete or related materials.

3.3 FIELD QUALITY CONTROL

- A. Field Tests and Inspections:
 - 1. Comply with Section 03 05 05 - Concrete Testing and Inspection.
 - 2. Tests and inspections of anchorages shall comply with ACI 355.2 and/or ACI 355.4 as applicable.
 - 3. Owner reserves the right to inspect and test completed anchorages at a minimum of 25 to 50 percent of provided anchorages.
- B. Supplier's services:
 - 1. Post-installed anchor manufacturer's representative shall demonstrate and observe the proper installation procedures for the post-installed anchors.
- C. Defective Work:
 - 1. Anchorages that do not successfully pass required field tests and inspections or that are otherwise deemed defective by Engineer shall be remedied, in accordance with the Contract Documents, at no cost to Owner.

3.4 CLEANING

- A. After concrete has been placed, remove protection and clean all anchorage of all concrete, dirt, and other foreign matter.
- B. Provide surface acceptable to receive field applied paint coatings when specified in Specification Section 09 96 00.

END OF SECTION

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SECTION 03 21 00 REINFORCEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcing bar requirements for concrete construction.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 03 05 05 - Concrete Testing and Inspection.
 - 2. Section 03 15 19 - Anchorage to Concrete.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. SP 66, ACI Detailing Manual.
 - b. 117, Specification for Tolerances for Concrete Construction and Materials.
 - c. 315, Manual of Standard Practice for Detailing Reinforced Concrete Structures.
 - d. 318, Building Code Requirements for Structural Concrete.
 - e. 350, Code Requirements for Environmental Engineering Concrete Structures.
 - 2. ASTM International (ASTM):
 - a. A36, Standard Specification for Carbon Structural Steel.
 - b. A276, Standard Specification for Stainless Steel Bars and Shapes.
 - c. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - d. A706, Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - e. A970, Standard Specification for Headed Steel Bars for Concrete Reinforcement.
 - f. A1064, Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - 3. Concrete Reinforcing Steel Institute (CRSI):
 - a. Manual of Standard Practice.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Mill certificates for all reinforcing.
 - d. Manufacturer and type of proprietary reinforcing mechanical splices.
 - 2. Qualifications of welding operators, welding processes and procedures.
 - 3. Reinforcing number, sizes, spacing, dimensions, configurations, locations, mark numbers, lap splice lengths and locations, concrete cover and reinforcing supports.
 - 4. Sufficient reinforcing details to permit installation of reinforcing.
 - 5. Reinforcing details in accordance with ACI SP 66 and ACI 315.
 - 6. Locations where proprietary reinforcing mechanical splices are required or proposed for use.

7. Shop Drawings shall be in sufficient detail to permit installation of reinforcing without reference to Contract Drawings.
 - a. Shop Drawings shall not be prepared by reproducing the plans and details indicated on the Contract Drawings but shall consist of completely redrawn plans and details as necessary to indicate complete fabrication and installation of all reinforcing steel.
 - b. Where multiple types of supports for reinforcing steel (such as chairs, runners, bolsters, and other types of supports) will be used in the Work, clearly indicate on the Shop Drawings the support types and materials of supports.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Support and store all reinforcing above ground.
- B. Ship to jobsite with attached plastic or metal tags with permanent mark numbers which match the Shop Drawing mark numbers.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURES

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Reinforcing adhesive anchors:
 - a. See Specification Section 03 15 19.
 2. Reinforcing mechanical splices:
 - a. Lenton Rebar Splicing by Erico, Inc.
 - b. Richmond dowel bar splicer system by Richmond Screw and Anchor Co., Inc.
 - c. Bar-Grip Systems by Barsplice Products, Inc.

2.2 MATERIALS

- A. Reinforcing Bars: ASTM A615, grade 60, deformed.
- B. Reinforcing Bars to be Welded: ASTM A706, Grade 60, deformed.
- C. Welded Wire Reinforcement: ASTM A1064.
- D. Smooth Dowel Bars:
 1. Water containing structures: ASTM A276, Type 304.
 2. All other locations: ASTM A36, with metal end cap to allow longitudinal movement equal to joint width plus 1 inch.
- E. Proprietary Reinforcing Mechanical Splices: To develop in tension and compression a minimum of 125% of the yield strength of the reinforcing bars being spliced.
- F. Headed Deformed Bars:
 1. ASTM A970, Class A.
- G. Reinforcing Adhesive Anchors:
 1. See Specification 03 15 19.

2.3 ACCESSORIES

- A. Chairs, Runners, Bolsters, Spacers, Hangers, and Other Reinforcing Supports:
 1. Metal fabrications with plastic-coated tips in contact with forms.
 - a. Plastic coating meeting requirements of CRSI Manual of Standard Practice.
 2. All plastic construction meeting the requirements of CRSI Manual of Standard Practice.
 - a. 100% non-metallic, non-corrosive.
 - b. Required for all walls and elevated construction exposed to liquid containing structures.

- B. Protective plastic caps at mechanical splices.

2.4 FABRICATION

- A. Tolerances:
 - 1. Conforms to ACI 117, except as modified herein.
 - 2. Sheared lengths: +1 inches.
 - 3. Overall dimensions of stirrups, ties and spirals: +1/2 inches.
 - 4. All other bends: +0 inches, -1/2 inches.
- B. Minimum diameter of bends measured on the inside of the reinforcing bar to be as indicated in ACI 318 Paragraph 7.2.
- C. Ship reinforcing to jobsite with attached plastic or metal tags.
 - 1. Place on each tag the mark number of the reinforcing corresponding to the mark number indicated on the Shop Drawing.
 - 2. Mark numbers on tags to be so placed that the numbers cannot be removed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Tolerances:
 - 1. Conform to ACI 117, except as modified herein.
 - 2. Reinforcing placement:
 - a. Clear distance to formed surfaces: +1/4 inches.
 - b. Minimum spacing between bars: -1/4 inches.
 - c. Top bars in slabs and beams:
 - 1) Members 8 inches deep or less: +1/4 inches.
 - 2) Members between 8 inches and 2 feet deep: -1/4 inches, +1/2 inches.
 - 3) Members more than 2 feet deep: -1/4 inches, +1 inches.
 - d. Crosswise of members: Spaced evenly within +1 inches.
 - e. Lengthwise of members: +2 inches.
 - 3. Minimum clear distances between reinforcing bars:
 - a. Beams, walls and slabs: Distance equal to bar diameter or 1 inch, whichever is greater.
 - b. Columns: Distance equal to 1-1/2 times the bar diameter or 1-1/2 inches, whichever is greater.
 - c. Beam and slab reinforcing shall be threaded through the column vertical rebars without displacing the column vertical bars and still maintaining the clear distances required for the beam and slab reinforcing bars.
- B. Minimum concrete protective covering for reinforcement: As shown on Drawings.
- C. Unless indicated otherwise on Drawings, provide splice lengths for reinforcing as follows:
 - 1. For reinforcing: Class B splice meeting the requirements of ACI 350.
 - 2. For welded wire reinforcement:
 - a. Splice lap length measured between outermost cross wires of each fabric sheet shall not be less than one spacing of cross wires plus 2 inches, nor less than 1.5 x development length nor less than 6 inches.
 - b. Development length shall be as required for the yield strength of the welded wire reinforcement in accordance with ACI 350.
 - 3. Provide splices of reinforcing not specifically indicated or specified subject to approval of Engineer.

- a. Mechanical proprietary splice connectors may only be used when approved or indicated on the Contract Drawings.
- D. Welding:
 - 1. Welding reinforcing is not permitted.
- E. Placing Reinforcing:
 - 1. Assure that reinforcement at time concrete is placed is free of mud, oil or other materials that may affect or reduce bond.
 - 2. Reinforcement with rust, mill scale or a combination of both will be accepted as being satisfactory without cleaning or brushing provided dimensions and weights including heights of deformations on a cleaned sample is not less than required by applicable ASTM specification that governs for the reinforcing supplied.
 - 3. Reinforcing support:
 - a. Uncoated reinforcing:
 - 1) Support reinforcing and fasten together to prevent displacement by construction operations.
 - a) Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - b) Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
 - c) Reinforcement shown on the Contract Documents may not be repositioned for use a support for reinforcement. Additional drop bars may be provided for support of reinforcing,
 - 2) Reinforcing supported on ground:
 - a) Slab on grade and other members with only one mat of reinforcing:
 - (1) Provide metal bar supports with bottom plate.
 - (2) Do not use concrete blocks to support slab-on-grade reinforcing.
 - b) All other members: Provide supporting concrete blocks or metal bar supports with bottom plate.
 - 3) Reinforcing supported on formwork:
 - a) Concrete surfaces in contact with or over process liquid: All-Plastic chairs, runners and bar supports.
 - b) All other formed surfaces:
 - (1) Provide plastic-coated metal chairs, runners, bolsters, spacers, hangers and other reinforcing support.
 - (2) Only tips in contact with the forms need to be plastic coated.
 - 4. Support reinforcing over cardboard void forms by means of concrete supports which will not puncture or damage the void forms during construction nor impair the strength of the concrete members in any way.
 - 5. Where parallel horizontal reinforcement in beams is indicated to be placed in two or more layers, bars in the upper layers shall be placed directly above bars in the bottom layer with clear distance between layers to be 1 inch.
 - a. Place spacer bars at 3 feet maximum centers to maintain the required 1 inch clear distance between layers.
 - 6. Extend reinforcement to within 2 inches of concrete perimeter edges.
 - a. If perimeter edge is formed by earth or stay-in-place forms, extend reinforcement to within 3 inches of the edge.
 - 7. To assure proper placement, furnish templates for all column vertical bars and dowels.
 - 8. Do not bend reinforcement after embedding in hardened concrete unless approved by Engineer.

- a. Do not bend reinforcing by means of heat.
- 9. Do not tack weld reinforcing.
- 10. Embed reinforcing into hardened concrete utilizing adhesive anchor system specifically manufactured for such installation:
 - a. See Specification Section 03 15 19.

3.2 FIELD QUALITY CONTROL

A. Reinforcement Congestion and Interferences:

- 1. Notify Engineer whenever the specified clearances between bars cannot be met.
- 2. Do not place any concrete until the Engineer submits a solution to reinforcing congestion problem.
- 3. Reinforcing may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items.
- 4. If bars are moved more than one bar diameter, obtain Engineer's approval of resulting arrangement of reinforcing.
- 5. No cutting of reinforcing shall be done without written approval of Engineer.

B. Special Inspection:

- 1. See Section 03 05 05.

END OF SECTION

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SECTION 03 31 30
CONCRETE MATERIALS AND PROPORTIONING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for concrete materials, including:
 - a. Materials, including various types of grout, admixtures, cement, sand, aggregate, and other materials.
 - b. Concrete strength and proportioning, including design mixes for:
 - 1) Normal weight concrete.
 - 2) Flowable fill (Controlled low strength material).
 - 3) Low-density Cellular Concrete
 - 4) Mass concrete.
 - 5) Grout.

B. Scope:

1. Unless shown or indicated otherwise in the Contract Documents, concrete Work shall comply with:
 - a. ACI 301.
 - b. Laws and Regulations, including applicable building code.
2. In this Section, material is apportioned into the following grouting types:
 - a. Base plates for columns and equipment.
 - b. As otherwise shown or indicated in the Contract Documents.
3. This Section addresses materials for concrete. Other Specifications sections present other requirements for complete concrete Work, including, but not necessarily limited to:
 - a. Section 03 05 05 - Concrete Testing and Inspection.
 - b. Section 03 11 13 - Formwork.
 - c. Section 03 21 00 - Reinforcement.
 - d. Section 03 31 31 - Concrete Mixing, Placing, Jointing, and Curing.
 - e. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
 - f. Others as indicated in the Contract Documents.

C. Related Requirements: Include but are not necessarily limited to:

1. Section 03 05 05 - Concrete Testing and Inspection.
2. Section 03 11 13 - Formwork.
3. Section 03 15 19 - Anchorage to Concrete.
4. Section 03 21 00 - Reinforcement.
5. Section 03 31 31 - Concrete Mixing, Placing, Jointing, and Curing.
6. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
7. Section 03 41 33 - Precast and Prestressed Concrete.

1.2 REFERENCES

A. Abbreviations and Terminology:

1. Abbreviations: The following abbreviations are used in this Section:
 - a. "AAR" means deleterious "alkali-aggregate reaction", resulting from either alkali-silica reactive (ASR) or alkali-carbonate reactive (ACR) aggregates.

- b. "SCM" means "supplementary cementitious materials", with the meaning indicated below.
 - c. "CLSM" means controlled low strength material in accordance with requirements of this Section.
 - d. "LDCC" means low density cellular concrete in accordance with requirements of this Section.
 - 2. Terminology: Terminology indicated below are not defined terms and are not indicated with initial capital letters, but when used in this Section have the meanings indicated below:
 - a. "Supplementary cementitious materials" (SCM) means fly ash, silica fume, and GGBFS.
 - b. "Water-bearing concrete" is concrete surface to be in contact (whether continuously or intermittently) with water, process liquid, or slurries during intended operation of the facility, including, but not limited to, concrete tanks, channels, wet wells, distribution chambers, and secondary containment structures.
 - c. Independent Laboratory:
 - 1) Testing shall be performed by an independent laboratory complying with requirements of the generally recognized accrediting entity for the jurisdiction where the Site is located.
 - 2) Testing laboratory shall obtain all concrete samples and waterproofing product samples from the manufacturer of the associated product or material.
- B. Reference Standards:
- 1. American Concrete Institute (ACI):
 - a. CT-13, Concrete Terminology.
 - b. 117, Specification for Tolerances for Concrete Construction and Materials.
 - c. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 - d. 212.3R, Chemical Admixtures for Concrete.
 - e. 232.2R, Use of Fly Ash in Concrete.
 - f. 301, Specifications for Structural Concrete for Buildings.
 - g. 318, Building Code Requirements for Structural Concrete.
 - h. 350, Code Requirements for Environmental Engineering Concrete Structures.
 - 2. ASTM International (ASTM):
 - a. C33, Standard Specification for Concrete Aggregates.
 - b. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - c. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - d. C125, Terminology Relating to Concrete and Concrete Aggregates.
 - e. C150, Standard Specification for Portland Cement.
 - f. C157, Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar, and Concrete.
 - g. C192, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
 - h. C260, Standard Specification for Air-Entraining Admixtures for Concrete.
 - i. C494, Standard Specification for Chemical Admixtures for Concrete.
 - j. C595, Standard Specification for Blended Hydraulic Cements.
 - k. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - l. C796, Standard Test Method for Foaming Agents for use in Producing Cellular Concrete Using Preformed Foam.

- m. C1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
- n. C1116, Standard Specification for Fiber-Reinforced Concrete.
- o. C1399, Standard Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete.
- p. C1609, Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading).
- q. C1602, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- r. C1778, Standard Guide for Reducing Risk of Deleterious Alkali-Aggregate Reaction in Concrete.
- s. D6103, Standard Test Method for Flow Consistency of Controlled Low-Strength Material (CLSM)
- 3. Steel Deck Institute (SDI):
 - a. Design Manual for Composite Decks, Form Decks and Roof Decks.
- 4. Idaho Department of Transportation
 - a. 2023 Standard Specifications for Highway Construction

1.3 SUBMITTALS

A. Action Submittals: Submit the following:

- 1. Shop Drawings:
 - a. Schedule (table) of concrete materials proposed, listed by each specified grouping of concrete Work, including, but not limited to, aggregates, sand, cement (by type), SCM, admixtures, synthetic fibers, grouts, and other materials. For each separate material and product, indicate manufacturer and type of material.
 - b. Mix Designs:
 - 1) Proposed mix design for each concrete grouping required. For each, indicate concrete designation (type) indicated in the Contract Documents, proposed materials and proportioning, and intended special uses, such as concrete intended for placement in cold weather or warm weather, concrete to be placed by pumping, concrete intended for specific locations in the Work, and others.
 - 2) Engineer's approval of mix design Shop Drawing is only for limited purposes indicated in the Contract Documents, including the General Conditions, and in no way reduces or mitigates Contractor's responsibility for construction means, methods, techniques, procedures, and sequences.
- 2. Product Data:
 - a. Written affidavit stating materials proposed comply with requirements of reference standards indicated in this Section and, where applicable, compliance with Idaho Department of Transportation standard specifications for highway and bridge construction in the jurisdiction of the Site. Clearly indicate specific reference standards and department of transportation standard specifications item designation applicable to each specific material.
 - b. For aggregate and sand, indicate source (quarry) and gradation of materials proposed for use. Indicate the specific concrete mix design(s) proposed for each.
 - c. For cement and SCM, indicate material source and submit manufacturer's technical data (except safety data sheets).
 - d. For each proposed admixture and type of grout material (including non-shrink grouts, epoxy grout, and grout cure/seal compound), submit manufacturer's published technical data (except safety data sheets).

B. Informational Submittals: Submit the following:

1. Certifications: Submit concurrent with, but separate from, associated Shop Drawings and product data Submittals:
 - a. Certification of standard deviation, in units of pounds per square inch, for ready mix plant furnishing concrete.
 - b. SCM: Certification that SCM complies with quality requirements of this Section, and SCM Supplier's certified test reports of SCM delivered to concrete Supplier.
 - c. ASTM C33: Certification that class of coarse aggregate complies with ASTM C33 for type and location of concrete Work.
 - d. Aggregate:
 - 1) Certification of aggregate gradation.
 - 2) Certification of coarse aggregate impurities relative to alkali-aggregate reactivity in accordance with ASTM C1778.
 - e. Certification of shrinkage test results.
 - f. LDCC: Description of equipment and placement procedures to verify compliance with specifications and assure annulus is completely filled.
2. Test Reports:
 - a. Cement and SCM mill certificates for all materials to be supplied.
 - b. Test results for AAR impurities of coarse aggregates within proposed mixes, in accordance with ASTM standards cited in this Section.
3. Supplier's Instructions: Submit concurrent with, but separate from, associated product data Submittals:
 - a. Manufacturer's written instructions on proper storage, handling, mixing, and use of materials furnished.

1.4 DELIVERY, STORAGE AND HANDLING

A. Storage of Materials:

1. Admixtures:
 - a. Store admixtures in manner that avoids contamination, evaporation, and damage.
 - b. For admixtures used in form of suspensions or non-stable solutions, perform agitating as recommended by manufacturer to ensure uniform distribution of ingredients.
 - c. Protect liquid admixtures from freezing and temperature changes that adversely affect admixture characteristics and performance.
2. Cement and SCM:
 - a. Store cement and SCM in containers in weathertight space that prevent contamination with moisture and other contaminants.
3. Aggregates:
 - a. Store and access aggregates in manner avoiding excessive segregation and preventing contamination with other materials and other sizes of like aggregate.
 - b. Do not use frozen or partially frozen aggregate.
4. Sand: Allow natural sand to drain until sand has relatively uniform moisture content, prior to use.
5. If stockpiled materials contact the ground, unless such materials are stored on a clean, firm, reasonably impervious surface such as concrete or asphalt paving, do not use in the concrete Work bottom six inches of stockpiled materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cement:

1. Provide ASTM C150, Type I/II or V cement, unless otherwise required by the Contract Documents.

2. Provide ASTM C595, Type IL cement with MS designation for moderate sulfate resistance as an alternative to ASTM C150.
 3. Mass Concrete: Provide ASTM C150, Type II or ASTM C595, Type IL cement.
 4. Cement type provided shall match cement type used in associated approved mix design.
- B. SCM:
1. Fly Ash:
 - a. ASTM C618, Class F.
 - b. Non-staining.
 - c. Appropriate for providing hardened concrete of uniform, light-gray color.
 - d. Compatible with all other concrete ingredients. Fly ash shall have no deleterious effect on hardened concrete Work.
 - e. Produced by source approved, by the Idaho Transportation Department in the same jurisdiction as the Site, for use in concrete for highway bridges.
 - f. Evaluate and use in accordance with ACI 232.2R.
 2. SCM type used shall match SCM type used in associated approved mix design.
- C. Admixtures:
1. Admixtures – General:
 - a. Provide admixtures of same type, manufacturer and quantity as used in establishing required concrete proportions in mix design approved by Engineer.
 - b. Provide admixtures certified by manufacturers as compatible with other admixtures proposed.
 2. Air Entraining Admixtures: Comply with ASTM C260.
 3. Water Reducing Admixtures:
 - a. Provide water-reducing admixtures in all concrete mixes to provide and maintain required water-to-cement ratio without additional cement.
 - b. Water Reducing, Retarding and Accelerating: Comply with ASTM C494 Types A through E, and ACI 212.3R.
 - c. High Range Water Reducers (Superplasticizers):
 - 1) Required for pumped concrete.
 - 2) Comply with ASTM C494 Types F and G.
 4. Hydration Stabilizer:
 - a. Comply with ASTM C494 Type D.
 5. Admixture Chlorides – General:
 - a. Provide chloride-free admixtures.
 - b. Do not use calcium chloride.
 6. Shrinkage Reducing Admixtures:
 - a. Description: This provision applies to admixtures used for reducing shrinkage of Portland cement concrete.
 - b. Provide dosage necessary to comply with maximum allowable shrinkage indicated in this Section.
 - c. Products and Manufacturers: The following are acceptable products:
 - 1) GCP Applied Technologies, Eclipse 4500.
 - 2) Euclid Chemical Company, Conex.
 - 3) Master Builders Solutions, either MasterLife SRA 20 or MasterLife CRA 007.
 - 4) Or equal.
 7. Low Density Foam: (LDCC)
 - a. Foaming Agent

- 1) Range of Cast Density: 35-45 pcf
- 2) Minimum Compressive Strength: 200 psi
- 3) Flow Consistency per ASTM D6103: Greater than 7 inches

D. Crystalline Cementitious Waterproofing:

1. Products and Manufacturers: Subject to compliance with the Contract Documents, the following are acceptable.
 - a. Xypex Chemical Corporation, C-500.
 - b. Kryton International Inc, Krystol Internal Membrane (KIM).
 - c. Euclid Chemical Company, Eucon Vandex AM-10.
 - d. Or equal.
2. Description: Factory blended dry powder compound consisting of Portland cement, treated aggregate, and active chemicals.
3. Dosage rate shall be not less than 2 percent by weight of cementitious materials or additional as necessary to comply with the performance requirements indicated below.
4. Required Locations: Provide crystalline cementitious waterproofing admixture in concrete as follows: at locations shown or indicated on the Drawings.
5. Performance Criteria:
 - a. Mix waterproofing material in proportions recommended by manufacturer.
 - b. Submit to Engineer, together with product data Submittal, results of tests (previously performed for manufacturer) by independent third-party testing entity.
 - c. Crystalline cementitious waterproofing material, identical to that proposed for use in the Work, shall have been tested in accordance with the following:
 - 1) DIN 1048/ EN 12390, Water Impermeability of Concrete:
 - a) Prepare and test untreated samples ("control samples") and treated samples, all of the same concrete mix design. Test not less than three control samples and three treated samples.
 - b) Each sample shall be not less than 120 mm thick.
 - c) Subject samples to test pressure of water not less than design hydrostatic pressure to which concrete will be subject after Substantial Completion, for test duration of not less than 72 hours. However, test duration and pressure shall be sufficient for control samples to have not less than 100 mm of water penetration (average for all control samples tested).
 - d) Treated samples shall demonstrate not less than 90 percent reduction in depth of water penetration (average of all treated samples tested compared with average of all untreated control samples tested).
 - 2) Permeability: Supplier shall retain independent testing entity to perform permeability testing in accordance with USCOE CRD-C48 - Mod Permeability of Concrete.
 - a) Test samples of concrete, of identical mix design, using mix design similar to that used for the Work. Test untreated samples ("control samples") and samples treated with the admixture.
 - b) Samples shall each be not greater than two inches thick.
 - c) Subject samples to water at test pressure of 150 psi.
 - d) When compared with control samples, the treated samples shall exhibit no measurable leakage. Control samples shall exhibit full saturation and measurable leakage.

E. Macro Synthetic Fibers:

1. Manufacturers and Products: Subject to compliance with the Contract documents, the following are acceptable:
 - a. Master Builders Solutions, MasterFiber MAC Series.

- b. GCP Applied Technologies, Strux 90/40.
 - c. Euclid Chemical Company, Tuf-Strand SF.
 - d. Or equal.
 - 2. Comply with ASTM C1116.
 - 3. Provide dosage to obtain average residual strength (at net deflection of L/150) of not less than 170 psi, in accordance with ASTM C1609 and ASTM C1399.
- F. Water:
- 1. Potable in accordance with Laws and Regulations.
 - 2. Clean and free from deleterious substances.
 - 3. Free of oils, acids, and organic matter. Comply with ASTM C1602.
- G. Aggregates for Normal Weight Concrete:
- 1. Comply with ASTM C33.
 - 2. Fine aggregates and coarse aggregates are separate ingredients.
 - 3. Provide aggregates acceptable for bridge construction in accordance with the third-party standard specifications indicated below in this provision.
 - 4. Blended aggregates are unacceptable
 - 5. Coarse Aggregate:
 - a. Material shall be well-graded, washed aggregate, free of organic material, confirming to Table 703.02-1 of the IDOT 2023 Standard Specification for Highway Construction Section 703.02..
 - b. Gradation: In accordance with Table 03 31 30-A in this section's "Mixes" Article.
 - c. Mass Concrete:
 - 1) Specific Gravity not less than 2.57.
 - 2) Limestone or granite.
 - 6. Alkali-Reactive Aggregates:
 - a. Aggregates that may be deleteriously reactive, when combined with alkalis in cement, are unacceptable.
 - b. Evaluate proposed aggregates for potential deleterious alkali-aggregate reaction in concrete in accordance with ASTM C1778.
 - 1) Submit to Engineer results of source quality control testing for alkali-aggregate reactivity presenting the following:
 - a) Analysis and classification of aggregates in accordance with ASTM C1778
 - b) Results of source quality control analysis of aggregates.
 - c) Include the flow from Figure 1 of ASTM C 1778 indicating test results sequence.
 - d) Field performance history alone shall not be submitted to document acceptable aggregate performance.
 - e) Size and exposure condition of the Work in Table 2 of ASTM C 1778: exposed to alkalis in service.
 - f) Structure class for use in Table 3 of ASTM C1778: Class SC4.
- H. Maximum total water-soluble chloride ion content for concrete mix including all ingredients measured as weight percent of cement in accordance with ASTM C1218:
- 1. Prestressed concrete: 0.06.
 - 2. All other concrete: 0.10.
- I. Non-shrink Grout:
- 1. Manufacturers and Products: Subject to compliance with the contract Documents, the following are acceptable:

- a. Master Builders Solutions, Masterflow, 713.
 - b. Euclid Chemical Company, NS Grout.
 - c. Sika, Sika Grout 212.
 - d. Or equal.
2. Description:
 - a. This provision requires non-shrink, non-metallic grout. Unless otherwise shown or indicated in the Contract Documents, references to "non-shrink grout" refer to non-shrink, non-metallic grout required by this provision.
 3. Performance Criteria:
 - a. Non-shrink grout shall produce a positive but controlled expansion.
 - b. Mass expansion shall not be created by gas liberation or by other means.
 - c. Minimum 28-day Compressive Strength: 7,000 PSI.
 4. Material:
 - a. Provide material that is non-shrink, non-metallic, non-corrosive, and non-staining.
 - b. Comply with ASTM C1107, Grade B.
 - c. Premixed with water only. Add water in accordance with manufacturer's written instructions.
- J. Epoxy Grout:
1. Manufacturers and Products: Subject to compliance with the Contract Documents, the following are acceptable:
 - a. Master Builders Solutions, Masterflow 648.
 - b. Five Star Products, DP Five Start Epoxy Grout.
 - c. Euclid Chemical Company, E3 Flowable.
 - d. Sika, Sikadur 42, Grout Pak.
 - e. Or equal.
 - f. One manufacturer shall furnish both aggregate and adhesive.
 2. Description:
 - a. Three-component epoxy resin system, comprised of two liquid epoxy components and one inert aggregate filler component.
 - b. Indication of locations where epoxy grout is required are indicated in the grout schedule in Section 03 31 31 - Concrete Mixing, Placing, Jointing, and Curing.
 - c. Furnish each component in separate package for mixing at the Site.
 3. Performance Criteria:
 - a. Minimum 28-day Compressive Strength: 13,000 psi.
 4. Materials:
 - a. Aggregate shall be compatible with adhesive.

2.2 MIXES

A. Mixes - General:

1. Provide concrete capable of: (a) being placed without segregation of aggregate from other components, and (b) developing all properties necessary and required.
2. Provide ready-mix concrete in accordance with ASTM C94/C94M.
3. Batching and other tolerances shall be in accordance with ACI 117.
4. All concrete shall be normal weight concrete, unless otherwise required by the Contract Documents. Normal weight concrete shall weigh approximately 145 to 150 pounds per cubic foot (without reinforcing steel), measured 28 days after placing.

B. Concrete Mixes:

1. Mix design requirements are indicated in this Section's Table 03 31 30-A, below.
- C. Air Entrainment:
1. Provide air entrainment in concrete providing total air content, expressed as percent by volume, in accordance with this Section's Table 03 31 30-A, below.
 2. Adjust dosage rate as necessary to compensate for shrinkage reducing admixtures and concrete placing method.
- D. Slump:
1. Slump – General:
 - a. Measure slump at point of discharge of wet concrete into final location.
 - b. Compensate for slump loss due to placing method.
 - c. Concrete with slump less than minimum required may be used provided such concrete can be properly placed and consolidated.
 - d. Slump of Concrete to be Placed by Pumping:
 - 1) Provide water or water-reducing admixture at ready-mix plant for concrete to be placed by pumping, to allow for slump loss due to pumping.
 - 2) Provide additional water sufficient only so that slump of concrete at discharge end of pump hose does not exceed: (a) maximum allowable slump indicated, and (b) maximum specified water-to-cement ratio.
 - e. Slump Adjustment at the Site:
 - 1) Slump may be adjusted at the Site by providing water reducers.
 - 2) Dosing shall be performed by experienced quality control technician employed by concrete Supplier. Concrete mixing thereafter shall be directed by the same technician.
 - f. Slump tolerances shall comply with ACI 117.
 2. Concrete for Walls and Columns:
 - a. 8 inches maximum; 4 inches minimum.
 - b. Slump shall be obtained by use of mid-range or high-range water reducer complying with ASTM C494.
 3. All Other Members:
 - a. Concrete using water reducer in accordance with ASTM C494: 8 inches maximum; 4 inches minimum.
 - b. Concrete without water reducer in accordance with ASTM C494: 5 inches maximum, one inch minimum.
- E. Proportioning:
1. Proportioning - General:
 - a. Proportion components of concrete to provide mixture that can be placed: (a) into corners and angles of forms, and around reinforcing, by placing and consolidation methods employed, (b) without component materials becoming segregated, and (c) without excessive, free water to collecting on concrete surface or other surfaces.
 - b. Proportion component elements of concrete to provide proper concrete Work, including concrete durability, strength, and other necessary and required properties.
 2. Normal Weight Concrete:
 - a. Normal weight concrete target cementitious materials contents and maximum water to-cementitious ratios shall be in accordance with this Section's Table 03 31 30-A, below.
 - b. Target cementitious materials contents indicated in the Contract Documents are intended to provide crack-free, durable, finished concrete Work, rather than concrete Work of excessive strength.
 3. SCM:
 - a. SCM – General:

- 1) Based on results of AAR testing by Supplier (performed in accordance with ASTM C1778) and alkali content of cement, SCM content (in accordance with this Section) may be adjusted in lieu of the indicated percentages to reduce risk associated with AAR.
- 2) Use only one type of SCM in a given mix unless expressly required or approved by Engineer.
- 3) Water-to-cementitious (i.e, total of SCM plus cement) ratio shall not exceed required maximum water-to-cement ratio indicated in this Section.
- b. Fly Ash:
 - 1) For cast-in-place concrete only, maximum of 25 percent by weight of Portland cement content, per cubic yard, may be fly ash, at rate of one pound fly ash for one pound cement.
 - 2) Do not use fly ash in concrete required in Section 03 41 33 - Precast and Prestressed Concrete, and.
4. Water-Reducing, Water-Retarding, and Water-Accelerating Admixtures:
 - a. Provide in accordance with admixture manufacturer's written instructions.
 - b. Add to mix at ready-mix plant.
 - c. Use hydration stabilizer admixture, or AAR-inhibiting admixture, in concrete, as necessary and required, for placing and workability.
 - 1) Water reducers are required to maintain required maximum water-to-cement ratios.
5. High Range Water Reducers (Superplasticizers):
 - a. Superplasticizers are required in:
 - 1) Concrete to be pumped, except slabs-on-grade and mats.
 - 2) Concrete for water-bearing structures.
 - 3) Other concrete Work at Contractor's option.
 - b. Maximum concrete slump, before addition of admixture, shall be three inches. Maximum slump after addition of superplasticizer admixture shall be eight inches.
 - c. Comply with Section 03 31 31 - Concrete Mixing, Placing, Jointing, and Curing, relative to superplasticizers.
6. Macro Synthetic Fibers:
 - a. Uniformly disperse synthetic fibers into concrete mixtures. Provide synthetic fibers in mixer at ready-mix plant.
 - b. Required Locations: Provide macro synthetic fibers in the following concrete Work:
 - 1) Elevated exterior concrete slab
 - c. Required Dosage:
 - 1) Determined by Contractor and concrete Supplier as necessary to comply with concrete's required minimum average residual strength.
 - 2) Provide in accordance with ASTM C1399 and ASTM C1609.
 - 3) Under no circumstances shall dosage of macro synthetic fibers be less than:
 - a) Four pounds per cubic yard when used in concrete slabs on metal decking, in accordance with SDI 31.
 - b) Three pounds per cubic yard for all other locations where such fibers are required or used.
7. Normal Weight Concrete Mix Proportioning:
 - a. Method 1:
 - 1) Use Method 1 when combination of concrete component materials and mixes will be evaluated and selected via trial-and-error.
 - 2) Provide mixes with suitable proportions and properties in accordance with ACI 211.1, using not less than three different water-to-cementitious ratios providing a

range of concrete compressive strengths, including required average compressive strength.

- 3) Trial mixes shall have slump within 0.75 inches of maximum allowed in the Contract Documents. For air-entrained concrete, air content of trial batches shall be within 0.5 percent of air entrainment required by the Contract Documents.
 - 4) For each water-to-cementitious ratio:
 - a) Provide not less than three trial compressive strength tests for concrete test age required, and cure in accordance with ASTM C192.
 - b) Cylinder Size: In accordance with ASTM C31.
 - c) Test for compressive strength at 28 days, in accordance with ASTM C39.
 - (1) Quantity of cylinders shall comply with one of the following trial strength test:
 - (a) 6-inch diameter cylinders: Two.
 - (b) 4-inch diameter cylinders: Three.
 - 5) From results of such required tests, plot curve showing relationship between water-to-cementitious ratio and compressive strength.
 - 6) Based on required curve, select water-to-cementitious ratio for the Work, that will provide concrete of required average compressive strength.
 - 7) Provide cementitious content and mixture proportions so maximum water cement ratio is not exceeded when slump is equal to maximum allowed in the Contract Documents.
 - 8) Required average compressive strength is indicated below in this Section.
- b. Method 2:
- 1) In lieu of trial mixes required by Method 1, field test results from prior projects, for concrete made using identical or substantively identical concrete component materials and proportioning, may be used by concrete supplier in determining proposed mix proportions, provided the test results are within a year of project start date.
 - 2) Use of proposed concrete mix proportions based on field test results from prior projects are subject to approval by Engineer. Engineer's decision will be based on information in such Submittals and demonstrated ability, of such concrete successfully provided on such prior projects, to provide required average compressive strength.
 - 3) Requirements for Submittals of Concrete Test Results from Prior Projects:
 - a) Submittals of field test results from prior projects shall clearly indicate all materials, proportions, and conditions, and clearly indicate where such matters are similar to those required for the concrete Work on the Project.
 - b) Changes in the materials, proportions, and conditions within submitted test results from prior projects shall have been not more restricted than those for the subject, proposed concrete mix.
 - c) Field test reports from prior projects shall be in accordance with ACI 350.
 - 4) Concrete proportions for the concrete Work may be determined from test results of prior projects via interpolation (by Contractor and concrete Supplier) between compressive strengths and proportions of two or more test results from prior projects, each in accordance with requirements of the Contract Documents for this Project.
8. Required average compressive strength shall exceed required 28-day compressive strength by the extent determined in accordance with ACI 350, Chapter 5 using the standard deviation of concrete ready-mix plant proposed for the Work as described in ACI 350, Chapter 5.

F. Controlled Low-Strength Material (CLSM):

1. Provide mixture of cement, SCM, fine sand, water, and air, with consistency allowing flow under a very low pressure (low head).
2. Approximate quantities of each component per cubic yard of mixed material:
 - a. Cement (Type I or Type II): 50 pounds.
 - b. SCM: 200 pounds.
 - c. Fine Sand: 2,700 pounds.
 - d. Water (approximate): 420 pounds.
 - e. Air Content (approximate): 10 percent.
3. Adjust actual quantities to provide yield of one cubic yard with materials used.
4. Approximate compressive strength shall be 85 to 175 psi.
5. Sand Gradation: Fine sand shall be evenly graded material with not less than 95 percent passing No. 4 sieve and not more than five percent passing No. 200 sieve.

G. Low-Density Cellular Concrete (LDCC):

1. Concrete Class II
 - a. Maximum Cast Density: 30-36 pcf
 - b. Minimum Compressive Strength at 28 days: 80 psi

H. Allowable Shrinkage:

1. Provide in accordance with Table 03 31 30-A of this Section, tested in accordance with ASTM C157 at 28 days.
2. Continue testing for 64 weeks in accordance with ASTM C157 and submit results to Engineer as Informational Submittals.
3. Perform for concrete Work for all water bearing or basement structures unless expressly indicated otherwise in the Contract Documents.

TABLE 03 31 30-A							
Type of Concrete	28-day Compressive Strength	Max. W/C Ratio	Target Total Cement (pounds)	SCM	ASTM C33 Size No.	Air Content (%)	Allowable Shrinkage Limit
Normal weight precast concrete	5000 PSI	0.42	611		57	4.5 to 7.5	NA
Normal weight water-bearing concrete	4500 PSI	0.40	564	Note 1	57 Note 2	4.5 to 7.5	0.042 percent
Normal weight all other concrete	4000 PSI	0.45	564	Note 1	57 67	4.5 to 7.5	0.048 percent
Mass Concrete	4500 PSI at 56 days	0.36 to 0.40	500		57	4.5 to 7.5	0.032 percent

Table 03 31 30-A Notes:

1. If fly ash is proposed for use, the weight of fly ash plus weight of Portland cement shall be used to comply with total target cement content.
2. Unless otherwise indicated, larger aggregate (No. 467) is required for concrete slabs or foundations on grade; optional elsewhere

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Testing and Inspections:

1. Code-Required Tests and Special Inspections:

- a. Section 03 05 05 - Concrete Testing and Inspection, indicates required testing for concrete Work.
- 2. Contractor-Performed Field Testing and Inspections:
 - a. Where concrete testing and inspection is required by the Contract Documents and is not part of the code-required tests and special inspections by Owner or other entity for whom Owner is responsible, such tests and inspections shall be by Contractor.
 - b. Perform concrete testing and inspections in accordance with Section 03 05 05 - Concrete Testing and Inspection.
 - c. Aggregates and Other Stockpiled Materials: To ensure stockpiles at the concrete mixing location are not contaminated and otherwise comply with Contract requirements, perform tests on such materials at the concrete ready-mix plant.
 - d. Perform strength test on all concrete to which water or superplasticizer, above the amount stated in concrete mix design Submittal approved by Engineer, has been added.
 - 1) Perform sampling after water or superplasticizer has been added and additional mixing has been performed.

END OF SECTION

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CRYSECTION 03 31 31
CONCRETE MIXING, PLACING, JOINTING, AND CURING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mixing, placing, jointing, and curing of concrete construction.
- B. Related Requirements: Include but are not necessarily limited to:
 - 1. Section 03 05 05 - Concrete Testing and Inspection.
 - 2. Section 03 11 13 - Formwork.
 - 3. Section 03 21 00 - Reinforcement.
 - 4. Section 03 31 30 - Concrete, Materials and Proportioning.
 - 5. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
 - 6. Section 07 16 16 – Crystalline Cementitious Waterproofing
 - 7. Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- A. Terminology:
 - 1. Terminology: Terminology indicated below are not defined terms and are not indicated with initial capital letters, but when used in this Section have the meanings indicated below:
 - a. Unless obviously meant or intended otherwise, certain words and terms used in this Section have meanings indicated in ACI CT-13.
 - b. "Water-bearing concrete" means concrete surface to be in contact (whether continuously or intermittently) with water, process liquid, or slurries during intended operation of the facility, including, but not limited to, concrete tanks, channels, wet wells, distribution chambers, and secondary containment structures.
- B. Reference Standards: Standards referenced in this Section include, but are not necessarily limited to, the following:
 - 1. American Concrete Institute (ACI):
 - a. CT-13, Concrete Terminology.
 - b. 117, Specification for Tolerances for Concrete Construction and Materials.
 - c. 304R, Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - d. 304.2R, Placing Concrete by Pumping Methods.
 - e. 305R, Guide to Hot Weather Concreting.
 - f. 305.1, Specification for Hot Weather Concreting.
 - g. 306R, Guide to Cold Weather Concreting.
 - h. 306.1, Standard Specification for Cold Weather Concreting.
 - i. 308.1, Specification for Curing Concrete.
 - j. 309R, Guide for Consolidation of Concrete.
 - k. 318, Building Code Requirements for Structural Concrete and Commentary.
 - l. 350, Code Requirements for Environmental Engineering Concrete Structures.
 - m. 360R, Guide to Design of Slabs-on-Ground.
 - 2. ASTM International (ASTM):
 - a. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - b. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

- c. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
- d. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- e. D1056, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
- f. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- 3. National Ready Mixed Concrete Association (NRMCA):
 - a. Checklist for Certification of Ready Mixed Concrete Production Facilities.
- 4. United States Army Corps of Engineers (USACE):
 - a. CRD-C572, Specifications for Polyvinylchloride Waterstop.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

- 1. Coordinate concrete placement Work with other Work, and work of other contractors (if any), that must be installed prior to placement of concrete.
- 2. Inform other contractors, if any, affected by the concrete Work of intended date(s) of placement of concrete. Provide sufficient advance notice to allow other contractors to perform their work that is to be completed prior to placing of concrete.

B. Pre-Installation Conference:

- 1. Pre-installation conference is required not less than 30 days prior to placing of concrete for: first placement of concrete for the Project. Responsibility for scheduling the conference and advising required participants of the date, time, and location of the conference resides with Contractor.
- 2. Location of Conference: Same location as construction progress meetings.
- 3. Required Participants:
 - a. Contractor: Contractor's project manager, Contractor's site superintendent, Contractor's safety representative, Contractor's quality control manager, concrete installation Subcontractor's (if any) project manager and site superintendent or foreman, concrete Supplier's representative, and others deemed necessary by Contractor.
 - b. Engineer: Structural engineer-in-responsible-charge or delegate, Resident Project Representative (if any), and others deemed necessary by Engineer.
 - c. Building code official or delegate (if available).
 - d. Owner: Special inspectors and concrete quality testing laboratory's representative, Owner's Site Representative, and others deemed necessary by Owner.
- 4. Person or entity that distributed notice of pre-installation conference shall chair the conference.
- 5. Site Visit:
 - a. Participants' required visit to location of the subject concrete Work may be made immediately prior to, during, or immediately following the pre-installation conference.
- 6. Participants shall be prepared to discuss the topics indicated below, and shall be empowered by their employer to make binding decisions concerning the conference topics:
 - a. Designation of responsible personnel.
 - b. Schedule for concrete Work and subsequent Work.
 - c. Status of other construction requiring coordination with subject concrete Work.
 - d. Status of required Submittals for concrete Work.
 - e. Contractor's concrete pre-placement plan checklist.
 - f. Mock-ups as a quality standard.
 - g. Subbase preparation and status (as applicable).

- h. Formwork.
 - i. Reinforcing.
 - j. Jointing, waterstops (as applicable), and related Work.
 - k. Sampling and testing for quality control and compliance with building codes and other Laws and Regulations.
 - 1) Contractor responsibility for coordinating with testing entity and special inspectors.
 - 2) Storage and protection of Samples.
 - 3) Additional test cylinders to be made for concrete deliveries in which water exceeding the water/cement ratio of approved mix design was added at the Site.
 - 4) Additional test cylinders to be made for concrete structural elements Contractor intends to subject to live loading prior to 28 days after placement of concrete.
 - 5) Reporting of results.
 - l. Coordination with authorities having jurisdiction.
 - m. Logistics for concrete delivery (Contractor's responsibility) and placing, including:
 - 1) Travel time between ready-mix plant and Site, maximum time concrete to be in delivery vehicles, and exceptions to limits.
 - 2) Review of approved concrete mix(es), including limits of water addition and person authorized to add water, if water has been withheld at the plant.
 - 3) Traffic flow and delivery vehicle cleanout (Contractor's responsibility).
 - n. Concrete placing and consolidation means, methods, procedures, techniques, and sequences, and related safety and protection measures (Contractor's responsibility).
 - o. Concrete finishing.
 - p. Temperature, weather, and atmosphere during placing and curing (Contractor's responsibility).
 - q. Mass concrete – criteria and procedures.
 - r. Curing procedures (Contractor's responsibility).
 - s. Removal of formwork and patching (Contractor's responsibility).
 - t. Criteria for Engineer's acceptance.
 - u. Other, related, subsequent Work.
 - v. Other necessary topics.
7. Discussion, whether at the pre-installation conference or otherwise, of Contractor's means, methods, procedures, techniques, and sequences of construction, and associated safety and protection measures, in no way changes or mitigates Contractor's sole responsibility for such matters.
 8. Record of Conference: Within two days following the pre-installation conference, Owner's Site Representative shall prepare and distribute to all participants of pre-installation conference, and others as appropriate, a reasonably complete record of topics discussed, identified problems, decisions made, and other matters pertinent to the subject concrete Work. Transmit such record in accordance with Section 01 31 26 - Electronic Communication Protocols
 9. Should conference reveal matters that will not be suitably addressed by the scheduled date for the subject concrete placement, after taking steps to address the matter(s) in question, reconvene the conference. If necessary, reschedule concrete placement without change in the Contract Times and Contract Price.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Concrete Supplier:
 - a. Ready-mix concrete batch plant shall be certified by NRMCA.

- b. Ready mix plant shall comply with NRMCA Checklist for Certification of Ready Mixed Concrete Production Facilities.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
 - a. Scaled (minimum 1/8 inch per foot) drawings showing proposed locations of construction joints, control joints, expansion joints (as applicable) and joint profile dimensions for each joint type.
 - b. Drawing indicating location, size and type of prefabricated waterstop joints.
2. Product Data including:
 - a. Manufacturers and types:
 - 1) Joint fillers.
 - 2) Curing agents.
 - 3) Construction joint bonding adhesive.
 - 4) Prefabricated waterstops.
 - b. Acknowledgement that products submitted meet requirements of standards referenced.
3. Samples:
 - a. Sample of each type of prefabricated waterstop proposed for the Work, when requested by Engineer.
4. Monitoring Procedures:

B. Informational Submittals: Submit the following:

1. Delivery Tickets:
 - a. Copies of concrete delivery tickets.
2. Supplier Instructions:
 - a. Procedure for adding high-range water reducer at the Site.
 - b. Instructions for handling and installing products approved by Engineer.
3. Field Quality Control Submittals:
 - a. Results of tests, inspections, and other quality control activities required by the Contract Documents, including Section 03 05 05 - Concrete Testing and Inspections, and this Section's "Field Quality Control" Article performed at the Site.
4. Supplier Site Visit Reports:
 - a. Report of each visit to the Site by Supplier, summarizing purpose of visit, activities while onsite, problems encountered, advice given to Contractor or Subcontractor, and actions taken.
5. Special Procedure Submittals:
 - a. Description of proposed curing methods.
6. Qualifications:
 - a. Ready-mix plant certification, in accordance with this Section's "Quality Assurance" Article.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Concrete Delivery:

1. Prepare a delivery ticket for each load of ready mixed concrete.
2. Truck operator shall hand ticket to Contractor at the time of delivery.
3. Ticket to show:
 - a. Mix identification.
 - b. Quantity delivered.

- c. Quantity of material in each batch.
- d. Outdoor temperature in the shade at location of concrete placement.
- e. Time at which cement was added.
- f. Time of delivery.
- g. Time of discharge.
- h. Quantity of water that may be added at the site without exceeding the specified water-cement ratio.
- i. Quantity of any water added at the Site.

1.7 PROJECT CONDITIONS

- A. Adjust concrete mix design when material characteristics, job conditions, weather, strength test results or other circumstances warrant.

- 1. Do not use revised concrete mixes until submitted to and approved by Engineer.

1.8 SEQUENCING AND SCHEDULING

- A. Do not begin concrete production until proposed concrete mix design has been approved by Engineer.

- 1. Engineer's approval of concrete mix design does not relieve Contractor of responsibility to provide concrete that meets the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Subject to compliance with the Contract Documents, the manufacturers listed in this article are acceptable.

- B. Neoprene Expansion Joint Fillers:

- 1. Acceptable manufacturers:
 - a. Permaglaze.
 - b. Rubatex.
 - c. Williams Products.
 - d. Or equal.
- 2. Materials:
 - a. Closed cell neoprene.
 - b. ASTM D1056, Type 2, Class A or C.
 - c. Grade: Compression deflection as required to limit deflection to 25 percent of joint thickness under pressure from concrete pour height.

- C. Asphalt Expansion Joint Fillers:

- 1. Acceptable manufacturers:
 - a. W.R Meadows.
 - b. J and P Petroleum Products.
 - c. Or equal.

- 2. Materials: ASTM D994.

- D. Fiber Expansion Joint Fillers:

- 1. Materials: ASTM D1751.

- E. Waterstops, PVC Type:

- 1. Acceptable manufacturers:
 - a. Sika Greenstreak Plastic Products.

- b. W.R Meadows.
 - c. Vinylex Corporation.
 - d. Bometals, Inc.
 - e. Or equal.
 - 2. Materials:
 - a. Virgin polyvinyl chloride compound not containing scrap or reclaimed materials or pigment.
 - b. Cast-in-place type: USACE CRD-572.
 - 3. Approved profiles as listed.
 - a. Construction joints:
 - 1) Ribbed: 6 inches wide by 3/8 inch.
 - 2) Sika Greenstreak Plastic Products Style #679, or equal.
 - b. Control joints:
 - 1) 6-inch wide by 3/8 inch thick with ribs and center bulb.
 - 2) Sika Greenstreak Plastic Products Style #705, or equal.
 - c. Expansion joint:
 - 1) 9 inches wide by 3/8 inch thick center bulb two inch outside diameter.
 - 2) Sika Greenstreak Plastic Products Style #739, or equal.
 - d.
 - 4. Provide factory-made waterstop fabrications at all changes in direction, intersections and transitions, leaving only straight butt splices for the field. Butt welds to be a minimum six inches clear of the intersection.
 - 5. Factory prepunched (less than 1.5 feet on centers, each edge, staggered) for wire supports.
 - a. Provide hog rings or grommets at all punched holes along the length of the waterstop.
 - 6. See Drawings for application and other requirements.
- F. Waterstops, Preformed Strip Type:
- 1. Acceptable manufacturers:
 - a. Sika Greenstreak Plastics, Inc. (Hydrotite).
 - b. Adeka Ultra Seal USA (MC-2010MN).
 - c. DeNeef (Swellseal 2010).
 - d. Or equal.
 - e.
 - 2. Hydrophilic, non-bentonite composition.
 - 3. Manufactured solely for the purpose of preventing water from traveling through construction joints.
 - 4. Volumetric expansion limited to three times maximum.
 - 5. See the Drawings for locations, applications, and other requirements.
- G. Water Swelling Sealant:
- 1. Required adhesive for use with strip-type waterstop.
 - 2. Compatible with strip-type waterstop.
 - 3. Single component, gun applied.
 - 4. Moisture cured.
 - 5. Minimum 70 percent volumetric expansion swelling capability.
 - a.
- H. Curing Materials shall comply with one or more of the following:
- 1. Absorbent Covers.

2. Moisture Retaining Covers.
 - a. Moisture Retaining Fabric.
3. Dissipating curing compound:
 - a. Fugitive dye, waterborne, membrane-forming.
 - b. ASTM C309, Type 1D, Class A or B, shall be composed of hydrocarbon resins, and dissipating agents that begin to break down upon exposure to UV light, and traffic, approximately four to six weeks after applications, providing a film that is removable with standard degreasing agents, and mechanized scrubbing actions to not impair the later addition and performance of applied finishes.
 - c. Products and Manufacturers:
 - 1) Dayton Superior Corporation; Day Chem Rez Cure (J-11-WD).
 - 2) Euclid Chemical Company; Kurez DR VOX.
 - 3) L&M Construction Chemicals, Inc.; L&M Cure R.
 - 4) Or equal.
4. Clear, water-borne, membrane-forming curing and sealing compound:
 - a. ASTM C1315, Type 1, Class A.
 - b. Moisture loss shall be not more than 0.40 kilograms per square meter when applied at 300 square feet per gallon.
 - c. Manufacturer's certification is required.
 - d. Subject to Project requirements, provide one of the following products:
 - 1) Solvent-based:
 - a) Euclid Chemical Company; Super Diamond Clear, Luster Seal 300 (exterior), Super Rez-Seal (interior).
 - b) L&M Construction Chemicals, Inc.; Lumiseal Plus.
 - c) W.R. Meadows, Inc.; CS-309/30.
 - d) Or equal.
 - 2) Water-based:
 - a) Euclid Chemical Company; Super Diamond Clear VOX.
 - b) L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
 - c) W.R. Meadows, Inc.; Vocomp-30.
 - d) Or equal.
- I. Vapor Retarder: Comply with Section 07 26 00 - Under Slab Vapor Retarder.
- J. Sand cement grout, non-shrink grout and epoxy grout: Comply with Section 03 31 30 - Concrete Materials and Proportioning.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installing the Work constitutes Contractor's approval of underlying work, substrates, and field conditions prevailing at the time of the Work.

3.2 PREPARATION

- A. Preparation – General:
 1. Materials and construction shall comply with the tolerances as specified in ACI 117.
 2. Complete formwork.
 - a. Perform formwork in accordance with Section 03 11 13 - Formwork.
 3. Remove earth, snow, ice, water, foreign matter, and other extraneous materials from areas that will receive concrete.
 4. Secure reinforcement in place.

- a. Provide reinforcing in accordance with Section 03 21 00 - Reinforcement.
- 5. Provide expansion joint material, anchors and other embedded items.
- 6. Prior to placing concrete, obtain Engineer's concurrence that associated formwork and reinforcing appear to be in accordance with the Contract Documents. However, in no event will Engineer's observations, comments, or concurrence that any part of the Work appears to be in accordance with the Contract Documents modify or reduce Contractor's sole responsibility for providing Work in accordance with the Contract Documents.
- 7. Do not place concrete during rain, sleet, snow, or other adverse ambient or environmental conditions unless adequate protection is provided by Contractor and such placement is acceptable to Engineer.
 - a. Provide sufficient quantity of competent, experienced workers with due regard for effects of concrete temperature and atmospheric conditions on rate of hardening of concrete as required to obtain good surfaces and avoid unplanned cold joints.
 - b. Do not allow precipitation or storm water runoff to increase mixing water nor to damage surface finish.
- 8. Remove hardened concrete and foreign materials from inner surfaces of conveying equipment and formwork.
- 9. Provide slabs and beams of minimum indicated required depth when sloping structural foundation base slabs and elevated slabs to drains.
 - a. For floor slabs on grade, slope top of subgrade to provide slab of required uniform thickness.
- B. Preparation of Subgrade for Slabs On Ground:
 - 1. Granular subgrade shall be wetted without standing water immediately prior to placing concrete.
 - 2. Obtain Engineer's acceptance of granular subgrade compaction density prior to placing slabs on ground.
- C. Edge Forms and Screeds:
 - 1. Set accurately to produce designated elevations and contours of finished surface.
 - 2. Sufficiently strong to support vibrating screeds or roller pipe screeds, if required.
 - 3. Use strike off templates, or acceptable vibrating type screeds, to align concrete surfaces to contours of screed strips.

3.3 CONCRETE MIXING

- A. Concrete Mixing - General:
 - 1. Provide concrete materials from one ready-mix batch plant qualified in accordance with this Section's "Quality Assurance" Article.
 - 2. Batch, mix, and transport in accordance with ASTM C94/C94M.
- B. Control of Admixtures:
 - 1. Control at ready-mix plant:
 - a. Admixtures shall be introduced at the ready-mix plant in accordance with manufacturer's recommendations.
 - b. Charge admixtures into mixer as solutions.
 - 1) Measure by means of an appropriate mechanical dispensing device.
 - 2) Liquid considered a part of mixing water.
 - 3) Admixtures that cannot be added in solution may be weighed or measured by volume if so recommended by manufacturer.
 - c. Add separately, when two or more admixtures are used in concrete, to avoid possible interaction that might interfere with efficiency of either admixture, or adversely affect concrete.

- d. Complete performing addition of retarding admixtures within one minute after addition of water to cement has been completed, or prior to beginning of last three quarters of required mixing, whichever occurs first.
- 2. Control of Admixtures at the Site:
 - a. Additional quantities of admixtures (with the exception of retarders) may be added at the Site provided:
 - 1) Addition of admixtures shall be under the supervision of the ready-mix plant's quality control representative.
 - 2) Addition of each admixture shall be documented on the delivery ticket.
 - 3) Provide additional mixing in accordance with ASTM C94.
- C. Tempering and Control of Mixing Water:
 - 1. Mix concrete only in quantities for immediate use.
 - 2. Discard concrete which has set.
 - 3. Discharge concrete from ready-mix delivery vehicles within time limit stated in ASTM C94.
 - 4. Addition of water at the Site:
 - a. Comply with Section 03 31 30 - Concrete Materials and Proportioning, for specified water cement ratio and slump.
 - b. Do not exceed maximum specified water cement ratio or slump.
 - c. Incorporate water by additional mixing equal to at least half of total mixing required.

3.4 PLACING OF CONCRETE

- A. Placing of Concrete - General:
 - 1. Place concrete as a rate such that concrete, which is being integrated with fresh concrete, is "workable".
 - a. Provide sufficient, competent, skilled workers for timely delivery of concrete into forms to avoid unintended cold joints and placement consolidation issues.
 - 2. Comply with ACI 304R, ACI 304.2R, and ACI 301.
 - 3. Do not begin placing concrete during rain, sleet, snow, or other adverse weather or environmental conditions that may be detrimental to concrete placement.
 - a. Protect fresh concrete from ensuing inclement weather and other environmental conditions that may be detrimental to concrete.
 - 4. Time between concrete batching and final placement shall not exceed 90 minutes, unless indicated otherwise by the ready-mix plant or noted on the delivery ticket.
 - a. Selection of time limit to end of discharge should consider ambient conditions, types of cementitious materials and admixtures used, placement procedures, and projected transportation time between ready-mix plant and the point of delivery.
 - b. If discharge is acceptable after more than 90 minutes have elapsed since batching, verify that air content of air-entrained concrete, slump, and temperature of concrete are as specified.
 - 5. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials.
 - 6. Begin work only when work of other trades affecting concrete is complete.
 - 7. When pumping concrete, do not use excess grout or mortar to lubricate concrete conveyance piping.
 - 8. Do not use excess water for workability or any reason when placing concrete by freefall.
 - 9. Deposit concrete continuously to avoid cold joints.
 - 10. Provide construction joints at locations shown or indicated in the Contract Documents, unless otherwise approved by Engineer via Shop Drawing or Contract modification.
 - a. Plan size of crews with due regard for effects of concrete temperature and ambient conditions to avoid unplanned cold joints.

11. Spreaders:
 - a. Temporary: Remove as soon as concrete placing renders their function unnecessary.
 - b. Embedded:
 - 1) Obtain approval of Engineer for their use.
 - 2) Materials: Concrete or metal.
 - 3) Ends of metal spreaders coated with plastic coating two inches from each end.
12. Deposit concrete as nearly as practicable in its final position to avoid segregation.
 - a. Maximum free fall: 4 feet.
 - b. Place concrete by means of hopper, "elephant trunk" or tremie pipe extending to within four feet of surface.
13. Perform the following operations before bleeding water has an opportunity to collect on surface:
 - a. Spread.
 - b. Consolidate.
 - c. Straightedge.
 - d. Darby or bull float.
14. No water shall be added to the concrete surface to ease finishing operation.
15. Do not discharge water into forms.
16. Consider use of form vibrators for certain placement situations.

B. Cold Weather Concrete Placement:

1. Comply with ACI 306.1.
2. Do not place concrete on forms or subgrades that are below 32 degrees F or contain frozen material.
3. Maintain all materials, forms, reinforcement, subgrade and any other items which concrete will come in contact with free of frost, ice or snow at time of concrete placement.
4. Temperature of concrete when discharged at site: in accordance with ACI 306.1.
5. Heat subgrade forms, embedments and reinforcement to between 45 and 70 degrees F, when temperature of surrounding air is 40 degrees F or below at time concrete is placed.
 - a. Remove frost from subgrade, forms and reinforcement before concrete is placed.
6. Combine water with aggregate in mixer before cement is added, if water or aggregate is heated above 90 degrees F.
7. Do not mix cement with water or with mixtures of water and aggregate having a temperature greater than 90 degrees F.
8. Comply with ACI 306R for specific requirements dealing with elevated steel troweled slabs that will be exposed to freeze-thaw cycles.

C. Hot Weather Concrete Placement:

1. Comply with ACI 305.1.
2. Cool ingredients before mixing, or add flake ice or well crushed ice of a size that will melt completely during mixing for all or part of mixing water if high temperature, low slump, flash set, cold joints, or shrinkage cracks are encountered.
3. Temperature of concrete at point of delivery (i.e. delivery vehicle discharge) when placed:
 - a. Not to exceed 90 degrees F.
 - b. Not so high as to cause:
 - 1) Shrinkage cracks.
 - 2) Difficulty in placement due to loss of slump.
 - 3) Flash set.
4. Temperature of forms and reinforcing when placing concrete:

- a. Not to exceed 90 degrees F.
 - b. May be reduced by spraying with water to cool below 90 degrees F.
 - 1) Leave no standing water to contact concrete being placed.
- 5. Prevent plastic shrinkage cracking, slab curling, or both due to evaporation.
- D. Consolidating:
 - 1. Consolidate in accordance with ACI 309R except as modified herein.
 - 2. Consolidate by vibration so that concrete is thoroughly worked around reinforcement, embedded items and into corners of forms.
 - a. Ensure no displacement of reinforcing or other embeds from final position.
 - b. Eliminate:
 - 1) Air or stone pockets.
 - 2) Honeycombing, pitting, or both.
 - 3) Planes of weakness.
 - 3. Use suitable form vibrators located just below top surface of concrete, where internal vibrators cannot be used in areas of congested reinforcing.
 - a. Size and coordinate external vibrators to specifically match forming system used.
 - 4. Internal vibrators:
 - a. Minimum frequency of 8000 vibrations per minute.
 - b. Insert and withdraw at points approximately 1.5 feet apart.
 - 1) Allow sufficient duration at each insertion to consolidate concrete but not sufficient to cause segregation.
 - c. Use in:
 - 1) Beams and girders of framed slabs.
 - 2) Columns and walls.
 - 3) Vibrating concrete around all waterstops.
 - d. Size of vibrators shall be in accordance with ACI 309R, Table 5.1.5.
 - 5. Obtain consolidation of slabs with internal vibrators, vibrating screeds, roller pipe screeds, or other appropriate means.
 - 6. Do not use vibrators to transport concrete within forms.
 - 7. When placing self-consolidating concrete, the use of form or pencil vibrators is acceptable, provided such methods do not cause aggregate segregation, or otherwise adversely affect the quality of the Work.
 - 8. Provide sufficient spare vibrators at the Site during all concrete placing operations to ensure continuous vibration.
 - 9. Bring a full surface of mortar against form by vibration supplemented if necessary by spading to work coarse aggregate back from formed surface, where concrete is to have an as-cast finish.
 - 10. Prevent construction equipment and machinery, construction operations, and personnel from introducing vibrations into freshly placed concrete after the concrete has been placed and consolidated.
- E. Handle concrete from mixer to place of final deposit by methods which will prevent segregation or loss of ingredients and in a manner which will assure that required quality of concrete is maintained.
 - 1. Use truck mixers, agitators, and non-agitating units in accordance with ASTM C94.
 - 2. Temporary horizontal belt conveyors:
 - a. Mount at a slope which will not cause segregation or loss of ingredients.
 - b. Protect concrete against undue drying or rise in temperature.
 - c. Use an arrangement at discharge end to prevent segregation.

- d. Do not allow mortar to adhere to return length of belt.
- e. Discharge conveyor runs into equipment specially designed for spreading concrete.
- 3. Temporary metal or metal lined chutes:
 - a. Slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal.
 - b. Chutes more than 20 feet long and chutes not meeting slope requirements may be used provided they discharge into a hopper before distribution.
 - c. Provide end of each chute with a device to prevent segregation.
- 4. Temporary pumping or pneumatic conveying equipment:
 - a. Designed for concrete application and having adequate pumping capacity.
 - b. Control pneumatic placement so segregation is avoided in discharged concrete.
 - c. Loss of slump in pumping or pneumatic conveying equipment shall not exceed 1.5 inches.
 - d. Do not convey concrete through pipe of aluminum or aluminum alloy.
 - e. Provide pumping equipment without Y sections.
- F. Placing of Concrete on Metal Deck:
 - 1. Prior to concrete placement, the metal deck shall be free of soil, debris, standing water, loose mill scale, and other foreign matter.
 - 2. Care shall be exercised when placing concrete so that the deck will not be subject to construction loads or impact that exceed the design capacity of the deck.
 - 3. Concrete shall be placed in a uniform manner and spread toward the center of the deck span.
 - 4. If buggies are used to place concrete, runways shall be planked, and buggies shall only operate on planking.
 - a. Planks shall be of adequate stiffness to transfer loads to the steel supports without damaging the deck.
 - 5. Deck damage caused by careless placement of concrete shall be repaired or replaced.
 - 6. Pour concrete to the elevations shown or indicated on the Drawings.

3.5 JOINTS AND EMBEDDED ITEMS

- A. Construction Joints - General:
 - 1. Provide joints at locations as shown or indicated on the Drawings or as shown on approved Shop Drawings approved by Engineer or in an appropriate Contract modification.
 - a. Where construction joint spacing shown on the Drawings exceeds the joint spacing indicated in Paragraph B. below, submit proposed construction joint location in conformance with this Section.
 - 2. Unplanned construction joints are unacceptable.
 - a. If concrete cannot be completely placed between planned construction joints, then it must be removed.
 - 3. In general, locate joints near middle of spans of slabs, beams and girders unless a beam intersects a girder at this point, in which case, offset joint in girder a distance equal to twice the width of the beam.
 - 4. Locate joints in walls and columns at underside of floors, slabs, beams, or girders, and at tops of foundations or floor slabs, unless shown otherwise.
 - a. At Contractor's option, beam pockets may be formed into concrete walls.
 - b. Size pockets to allow beam reinforcing to be placed as detailed on the Drawings.
 - 5. Place beams, girders, column capitals and drop panels at same time as slabs.
 - 6. Place corbels monolithically with their supporting members.
 - a. Locate wall vertical construction joints midway between corbels.

- b. Where only a single corbel is located, place it also monolithically with wall and locate wall vertical construction joint a minimum of three feet from face of corbel.
- 7. Make joints perpendicular to main reinforcement with all reinforcement continuous across joints.
- 8. Provide the following joints unless shown or indicated otherwise on the Drawings:
 - a. Roughen joints: horizontal construction joints.
 - b. Keyed joints: vertical construction joints.
- 9. Roughen construction joints:
 - a. Clean the previously hardened concrete interface and remove all laitance.
 - b. Intentionally roughen the interface to a full amplitude of 0.25 inch.
- 10. Keyways:
 - a. Construction joint keyways shall have the following dimensions, unless shown or indicated otherwise on the Drawings or as directed by Engineer.
 - b. Wall keys:
 - 1) Keyway width, not less than one-third and not more than one-half the wall thickness measured perpendicular to wall faces.
 - 2) Keyway depth shall be not less than 1.5 inches.
 - 3) Continuous along length of wall.
 - 4) Place keyway in wall center unless otherwise shown or indicated on the Drawings.
 - c. Keyways in footings, foundations, base slabs, and structural or elevated slabs:
 - 1) Keyway height not less than one-third and not more than one-half the footing or slab thickness.
 - 2) Keyway depth not less than 1.5 inches.
 - 3) Continuous along footing or slab.
 - 4) Keyway in footing or slab center unless shown otherwise on the Drawings.
 - d. Beam keyways:
 - 1) Full width of beam.
 - 2) Keyway height not less than 5.5 inches.
 - 3) Keyway depth not less than 1.5 inches.
 - 4) Keyway located in initial beam pour, directly above the bottom reinforcing, unless shown otherwise on the Drawings.
- 11. Minimum time before placement of adjoining concrete construction:
 - a. All other concrete: 60 hours, unless otherwise noted.
- B. Construction Joints - Spacing Unless Otherwise Specified:
 - 1. Structures not intended to contain liquid:
 - a. Wall vertical construction joints:
 - 1) 50 feet maximum on centers.
 - 2) At wall intersections, four feet minimum from corner.
 - b. Base slab, floor, and roof slab construction joints:
 - 1) Placements to be approximately square and not to exceed 2,500 square feet.
 - 2) Maximum side dimension of a slab pour shall be 70 feet.
 - 2. Water bearing structures:
 - a. Wall vertical construction joints:
 - 1) 30 feet maximum on centers.
 - 2) At wall intersections, six feet minimum from corner.
 - b. 18 Floor slab, construction joints:
 - 1) Placements to be approximately square and not to exceed 2,000 square feet.

- 2) Maximum side dimension of a slab pour to be less than:
 - a) Twice the length of the short side.
 - b) 60 feet.
- c. Elevated slab construction joints:
 - 1) Placements to be approximately square and not to exceed 4,000 square feet.
 - 2) Maximum side dimension of a slab pour to be less than:
 - a) Twice the length of the short side.
 - b) 70 feet.
- C. Construction Joints - Bonding:
 1. Obtain bond between concrete pours at construction joints by thoroughly cleaning and removing all laitance from construction joints.
 2. Before new concrete is placed, all construction joints shall be coated with cement grout, or dampened, as indicated below:
 3. Roughen construction joints:
 - a. Roughen the surface of the concrete to expose the coarse aggregate uniformly with 0.25 inch minimum amplitude.
 - 1) Remove laitance, loosened particles of aggregate or damaged concrete at the surface.
 4. Keyed construction joints:
 - a. Thoroughly clean construction joints and remove all laitance.
 - b. Dampen the hardened concrete immediately prior to placing of fresh concrete.
- D. Slab On Grade Joints:
 1. Locate construction and control joints in slabs on grade as shown or indicated on the Drawings.
 2. Time cutting properly with set of concrete, if saw cut joints are required or allowed.
 - a. Start cutting as soon as concrete has hardened sufficiently to prevent aggregates being dislodged by saw.
 - b. Complete before shrinkage stresses become sufficient to produce cracking.
- E. Expansion Joints:
 1. Do not allow reinforcement or other embedded metal items bonded to concrete (except smooth dowels bonded on only one side of joint) to extend continuously through an expansion joint.
 2. Use neoprene expansion joint fillers, unless shown or indicated otherwise on the Drawings.
 3. Seal expansion joints as shown or indicated on the Drawings.
 - a. Comply with Section 07 92 00 - Joint Sealants.
- F. Waterstops - General:
 1. Waterstop shall be continuous with splices in accordance with manufacturer's instructions and create water tight joints.
 2. Do not mix different types of waterstop materials in the same structure without approval from the Engineer unless shown or indicated on the Drawings.
 3. Preformed strip type:
 - a. Locate waterstop at center of wall, unless shown or indicated otherwise on the Drawings.
 - 1) Maintain at least three inches from edge of concrete or as recommended by manufacturer.

- b. Install in a bed of swelling sealant on smooth surface of hardened concrete by use of nails, adhesive or other means as recommended by manufacturer to prevent movement of waterstop during placement of concrete.
 - c. Roughened joints shall be specially prepared during concrete placement to provide smooth surface for proper water stop installation.
 - d. Use in joints against existing concrete where shown or indicated on the Drawings.
- 4. PVC waterstops:
 - a. Pre-position waterstop accurately in joints, with adequate clearance from all reinforcing. Do not push waterstop into wet concrete.
 - b. Secure waterstops in correct position using hog rings or grommets spaced no more than 1.5 feet maximum staggered along each edge full length and passed through the edge of the waterstop.
 - 1) Tie wire to adjacent reinforcing.
 - c. Hold horizontal waterstops in place with continuous supports.
 - d. Install according to manufacturer's instructions.
 - 1) Do not displace reinforcement from required location.
 - e. Splice ends and intersections with perpendicular butt splice using electrical splicing iron in accordance with manufacturer's instructions.
 - 1) Use factory fabricated "T" and corner intersection fittings.
 - 2) Field splice straight runs of material.
 - f. Unless otherwise noted, provide for construction joints in new construction for all structures indicated on the Drawings.
- G. Other Embedded Items:
 - 1. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for its support, prior to initiating concreting.
 - 2. Do not route electrical conduit, drains, or pipes in concrete slabs, walls, columns, foundations, beams or other structural members unless approved by Engineer.
- H. Placing Embedded Items:
 - 1. Support against displacement.
 - 2. Fill voids in sleeves, inserts and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.
 - 3. Provide adequate means for anchoring waterstop in concrete.
 - a. Provide means to prevent waterstops in the forms from being folded over by the concrete as it is placed.

3.6 FINISHING

- A. Comply with Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
- B. Coordinate mixing and placing with finishing.

3.7 INSTALLATION OF GROUT

- A. Grout Schedule:
 - 1. Non-shrinking non-metallic grout:
 - a. Filling form tie holes.
 - b. Under column and beam base plates.
 - c. Other uses shown or indicated on the Drawings.
 - 2. Epoxy grout:
 - a. Patching cavities in concrete.
 - b. Grouting of dowels and anchor bolts into existing concrete.

- c. Grouting of rotating or oscillating equipment base plates.
 - d. As shown or indicated on the Drawings.
- B. Grout Installation:
- 1. Non-shrink non-metallic grout:
 - a. Clean concrete surface to receive grout.
 - b. Saturate concrete with water for 24 hours prior to grouting.
 - c. Mix in a mechanical mixer.
 - d. Use no more water than necessary to produce flowable grout.
 - e. Place in accordance with manufacturer's instructions.
 - f. Provide under beam, column, and equipment base plates, in joints between precast concrete and cast-in-place slabs, and in other locations shown or indicated on the Drawings.
 - g. Completely fill spaces and cavities below the top of base plates.
 - h. Provide forms where base plates and bed plates do not confine grout.
 - i. Where exposed to view, finish grout edges smooth.
 - j. Except where a slope is shown or indicated on the Drawings, finish edges flush at the base plate, bed plate, member or piece of equipment.
 - k. Coat exposed edges of grout with cure or seal compound recommended by the grout manufacturer.
 - 2. Epoxy grout:
 - a. Mix and place in accordance with manufacturer's written instructions.
 - b. Apply only to clean, dry, sound surface.
 - c. Completely fill cavities and spaces around dowels and anchors without voids.
 - d. Grout base and bed plates as specified for non-shrinking, non-metallic grout.
 - e. Obtain manufacturer's field technical assistance as necessary to ensure proper placement.

3.8 CURING AND PROTECTION

- A. Protect concrete from premature drying, excessively hot or cold temperatures, and mechanical damage immediately after placement, and maintain with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement, hardening, and compressive strength gain.
 - 1. Comply with ACI 308.1 except as modified herein.
 - 2. Do not impose loads by foot traffic, wheeled traffic, and other loads until concrete has sufficiently cured to carry imposed loads without adversely affecting the concrete. In no event shall concrete be subject to loading or traffic during initial 48 hours of curing, unless otherwise approved by Engineer.
- B. For surfaces of non-water bearing structures, apply one of the following curing procedures immediately after completion of placement and finishing (surfaces not in contact with forms).
 - 1. Ponding or continuous sprinkling. Avoid eroding the surface of freshly placed concrete.
 - 2. Application of wet Absorbent Covers:
 - a. Minimum lap: 12 inches.
 - b. Provide continuous uniform supply of moisture, such as sprinklers or soaker hoses as necessary to keep concrete surface continuously wet.
 - c. Monitor Absorbent Covers as required to prevent cover materials or concrete surface from drying out.
 - 3. Continuous application of steam (not exceeding 150 degrees F) or mist spray.
 - 4. Application of Moisture Retaining Cover sheet materials.
 - a. Place as soon as possible after final finishing and without marring the surface.

- b. Minimum lap: 12 inches.
 - c. Seal edges to make water-tight.
 - d. Place Moisture Retaining Cover in intimate contact with the concrete surface, without wrinkles and weighted to hold in place.
 - e. Hold cover and edges in place as necessary to prevent wind from displacing the cover.
 - f. Moisture Retaining Fabric:
 - 1) Install in accordance with manufacturer's written recommendations.
 - 2) Saturate concrete surface and fabric side of cover immediately prior to placing.
 - g. Monitor continuously during the curing period:
 - 1) Repair holes, tears or displaced cover.
 - 2) Rewet as necessary to keep concrete moist under cover.
 - 5. Application of other moisture retaining covering acceptable to Engineer.
 - 6. Water used for curing shall be within 20 degrees F of the concrete temperature.
 - 7. Application of a curing compound.
 - a. Apply curing compound in accordance with manufacturer's written recommendations immediately after any water sheen, which may develop after finishing, has disappeared from concrete surface.
 - b. Do not use on surface against which additional concrete or other material is to be bonded unless it is proven that curing compound will not prevent bond.
 - c. Where a vertical surface is cured with a curing compound, the vertical surface shall be covered with a minimum of two coats of the curing compound.
 - 1) Apply the first coat of curing compound to a vertical surface immediately after form removal.
 - 2) The vertical concrete surface at the time of receiving the first coat shall be damp with no free water on the surface.
 - 3) Allow the preceding coat to completely dry prior to applying the next coat.
 - 4) A vertical surface: Any surface steeper than 1 vertical to 4 horizontal.
 - 8. Surfaces In Contact with Forms:
 - a. Formed surfaces: Cure formed concrete surfaces utilizing final curing methods per ACI 308.1, including underside of beams, supported slabs, and other similar surfaces,
 - 1) See Section 03 11 13 - Formwork.
 - b. Minimize moisture loss from and temperature gain of concrete placed in forms exposed to heating by sun by keeping forms wet and cool until they can be safely removed.
 - c. Make provisions to keep concrete wall moist while stripping forms and until curing measures are in place.
 - d. After form removal, cure concrete until end of time prescribed.
 - e. Use one of the methods listed above.
 - f. Forms left in place shall not be used as a method of curing in hot weather.
 - g. The term "hot weather", where used in these Specifications, is defined in ACI 305.1.
 - h. In hot weather, remove forms from vertical surfaces as soon as concrete has gained sufficient strength so that the formwork is no longer required to support the concrete.
- C. Curing Period:
- 1. Continue curing for at least seven days for all concrete except Type III, high early strength concrete for which period shall be at least three days.
 - a. If one of curing procedures indicated above is used initially, it may be replaced by one of other procedures indicated any time after concrete is two days old, provided concrete is not permitted to become surface dry during transition.
- D. Cold Weather:

1. Comply with of ACI 306.1.
 2. Maintain temperature of concrete in accordance with ACI 306.1 for a minimum of 72 hours after concrete is placed, when outdoor temperature is 40 degrees F, or less.
 - a. Maximum temperature rate of decrease: In accordance with ACI 306.1.
 3. Provide temporary heating, covering, insulating, or housing of the concrete Work to maintain required temperature without damage due to concentration of heat.
 4. Do not use combustion heaters unless precautions are taken to prevent exposure of concrete to exhaust gases which contain carbon dioxide.
 5. Interior slabs in areas intended to be heated shall be adequately protected so that frost does not develop in the supporting subgrade.
- E. Hot Weather:
1. Comply with ACI 305.1 and ACI 308.1.
 2. Provide as necessary cooling forms, reinforcement and concrete, windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light colored material.
 3. Provide protective measures as quickly as concrete hardening and finishing operations will allow.
 4. Maximum temperature rate of decrease: In accordance with ACI 305.1.
- F. Rate of Temperature Change:
1. Maintain temperature of air immediately adjacent to concrete as uniform as possible, during and immediately following curing.
- G. Protection from Mechanical Damage:
1. Protect concrete from damage of all types, whether or not mechanically imparted including load stresses, heavy shock, and excessive vibration.
 2. Protect finished concrete surfaces from all types of damage, including damage by construction equipment and machinery, construction means and methods, precipitation, and running water.
 3. Do not load self-supporting structures in such a way as to overstress concrete.

3.9 FIELD QUALITY CONTROL

- A. Tests and Inspections:
1. Special Inspections in accordance with building code:
 - a. Comply with The Structural Special Inspections tables on the drawings, and 03 05 05 - Concrete Testing and Inspection.
- B. Supplier's Onsite Services:
1. Waterstop manufacturer's representative shall provide on-site training of waterstop installation, field splicing, welding and inspection procedures prior to construction.

END OF SECTION

SECTION 03 35 00
CONCRETE FINISHING AND REPAIR OF SURFACE DEFECTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concrete finishing and repair of surface defects.
 - 2. Chemical Sealers.
 - 3. Polymer Modified Cementitious Coating.
 - 4. Resurfacing Mortar.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 03 11 13 - Formwork.
 - 2. Section 03 31 30 - Concrete, Materials and Proportioning.
 - 3. Section 03 31 31 - Concrete Mixing, Placing, Jointing and Curing.
 - 4. Section 09 96 00 - High Performance Industrial Coatings.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. CT-13, Concrete Terminology.
 - b. 117, Specification for Tolerances for Concrete Construction and Materials.
 - c. 303R, Guide to Cast-in-Place Architectural Concrete Practice.
 - d. 308, Standard Practice for Curing Concrete.
 - 2. ASTM International (ASTM):
 - a. C109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).
 - b. C150, Standard Specification for Portland Cement.
 - c. C157, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
 - d. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - e. C666, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
 - f. C779, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
 - g. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
 - h. D4258, Standard Practice for Surface Cleaning Concrete for Coating.
 - i. D4259, Standard Practice for Abrading Concrete.
 - j. E1155, Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers.
 - k. E1486, Standard Test Method for Determining Floor Tolerances Using Waviness, Wheel Path and Levelness Criteria.
 - 3. International Concrete Repair Institute (ICRI):
 - a. 310.2R, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
 - 4. National Council Highway Research Program (NCHRP):

- a. 244, Concrete Sealers for the Protection of Bridge Structures.
- 5. The Society for Protective Coatings/NACE International (SSPC/NACE):
 - a. SP 13/NACE No. 6, Surface Preparation of Concrete.
- B. Qualifications:
 - 1. Chemical Sealer CS-2:
 - a. Applicator shall be factory trained and approved, in writing, by the manufacturer to apply the product.
 - b. Applicator shall have a minimum of five years of experience successfully applying materials specified.
- C. Mock-Ups.
 - 1. General:
 - a. Construct additional mock-ups as required until accepted.
 - b. Mock-ups constitute minimum standard of quality for actual construction.
 - c. Maintain mock-up during construction.
 - d. Remove when directed by Engineer.
 - 2. Construct mock-up for each type of wall finish specified for review and acceptance by Engineer.
 - a. Minimum 4 x 4 feet area for each different wall finish specified.
 - b. Mock-ups shall include:
 - 1) Sample of patched tie hole.
 - 2) Sample of all jointery being used in the walls.
 - c. Include mock-up of wall having polymer modified cementitious coating.
 - 1) Mock-up shall be stepped to show surface preparation, repairs and coating in all stages of application.
 - 3. Construct mock-up floor slab for review and acceptance by Engineer.
 - a. Minimum 10 x 10 feet.

1.3 DEFINITIONS

- A. Vertical Surface Defects:
 - 1. Any void in the face of the concrete deeper than 1/8 inches, such as:
 - a. Tie holes.
 - b. Air pockets (bug holes).
 - c. Honeycombs.
 - d. Rock holes.
 - 2. Scabbing:
 - a. Scabbing is defect in which parts of the form face, including release agent, adhere to concrete.
 - 3. Foreign material embedded in face of concrete.
 - 4. Fins 1/16 inches or more in height.
- B. Installer or Applicator:
 - 1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 - 2. Installer and applicator are synonymous.
- C. Other words and terms used in this Specification Section are defined in ACI CT-13.

1.4 SUBMITTALS

- A. Shop Drawings:

1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
2. Certifications:
 - a. Certification of aggregate gradation.
 - b. Certification of manufacturer experience qualifications and performance history.
 - c. Certification of applicator's qualifications.
 - 1) Refer to Qualifications paragraph.
 - 2) Provide manufacturer's written approval of applicators.
 - 3) Provide references substantiating specialty experience.

B. Informational Submittals:

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's recommendations and requirements for materials used.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. Bonding Agents:
 - a. Master Builders Solutions.
 - b. Euclid Chemical Co.
 - c. Laticrete - L&M Construction Chemicals.
 2. Chemical Sealers:
 - a. Master Builders Solutions.
 - b. Euclid Chemical Co.
 - c. Laticrete - L&M Construction Chemicals.
 - d. Tnemec Chemprobe.
 3. Polymer Modified Cementitious Coating:
 - a. Aquafin International.
 - b. Master Builders Solutions.
 - c. Euclid Chemical Co.
 4. Patching Mortar:
 - a. Master Builders Solutions.
 - b. Euclid Chemical Co.
 - c. Laticrete - L&M Construction Chemicals.
 - d. Sika Corporation.

2.2 MATERIALS

- A. Chemical Sealer CS-1:
1. High solids, water-based solution containing acrylic copolymers.
 - a. ASTM C1315, Type I, Class A.
 - b. Non-yellowing UV resistant.
 - c. VOC Content: <200 G/L.
 2. USDA approved as a concrete floor sealer.
 3. Euclid Chemical Super Diamond Clear VOX.

B. Chemical Sealer CS-2:

1. Water based chemical solution containing a blend of silicate and silicate polymers designed to seal, harden and dustproof concrete floors.
2. VOC Content: 0 G/L.
3. Performance of treated concrete floor:
 - a. Coefficient of Friction:
 - 1) Dry: 0.81.
 - 2) Wet: 0.72.
 - b. Liquid repellency, RILEM Method 11.4:
 - 1) ≥ 1 mL.
4. Euclid Chemical Euco Diamond Hard.

C. Chemical Sealer CS-3:

1. Clear, penetrating, breathable, waterborne silane-siloxane solution.
2. VOC content: ≤ 50 G/L.
3. Odorless.
4. Flash point: >200 degrees F.
5. Water absorption: 85% reduction per NCHRP 244.
6. Chloride penetration: 82% reduction per NCHRP 244.
7. Euclid Chemical Baracade WB 244.

D. Patching Mortar: Trowelable cementitious repair mortar for vertical, overhead, and horizontal repairs.

1. Portland cement-based, rapid-set repair mortar for interior or exterior use.
2. Compressive Strength, ASTM C109:
 - a. Minimum 3000 psi at 7 days.
 - b. Minimum 5000 psi at 28 days.
3. Freeze Thaw Durability, ASTM C666: 96.75% at 300 Cycles.
4. Shrinkage, ASTM C157: 0.069%.
5. Euclid Chemical Speed Crete Red Line.

E. Bonding Agents:

1. For use only on concrete surfaces not receiving liquid water repellent coating:
 - a. High solids acrylic latex base liquid for interior or exterior application as a bonding agent to improve adhesion and mechanical properties of concrete patching mortars.
 - 1) Master Builders MasterEmaco A 660.
 - 2) Euclid Chemical Co. Flex-Con.
 - 3) Laticrete L&M Everbond.
2. For use only on concrete surface receiving liquid water repellent:
 - a. Non-acrylic base liquid for interior or exterior application as a bonding agent to improve adhesion and mechanical properties of concrete patching mortars.

F. Cement:

1. ASTM C150, Type II Portland for areas exposed to sewage.
2. ASTM C150, Type V Portland where specified or indicated on Drawings.
3. ASTM C595, Type IL-HS Hydraulic Cement is an acceptable alternative.

G. Aggregate:

1. Sand: Maximum size #30 mesh sieve.
2. For exposed aggregate finish surfaces: Same as surrounding wall.

- H. Water: Potable.
- I. Polymer modified cementitious coating:
 - 1. Polymer modified Portland cement based coating for concrete and masonry.
 - a. Waterproof.
 - b. Resistant to both positive and negative hydrostatic pressure.
 - c. Breathable.
 - 2. Master Builders Solutions MasterSeal 581 or Euclid Chemical Tamoseal.
 - a. Color:
 - 1) Interior surfaces: Standard gray.
 - 2) Exterior surfaces: Standard gray.
 - b. Texture: Fine.
- J. Nonshrink Grout: See Specification Section 03 31 30 and Specification Section 03 31 31.

2.3 MIXES

- A. Bonding Grout: One part cement to one part aggregate.
- B. Patching Mortar:
 - 1. One part cement to 2-1/2 parts aggregate by damp loose volume.
 - a. Substitute white Portland cement for a part of gray Portland cement to produce color matching surrounding concrete.

PART 3 - EXECUTION

3.1 PREPARATION

- A. For methods of curing, see Specification Section 03 31 31.
- B. Surface Preparation:
 - 1. Clean surfaces in accordance with ASTM D4258 to remove dust, dirt, form oil, grease, or other contaminants prior to abrasive blasting, chipping, grinding or wire brushing.
 - 2. Prepare surfaces in accordance with ASTM D4259 and SSPC SP 13/NACE No. 6 to completely open defects down to sound concrete and remove laitance.
 - a. Provide concrete surface profile (CSP) in accordance with ICRI 310.2:
 - 1) Areas to receive Repair Mortar:
 - a) Areas larger than 1 SF or deeper than 1/4 inches Abrasive blast, scarify or needle scale to CSP No. 6-8.
 - b. If additional chipping or wire brushing is necessary, make edges perpendicular to surface or slightly undercut.
 - c. No feathered edges will be permitted.
 - d. Rinse surface with clean water to remove all dust, dirt, debris, loosened concrete, laitance, and other contaminants.
- C. Preparation of Bonding Grout Mixture:
 - 1. Mix cement and aggregate.
 - 2. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions.
 - 3. Add bonding agent/water mixture to cement/aggregate mixture.
 - 4. Mix to consistency of thick cream.
 - 5. Bonding agent itself may be used as bonding grout if approved by manufacturer and Engineer.
- D. Preparation of Patching Mortar Mixture:

1. Mix specified patching mortar per manufacturer's published recommendations.
 2. For repairs exceeding 2 inches in depth, mix with clean, pre-dampened 3/8 inches pea gravel in accordance with the manufacturer's recommendations.
- E. Polymer modified cementitious coating:
1. Mix in accordance with manufacturer's recommendations using bonding agent acceptable to coating manufacturer.

3.2 INSTALLATION AND APPLICATION

- A. Do not repair surface defects or apply wall or floor finishes when temperature is or is expected to be below 50 degrees F.
1. If necessary, enclose and heat area to between 50 and 70 degrees F during repair of surface defects and curing of patching material.
 - a. Use only clean fuel, indirect fired heating apparatus.
 - b. Exhaust combustion byproducts outside of work area.
- B. Chemical Sealer Application:
1. General:
 - a. Immediately prior to Substantial Completion, thoroughly clean floor in accordance with ASTM D4258 and prepare to receive chemical sealer.
 - 1) Remove previously applied membrane curing compounds.
 - 2) Remove soil, oils, stains, discoloration, or any other imperfection having a negative impact on the appearance of the finished floor.
 - b. Apply product to floor areas indicated on the Drawings.
 - c. Apply in accordance with manufacturer's published installation instructions.
 2. Chemical Sealer (CS-1):
 - a. Apply two uniform coats at rate recommended by manufacturer.
 - 1) Apply using manufacturer's recommended equipment with a fan-tip nozzle.
 - 2) Do not allow material to puddle.
 - b. Allow first coat to completely dry before applying second coat.
 - c. Spotted or mottled appearances will not be accepted.
 3. Chemical Sealer (CS-2):
 - a. Apply two uniform coats at rate recommended by manufacturer.
 - 1) Scrub the material into the floor using a mechanical scrubber.
 - a) Keep the surface wet for not less than 30 minutes.
 - b) Continue scrubbing in accordance with manufacturer's application instructions.
 - c) After material has thickened, but not more than 60 minutes after application, remove all excess liquid.
 - 2) Thoroughly rinse with clean water to remove all residue.
 - a) Damp mop with clean water to remove any streaks.
 - b) Do not allow residue to dry on floor surface.
 - 3) Do not track material onto untreated surfaces.
 - b. After rinsing, allow floor to dry completely and apply second coat following the same procedures.
 - c. Final floor finish shall have uniform sheen without streaking, stains or white residue.
 4. Chemical Sealer (CS-3):
 - a. Apply uniform coats at rate recommended by manufacturer.
 - 1) Apply with fine, uniform spray or microfiber pad.

- b. Allow floor to dry completely and remove any dried residue using hot water and mild citric acid.
- c. Final floor finish shall be uniform, free of residue, and shall repel water.
- d. Apply additional coat(s) as necessary to achieve water repellent finish.

C. Repairing Surface Defects:

- 1. This method is to be used on vertical concrete surfaces as indicated in the Concrete Finishes for Vertical Wall Surfaces paragraph of this Specification Section and similar concrete surfaces not otherwise specified to receive another finish or coating.
 - a. For surfaces indicated to receive finish or coating other than those specified herein; refer to the applicable Specification Section for surface preparation requirements:
 - 1) High Performance Industrial Coatings: See Specification Section 09 96 00.
- 2. Fill and repair surface defects and tie-holes using patching mortar mix specified in the MATERIALS Article in PART 2.
 - a. Prime exposed reinforcing steel, embeds or other steel surfaces with primer as recommended by patching mortar manufacturer.
 - b. Scrub bond coat:
 - 1) Wet substrate to a saturated surface dry (SSD) condition.
 - 2) Mix patching mortar to a scrub coat or slurry consistency per manufacturer's published recommendations and apply to entire area.
 - c. As an alternate to the scrub bond coat, concrete may be primed with manufacturer's recommended epoxy primer.
 - d. Patching Mortar Application:
 - 1) Mix and apply Patching Mortar per manufacturer's recommendations within the open time of the product scrub coat or any bonding agents.
 - 2) Finish to level of surrounding concrete surface utilizing techniques recommended by manufacturer.
- 3. Consolidate patching mortar into place and strike off so as to leave patch slightly higher than surrounding surface.
- 4. Leave undisturbed until mortar has stiffened before finishing level with surrounding surface.
 - a. Do not use steel tools in finishing a patch in a formed wall which will be exposed to view.
- 5. Cure patching mortar in accordance with ACI 308.

D. Concrete Finishes for Vertical Wall Surfaces:

- 1. General:
 - a. Give concrete surfaces finish as specified below after removal of formwork and repair of surface defects.
 - b. Finish numbers not listed are "Not Used".
- 2. Finish #1 - As cast rough form finish:
 - a. Selected forming materials are not required.
 - b. Prepare surface in accordance with the PREPARATION Article in PART 3 of this Specification Section.
 - c. Repair the following surface defects using patching mortar specified in PART 2:
 - 1) Tie holes.
 - 2) Honeycombs deeper than 1/4 inches.
 - 3) Air pockets deeper than 1/4 inches.
 - 4) Rock holes deeper than 1/4 inches.
 - d. Chip or rub off fins exceeding 1/4 inches in height.
 - e. Provide at unexposed surfaces such as:
 - 1) Foundations.

- 2) Below-grade walls not to be waterproofed.
- 3) Concealed surface of concrete back-up wythe in cavity wall construction.
3. Finish #2 - As cast form finish:
 - a. Form facing material shall produce a smooth, hard, uniform texture.
 - 1) Use forms specified for surfaces exposed to view in accordance with Specification Section 03 11 13.
 - b. Prepare surface in accordance with the PREPARATION Article in PART 3 of this Specification Section.
 - 1) Chip or rub off fins exceeding 1/8 inches in height.
 - 2) Abrasive blast surfaces in accordance with ASTM D4259 and SSPC SP 13/NACE No. 6 to completely open defects down to sound concrete and remove laitance.
 - a) Provide ICRI 310.2 Concrete Surface Profile (CSP) No. 3, minimum across the entire surface.
 - (1) For contiguous repair areas larger than 1 SF or deeper than 1/4 inches Abrasive blast, scarify or needle scale to CSP No. 6-8.
 - b) If additional chipping or wire brushing is necessary, make edges perpendicular to surface or slightly undercut.
 - c) No feather edges will be permitted.
 - 3) Rinse surface with clean water and allow surface water to evaporate prior to repairing surface defects.
 - 4) Repair the following surface defects using patching mortar specified in PART 2:
 - a) Tie holes.
 - b) Honeycombs deeper than 1/4 inches or larger than 1/4 inches diameter.
 - c) Air pockets deeper than 1/4 inches or larger than 1/4 inches diameter.
 - d) Rock holes deeper than 1/4 inches or larger than 1/4 inches diameter.
 - e) Scabbing.
 - 5) Brush blast repaired areas to match adjacent surface texture.
 - c. Provide this finish for:
 - 1) Interior walls of pipe galleries and free flow channels.
 - 2) Underside of horizontal elements adjacent to the finished surface.
 - 3) Exposed surfaces not specified to receive another finish.
4. Finish #3 - Grout rubbed finish:
 - a. Provide this finish for:
5. Finish #4 - Polymer modified cementitious coating:
 - a. Form facing material shall produce a smooth, hard, uniform texture.
 - 1) Use forms specified for surfaces exposed to view in accordance with Specification Section 03 11 13.
 - 2) Comply with ACI 303R for formwork accuracy and form joint handling to prevent grout leakage.
 - b. Prepare surface in accordance with the PREPARATION Article in PART 3 of this Specification Section.
 - 1) Chip or rub off fins exceeding 1/8 inches in height.
 - 2) Abrasive blast and repair surface defects in accordance with Concrete Finish #2.
 - c. Apply decorative coating to entire surface.
 - 1) As a mixing liquid for the coating, use bonding agent and water mixture as recommended by coating manufacturer.
 - 2) Apply two (2) coats at 2 pounds per square yard per coat.
 - a) During application of first coat, complete fill all voids, depressions or other surface imperfections.

- d. When second coat is set, float to a uniform texture with a sponge float.
 - e. Provide this finish on all exposed to view:
 - 1) Exterior building surfaces not otherwise indicated to receive an Architectural Abrasive Blast Finish.
 - 2) Interior walls, columns and similar vertical surfaces where indicated on Room Finish Schedule on the Drawings.
 - 3) Underside of horizontal elements adjacent to the finished surface.
 - f. Construct mock-up per the Mock-Ups paragraph in the QUALITY ASSURANCE Article in PART 1 of this Specification Section.
- E. Related Unformed Surfaces (Except Slabs):
- 1. Strike smooth and level tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces after concrete is placed.
 - 2. Float surface to a texture consistent with that of formed surfaces.
 - a. If more than one finish occurs immediately adjacent to unformed surface, provide surface with most stringent formed surface requirement.
 - 3. Continue treatment uniformly across unformed surfaces.
- F. Concrete Finishes for Horizontal Slab Surfaces:
- 1. General:
 - a. Tamp concrete to force coarse aggregate down from surface.
 - b. Screed with straightedge, eliminate high and low places, bring surface to required finish elevations; slope uniformly to drains.
 - c. Dusting of surface with dry cement or sand during finishing processes not permitted.
 - 2. Unspecified slab finish:
 - a. When type of finish is not indicated, use following finishes as applicable:
 - 1) Surfaces intended to receive bonded applied cementitious applications: Scratched finish.
 - 2) Surfaces intended to receive roofing or waterproofing membranes: Floated finish.
 - 3) Floors: Troweled finish.
 - 4) Garage floors and ramps: Broom or belt finish.
 - 5) Exterior slabs, sidewalks, platforms, steps and landings, and ramps, not covered by other finish materials: Broom or belt finish.
 - 6) All slabs to receive a floated finish before final finishing.
 - 3. Scratched slab finish: After concrete has been placed, consolidated, struck off, and leveled to a Class B tolerance, roughen surface with stiff brushes or rakes before final set.
 - 4. Floated finish:
 - a. After concrete has been placed, consolidated, struck off, and leveled to a Class B tolerance, do no further work until ready for floating.
 - b. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit operations.
 - 1) Use wood or cork float.
 - c. During or after first floating, check planeness of entire surface with a 10 feet straightedge applied at not less than two different angles.
 - 5. Cut down all high spots and fill all low spots to produce a surface with Class B tolerance throughout.
 - a. Refloat slab immediately to a uniform texture.
 - 6. Troweled finish:
 - a. Float finish surface to true, even plane.
 - b. Power trowel, and finally hand trowel.

- c. First troweling after power troweling shall produce a smooth surface which is relatively free of defects, but which may still show some trowel marks.
- d. Perform additional trowelings by hand after surface has hardened sufficiently.
- e. Final trowel when a ringing sound is produced as trowel is moved over surface.
- f. Thoroughly consolidate surface by hand troweling.
- g. Finish in accordance with the FIELD QUALITY CONTROL Article in PART 3 of this Specification Section.
 - 1) Leave finished surface essentially free of trowel marks, uniform in texture and appearance.
- h. On surfaces intended to support floor coverings, remove any defects that would show through floor covering.
- 7. Broom or belt finish: Immediately after concrete has received a float finish as specified, give it a transverse scored texture by drawing a broom or burlap belt across surface.
- 8. Underside of concrete slab finish:
 - a. Match finish as specified for adjacent vertical surfaces.
 - b. If more than one finish occurs immediately adjacent to underside of slab surface, provide surface with most stringent formed surface requirement.

3.3 FIELD QUALITY CONTROL

A. Tolerances:

- 1. Finished floor slabs:
 - a. Provide Floor Flatness (F_F) and Floor Levelness (F_L) in accordance with ACI 117.
 - 1) Measure in accordance with ASTM E1155.
 - b. Slabs not indicated to be sloped:
 - 1) F_F : Equal or greater than 35.
 - 2) F_L : Equal or greater than 25.
 - c. Slabs indicated to be sloped or curved:
 - 1) Measure in accordance with ASTM E1486.
 - 2) Provide slopes or curves as indicated on the Drawings.
 - d. Slabs indicated to receive polished concrete floor:
 - 1) F_F : Equal or greater than 45.
 - 2) F_L : Equal or greater than 35.
 - 3) Refer to Room Finish Schedule on Drawings.
- 2. Horizontal surfaces other than finished floor slabs, including but not limited to, top of footings, top of walls, concrete fill in tankage, channels and similar applications:
 - a. Gap between a 10 feet straightedge placed anywhere and the finished surface shall not exceed:
 - 1) Class A tolerance: 1/4 inches.
 - 2) Class B tolerance: 3/8 inches.
 - 3) Class C tolerance: 1/2 inches.
 - b. Accumulated deviation from intended true plane of finished surface shall not exceed 1/2 inches.

B. Unacceptable finishes shall be replaced or, if approved in writing by Engineer, may be corrected provided strength and appearance are not adversely affected.

- 1. High spots to be removed by grinding and/or low spots filled with a patching compound or other remedial measures to match adjacent surfaces.

C. Provide services of manufacturer's technical representative:

1. A certified manufacturer's representative experienced in the use of the products used shall be present on a full-time basis to observe and oversee all operations associated with the installation.
2. Contractor, along with manufacturer, shall be fully responsible for the proper application, including all means and methods incidental thereto necessary for a sound, secure and complete installation.
3. Manufacturer's representative shall be present for installation of:
 - a. Dry-shake Hardener.
 - b. Heavy-duty Metallic Aggregate Topping.

3.4 PROTECTION

- A. All horizontal slab surfaces receiving chemical sealer shall be kept free of traffic and loads for minimum of 72 hours following installation of sealer.

3.5 CONCRETE FINISH SCHEDULE

DRAWING NO.	STRUCTURE NAME	SURFACE TO BE FINISHED	FINISH NO.

END OF SECTION

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SECTION 03 41 33
PRECAST AND PRESTRESSED CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Precast and prestressed concrete.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 03 05 05 - Testing.
 - 2. Section 03 21 00 - Reinforcement.
 - 3. Section 03 31 30 - Concrete, Materials and Proportioning.
 - 4. Section 09 96 00 - High Performance Industrial Coatings.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. HB, Standard Specifications for Highway Bridges.
 - 2. American Concrete Institute (ACI):
 - a. 211.2, Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
 - b. 318, Building Code Requirements for Structural Concrete.
 - 3. ASTM International (ASTM):
 - a. A36, Standard Specification for Carbon Structural Steel.
 - b. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 - c. A416, Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
 - d. A496, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - e. A1064, Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - f. C33, Standard Specification for Concrete Aggregates.
 - g. C150, Standard Specification for Portland Cement.
 - h. C330, Standard Specification for Lightweight Aggregates for Structural Concrete.
 - i. D2240, Standard Test Method for Rubber Property-Durometer Hardness.
 - j. E329, Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
 - 4. American Welding Society (AWS):
 - a. A5.1/A5.1M, Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
 - b. A5.5/A5.5M, Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding.
 - c. D1.1, Structural Welding Code - Steel.
 - d. D1.4, Structural Welding Code - Reinforcing Steel.
 - e. D1.6, Structural Welding Code – Stainless Steel.
 - 5. Occupational Safety and Health Administration (OSHA).
 - 6. Precast/Prestressed Concrete Institute (PCI):
 - a. MNL 116, Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.
 - b. MNL 120, Design Handbook - Precast and Prestressed Concrete.

7. Idaho Department of Transportation
 - a. 2023 Standard Specifications for Highway Construction
- B. Qualifications:
 1. Provide precast and prestressed concrete units produced by an active member of PCI.
 2. Plant to be certified by the Precast/Prestressed Concrete Institute, Plant Certification Program, as applicable:
 - a. Certification Code C1: Precast Concrete Products.
 - b. Certification Code C2: Precast Hollow Core and Repetitive Products.
 - c. Certification Code C3: Prestressed Straight Strand Structural Members.
 - d. Certification Code C4: Prestressed Deflected Strand Structural Members.
 - e. Plant shall have been certified within past year from bid date.
 3. Plant shall be certified by IAS and shall be acceptable to the Building Code Official to assure compliance with approved fabricator Special Inspection requirements in accordance with the building code.
 - a. Plants that are not certified by IAS or not acceptable to the Building Code Official may be acceptable to work on the Project, provided:
 - 1) Plant meets all remaining qualifications.
 - 2) Contractor reimburses the Owner the cost of Special Inspection services.
 4. Provide units manufactured by plant which has regularly and continuously engaged in manufacture of units of same type as those required for a minimum of three years.
 5. Assure manufacturer's testing facilities meet requirements of ASTM E329.
 6. Welding operators and processes to be qualified in accordance with:
 - a. AWS D1.1 for welding steel shapes and plates.
 - b. AWS D1.4 for welding reinforcing bars.
 7. Welding operators to have passed qualification tests for type of welding required during the previous 12 months prior to commencement of welding.
 8. Engineer for all precast or prestressed members: Professional Engineer licensed in the State of Idaho.
 - a. Engineer to have minimum five years of experience in design of precast and prestressed members with scope similar to this Project.
 9. Precast erector:
 - a. Minimum three years of experience with projects of similar size and complexity.

1.3 DEFINITIONS

- A. Slabs: May refer to hollow core slabs or solid flat slabs, prestressed or non-prestressed.

1.4 SUBMITTALS

- A. Shop Drawings:
 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Sizes, types and manufacturer of bearing pads.
 - d. Hardware to be utilized to support suspended appurtenances.
 2. Shop Drawings and erection plans for precast units, their connections and supports showing:
 - a. Member size and location.
 - b. Size, configuration, location and quantity of reinforcing bars and prestressing strands.
 - c. Initial prestress forces.

- d. Size and location of openings verified by Contractor.
 - e. Size, number, and locations of embedded metal items and connections.
 - f. Required concrete strengths.
 - g. Identification of each unit using same standard marking numbers as used to mark actual units.
3. Calculations for members and connections designed by fabricator.
 - a. Calculations to be sealed by a professional Structural Engineer registered in the State in which the Project is constructed.
 - b. Perform calculations using the dead load of the members plus the superimposed uniform and concentrated loads shown on the Drawings and indicated in this Specification Section.
 - c. Indicate the following:
 - 1) Design for maximum moment, maximum shear and maximum torsion.
 - 2) Final top and bottom flexural stresses resulting from the stresses due to maximum moment and prestress force.
 - 3) Ultimate moment capacity.
 - 4) Final top and bottom flexural stresses, ultimate moment capacity, and ultimate shear capacity, if affected, for members with reduced cross sections due to openings or penetrations.
 - 5) When required on Drawings, a check for no tension in top and bottom of members due to prestress force and member dead load plus superimposed loads indicated on Drawings and in this Specification Section.
 - 6) Column design for maximum axial load and maximum moment.
 4. Submit test results, when so required on Drawings, showing that embedded connection items will adequately support the indicated loads.
 - a. Connection items to have an ultimate load capacity of at least two times the required indicated load.
 5. Concrete mix design(s) including submittal information defined in Specification Section 03 31 30.
 6. Fabricator's quality control documentation for special inspections as required by the building code Chapter 17.
 7. Copies of source quality control tests.
 8. Certification of manufacturer's testing facility qualifications.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Headed studs and deformed bar anchors:
 - a. Nelson Stud Welding Div., TRW, Inc.
 - b. KSM Division, Omark Industries.
 2. Bearing pads:
 - a. JVI, Inc.

2.2 MATERIALS

- A. Embedded Steel Plates and Shapes:
 1. ASTM A36.
- B. Bearing Pads:
 1. Under slabs:

- a. Plastic bearing strips.
 - b. Minimum compressive strength: 8,000 psi with no fracture at 26,000 psi.
 - c. Korolath of New England, Inc., or equal.
- 2. For all other locations:
 - a. Random, fiber-reinforced elastomeric pads.
 - b. Preformed, randomly oriented synthetic fibers set in elastomer.
 - c. Capable of supporting a compressive stress of 3000 psi with no cracking, splitting, excessive bulging or delaminating in the internal portions of the pad.
 - d. Size pad to keep a minimum stress 200 psi under minimum dead load.
 - e. Masticord as manufactured by JVI, Inc., or equal.
- C. Cement:
 - 1. Comply with ASTM C150, Type I or III; or ASTM C595, Type IL Blended Cement
 - 2. Type II cement or Type IL-HS to be used in the following precast units:
 - a. Precast weir troughs.
- D. Aggregates for Normal Weight Concrete:
 - 1. ASTM C33 with coarse aggregate meeting the gradation for Size 67 as stated in ASTM C33.
 - 2. Provide aggregates approved for bridge construction by the Idaho Transportation Department.
 - 3. All fine aggregate to be natural not manufactured.
- E. Water:
 - 1. Potable, clean.
 - 2. Free of oils, acids, and organic matter.
- F. Maximum total chloride ion content contributed from all ingredients of concrete including water, aggregates, cement and admixtures measured as a weight percent of cement to not exceed 0.06 for prestressed concrete and 0.10 for all other precast concrete.
- G. Prestressing Strands:
 - 1. Either 250K or 270K high tensile strength uncoated seven wire strand.
 - 2. Manufacture and test strands in accordance with ASTM A416.
- H. Reinforcing Steel and Welded Wire Reinforcement: See Specification Section 03 21 00.
- I. Headed Studs:
 - 1. ASTM A108.
 - 2. Minimum yield strength: 50,000 psi.
 - 3. Minimum tensile strength: 60,000 psi.
- J. Deformed Bar Anchors:
 - 1. ASTM A496 or ASTM A1064.
 - 2. Minimum tensile strength: 80,000 psi.
 - 3. Minimum yield strength: 70,000 psi.
- K. Electrodes:
 - 1. E70 series conforming to AWS A5.1/A5.1M or AWS A5.5/A5.5M for welding steel shapes and plates.
 - 2. E90 series conforming to AWS A5.5/A5.5M for welding rebar.
- L. Concrete sand cement grout in keyways between slabs.
 - 1. See Specification Section 03 31 30.

2.3 DESIGN

A. General Design Requirements:

1. Design units and connections in strict accordance with ACI 318 and the PCI MNL 120.
2. Design units for spans, dead load of members, dead and live loads indicated on the Drawings with concentrated loads placed in their actual locations.
 - a. Verify weights and locations of concentrated loads.
3. Design units taking into account reduced cross section at openings and penetrations.
4. Provide all reinforcing in units as indicated.
 - a. Where not indicated, design and provide all reinforcing and prestressing strands subject to approval of Engineer.
5. Due to presence of corrosive atmosphere, design prestressed members where indicated on Drawings for no tension in top and bottom of members resulting from loads indicated on Drawings and in this Specification Section.
6. Design connections to allow rotation and/or movement as appropriate to avoid damage to connections, supporting members, joint sealants and other building components.
7. Design double tee flanges to carry all dead and live loads to be placed thereon.
 - a. Do not place concentrated equipment loads on flanges but support the loads on the double tee legs.

B. Specific Design Requirements:

1. Precast Double Tee Roof.

2.4 MIXES

A. See Specification Section 03 31 30.

B. Do not begin fabrication of units until concrete mix design(s) have been approved by Engineer.

2.5 FABRICATION

- A. Do not fabricate units until Shop Drawings have been approved by Engineer and returned to Contractor and support locations have been field verified by Contractor.
- B. Manufacture, quality, dimensional and erection tolerances of all units to be in accordance with both PCI MNL 116 and PCI MNL 120.
- C. Cast all members in smooth rigid forms which will provide straight, true members of uniform thickness and uniform color and finish.
- D. Use sand cement grout mixture to fill all air pockets and voids, and to repair chipped edges.
- E. Finish all repairs smooth and to match adjacent surface texture and color.
- F. Where units are to receive concrete topping, provide units having heavy broom finish on top surface for bond.
 1. Provide roughness of top surface to provide bond with topping and design for horizontal shear at topping and unit interface in accordance with requirements of ACI 318, Horizontal Shear Strength paragraph.
 2. Make all other surfaces smooth.
- G. Incorporate embedded plates, angles, and flange welding strips into members at time of manufacture.
 1. Provide embedded items as shown on the Drawings unless prior approval is received from Engineer to do otherwise.
 2. Provide flange welding strips on all flanged edges of all double tee units as indicated on Drawings.
 3. Space strips as shown on Drawings.
 4. Cast lifting handles into units at or near support points.

- a. Remove lifting handles after units are erected.
- H. Cast openings larger than 6 inches SQ or 6 inches diameter in units at time of manufacture.
 - 1. Make smaller openings by neat cutting or neat drilling by trades requiring them.
 - 2. Coordinate sizes and locations of all openings before fabrication of units.
- I. Make provisions for support of suspended ceilings, lighting fixtures, ducts, piping, conduits and other suspended work.
 - 1. When drilled expansion bolts or powder-driven fasteners are approved for use, coordinate prestress strand location with prestress concrete member supplier so that drilled expansion bolts or powder-driven fasteners do not hit or are drilled or driven into prestress strands.
 - 2. Install powder-driven fasteners by means of a low velocity powder-actuated tool complying with requirements of OSHA.
 - a. Assure that the load to be supported by each in place drilled expansion bolt or powder-driven fastener does not exceed the maximum allowable load recommended by the bolt or fastener manufacturer for the concrete strength encountered and for the type, size and embedment length of expansion bolt or driven fastener installed.
- J. Automatically weld headed studs and deformed bar anchors to members to provide full penetration weld between studs, bar anchors and members they are attached to.
- K. Weld steel shapes and plates per AWS D1.6 and reinforcing steel per AWS D1.4.
- L. Minimum concrete compressive strength at time of strand release: 3500 psi.
- M. Mark each unit as indicated on the erection plans.
 - 1. Place mark on non-exposed-to-view surface.
- N. Coat or finish ends of exposed prestressing strands to prevent rusting.
- O. Fabricate the following types of precast and prestressed units (all units to be made with normal weight concrete unless noted otherwise on Drawings):
 - 1. Prestressed double tees of sizes indicated on Drawings.
 - a. Weight of double tees, based on the nominal section width, not to exceed following:

DEPTH	NORMAL WEIGHT CONCRETE	LIGHTWEIGHT CONCRETE
24 inches	55 psf	40 psf

- 2. Precast items shown on Drawings including but not limited to:
 - a. Lintels.
 - b. Splash blocks.
- 3. Precast concrete beams and columns as shown on Drawings:
 - a. Reinforce as indicated.
 - 1) If reinforcement is not indicated, design and provide reinforcement as required to support maximum torsion, shear, moment and axial loads.
 - b. See the Specific Design Requirements paragraph in the DESIGN Article in PART 2 of this Specification Section
 - c. Provide beam and column connections as indicated on Drawings and as required to support all loads subject to Engineer's approval.

2.6 SOURCE QUALITY CONTROL

- A. During production of precast concrete units, conduct strength tests of concrete placed in units as required in Specification Section 03 05 05 for concrete placed during fabrication.
 - 1. Results of strength tests to be sent immediately to Engineer, Contractor and Owner.
 - 2. Test reports to indicate units they represent.

- B. When approved by Engineer, strength tests may be made by precast manufacturer after he has submitted certification that his testing facilities meet the requirements of ASTM E329.
- C. Conduct tests on precast concrete using the following procedures:
 - 1. If the precast manufacturer's quality control program requires more frequent or more stringent testing requirements, the manufacturer's quality control program will take precedence over the specific type of test.
 - a. Precast manufacturer to employ services of an independent testing laboratory to perform concrete testing for manufacturer's production procedures (not listed below) and quality control program.
 - 2. If the precast fabrication plant is not certified by IAS and acceptable to the Building Code Official, Owner will employ and pay for precast concrete production special inspection.
 - a. Coordinate with Owner's special inspector.
 - 1) Provide minimum 7 calendar days notice prior to the start of fabrication.
 - 2) Provide minimum 24 hours notice prior to fabrication of any precast members.
 - 3. If precast fabrication plant is certified by IAS and acceptable to the Building Code Official, perform concrete tests as specified in Section 03 05 05. Frequency of tests: Per PCI MNL-116 or PCI MNL-117 as applicable.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify acceptability and location of supports to receive units.
 - 1. Check bearing surfaces to determine that they are level and uniform.
- B. Verify compressive strengths of concrete and masonry supports.
 - 1. Do not start erection of units until supports have reached their 28 day required compressive strengths.

3.2 ERECTION

- A. Sequence erection to provide a balance of loads across beams and columns.
- B. Give consideration to possible lack of stability or capacity of partially completed frame or structure.
- C. Contractor to be responsible for guying, shoring, and bracing of frame, walls and individual members as necessary to resist forces due to wind, erection, or any other source that may occur before structure is completed.
- D. Use only erection equipment adequate for placing units at lines and elevations indicated on Drawings.
 - 1. Do not damage units or existing construction during erection.
 - 2. Erect units using lifting handles cast into the units.
- E. Place each leg of all double tees on a 3/8 inches thick bearing pad held 1 inch back from edge of support.
 - 1. Pad dimensions equal to length of bearing -1 inches x bearing width +2 inches.
- F. Place slabs on continuous 1/4 inches thick Korolath bearing strips so that width equals bearing length -1 inches.
- G. Provide a 1/2 inches thick bearing pad on the top of all precast concrete columns.
- H. Pad to cover entire top surface of column except hold pad back 1 inch from face of column all around.
- I. Weir Trough:
 - 1. Anchor weir troughs to supports as indicated on Drawings.

2. Provide continuous 3/8 inches thick bearing pad under troughs at support.
 3. Hold back pads 1 inch from edge of support.
- J. After erection, verify that there is no direct contact between bottom of units and supporting members.
1. Where direct contact occurs, install additional layers of bearing material to raise units off supports.
- K. Lintels:
1. Length of lintel bearing on supports to be as indicated on Drawings.
 - a. If not indicated, minimum length of lintel bearing to be 8 inches.
 2. Fill masonry cells under lintel bearing with masonry grout and reinforce cells as indicated.
 3. Provide minimum 3/8 inches thick full bed joint of masonry mortar between underside of lintel and top surface of grouted masonry for complete lintel bearing length.
- L. Weld steel shapes and plates per AWS D1.1 and reinforcing steel per AWS D1.4.
- M. Fill all keyways between slabs with concrete sand cement grout.
1. See Specification Section 03 31 30.
- N. After all precast units are erected and all precast unit connections have been made, coat all exposed surfaces of the connections.
1. See Specification Section 09 96 00.

3.3 FIELD QUALITY CONTROL

- A. Testing and Special Inspections: See Section 01 45 33.
- B. Causes for rejection of units include, but are not necessarily limited to the following:
1. Cracked units.
 2. Chipped, broken, or spalled edges.
 3. Units not within allowable casting tolerances.
 4. Voids or air pockets which, in opinion of Engineer, are too numerous or too large.
 5. Non-uniform finish or appearance.
 6. Low concrete strength.
 7. Improperly placed embedded items and/or openings.
 8. Exposed wire mesh, reinforcing or prestressing strands.

END OF SECTION



DIVISION 04

MASONRY



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SECTION 04 01 20
MASONRY CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Masonry cleaning.

1.2 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Use experienced workmen familiar with product and its application.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Manufacturer's application instructions.
 - b. Manufacturer's dilution recommendations.
 - c. Manufacturer's recommendations on neutralizing rinse.
- B. Certifications:
 - 1. Certification that Contractor is experienced in this type of masonry cleaning.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Cleaning solution, detergent type:
 - a. PROSOCO, Inc.
 - b. Diedrich Technologies, Inc.
 - 2. Cleaning solution for manganese or vanadium stained masonry:
 - a. PROSOCO, Inc.
 - b. Diedrich Technologies, Inc.

2.2 MATERIALS

- A. Detergent-Type Cleaning Solution: PROSOCO, Inc. "Sure Klean #600 inches detergent masonry cleaner.
- B. Manganese or Vanadium-Stained Masonry: PROSOCO, Inc. "Vanatrol."
- C. Water: Potable.
- D. Neutralizing rinse as required by manufacturer.

2.3 MIXES

- A. Dilute cleaning solution with potable water at rate which will provide for the weakest solution allowable for cleaning wall.
- B. If project conditions require solution of greater than 5% acid, obtain permission from Engineer in writing prior to applying solution to wall surface.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Allow seven days after completion of masonry work before start of cleaning.
- B. Remove excess mortar using wooden paddles and scrapers.
- C. Protect adjacent surfaces not to be cleaned.

3.2 APPLICATION

- A. Protect adjacent surfaces subject to potential damage by cleaning solution.
- B. Apply masonry cleaner to exposed-to-view masonry surfaces.
 - 1. Do not use wire brushes.
 - 2. Use only tools free of rust.
 - 3. Apply solution using fibered wall-washing brush.
- C. Thoroughly rinse and pre-soak walls.
- D. Flush all loose mortar and dirt from surface.
- E. Wet to prevent "run-off" streaking.
- F. Scrape off mortar and reapply cleaning solution.
- G. After scrubbing, clean thoroughly with pressurized water.
- H. Apply neutralizing rinse as recommended by manufacturer.

END OF SECTION

SECTION 04 05 13
MASONRY MORTAR AND GROUT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Masonry mortar.
 - 2. Masonry grout.
 - 3. Integral water repellent admixture.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 03 31 30 - Concrete, Materials and Proportioning.
 - 2. Section 04 22 00 - Concrete Masonry.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. ASTM International (ASTM):
 - a. C143/C143M, Standard Test Method for Slump of Hydraulic-Cement Concrete.
 - b. C144, Standard Specification for Aggregate for Masonry Mortar.
 - c. C150/C150M, Standard Specification for Portland Cement.
 - d. C207, Standard Specification for Hydrated Lime for Masonry Purposes.
 - e. C270, Standard Specification for Mortar for Unit Masonry.
 - f. C404, Standard Specification for Aggregates for Masonry Grout.
 - g. C476, Standard Specification for Grout for Masonry.
 - h. C1019, Standard Test Method for Sampling and Testing Grout.
 - i. C1093, Standard Practice for Accreditation of Testing Agencies for Masonry.
 - j. C1384, Standard Specification for Admixtures for Masonry Mortars.
 - 2. The Masonry Society (TMS):
 - a. 602, Specification for Masonry Structures.
- B. Qualifications:
 - 1. Preconstruction Testing Laboratory shall be an independent agency qualified in accordance with ASTM C1093 for performing the testing indicated.
 - a. Testing Laboratory shall have a minimum of 10 years of experience in the testing of mortar and grout.
 - b. Technician conducting tests shall have minimum of five years of experience in the testing of mortar and grout.
- C. Mock-Ups:
 - 1. Provide mortar and grout for mock-up specified in Specification Section 04 22 00.

1.3 DEFINITIONS

- A. Coarse grout and fine grout are defined by the aggregate size used in accordance with ASTM C476.
- B. Coarse aggregate and fine aggregate are defined in ASTM C404, Table 1.

1.4 SUBMITTALS

- A. Shop Drawings:

1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. General:
 - 1) Product data for cementitious materials.
 - 2) Source or producer of aggregates and gradation.
 - 3) Integral water repellent manufacturer's dosage rate.
 - c. Proposed mortar mix design:
 - d. Proposed masonry grout mix design.
 2. Test results:
 - a. Preconstruction mortar test results.
 - b. Preconstruction masonry grout test results.
- B. Informational Submittals:
1. Qualifications of testing lab and technician.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location.
 1. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mixes in moisture-resistant containers.
 1. Store preblended, dry mixes in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portland Cement:
 1. ASTM C150/C150M, Type I or II.
 2. No air entrainment.
 3. Natural color.
 4. Maximum percent of alkalis: 0.60 in accordance with ASTM C150/C150M, Table 2.
- B. Blended Hydraulic Cement:
 1. ASTM C595, Type IL
 2. No air entrainment.
 3. Natural color.
 4. Maximum percent of alkalis: 5% in accordance with ASTM C1778.
- C. Hydrated Lime:
 1. ASTM C207, Type S.
 2. Type SA not acceptable.
 3. Lime substitutes are not acceptable.
- D. Mortar Aggregate: ASTM C144, free of gypsum.
- E. Grout Aggregate: ASTM C404.
- F. Water: Potable.
- G. Integral Water Repellent Admixture:
 1. Liquid polymeric admixture: ASTM C1384.

2. Verify compatibility with liquid water repellent admixture being used in the fabrication of concrete masonry units.

2.2 MIXES

- A. Mortar and grout shall comply with TMS 602 and building code.
- B. Type "S" mortar shall be used:
 1. Comply with ASTM C270, Table No. 1, Cement-Lime Mortar.
 - a. Do not use masonry cement or mortar cement.
 - b. No fly ash additives will be accepted.
 2. Mix materials minimum of three minutes and maximum of five minutes.
 3. Adjust consistency to satisfaction of mason.
 4. Do not use admixtures unless otherwise indicated.
 5. Provide integral water repellent admixture in mortar used for:
 - a. Exterior concrete masonry work.
 - b. Interior concrete masonry work in wet areas.
 6. Do not use integral water repellent admixture in mortar for brick.
- C. Masonry Grout:
 1. ASTM C476.
 - a. Minimum 28-day compressive strength: 2,000 psi.
 - b. Slump: 8 to 11 inches.
 2. Mix 5 minutes minimum.
 3. No admixtures allowed.
 4. At Contractor's option, premixed or preblended grout meeting the above minimum requirements may be used.

2.3 SOURCE QUALITY CONTROL

- A. Perform preconstruction laboratory tests on proposed masonry mortar and grout prior to start of masonry work.
 1. Perform tests far enough in advance so that any necessary retesting can be accomplished before masonry construction begins.
 - a. Test mortar per ASTM C270.
 - b. Test grout per ASTM C1019.
- B. Source Limitations for Mortar Materials:
 1. Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions and TMS 602.
- B. Mortar:
 1. If standard gray mortar begins to stiffen, it may be retempered by adding water and remixing unless prohibited by water repellent admixture manufacturer.
 - a. Standard gray mortar shall not be retempered more than one time.
 2. All mortar must be used within 2-1/2 hours maximum after initial mixing per TMS 602.
 3. Engineer reserves right to alter mix design based on initial rate of absorption of masonry units.

4. Set Prefaced masonry using type S mortar.
 - a. Rake mortar from joint as recommended by the unit manufacturer.
 - b. Tuckpoint raked joints using pointing grout.
 - 1) Install pointing grout in accordance with ANSI A108.10 and masonry unit manufacturer's published instructions.
 - 2) Use polymer modified sanded pointing grout for joints in:
 - a) Exterior masonry.
 - b) Interior dry areas.
 - 3) Use epoxy pointing grout for joints in interior areas subject to exposure to corrosive or caustic chemicals.

C. Masonry Grout:

1. Use grout within 1-1/2 hours maximum after initial mixing.
2. Use no grout after it has begun to set.
3. Do not retemper grout after initial mixing.
4. Place grout in lifts not exceeding 4 feet.
5. Use coarse grout in spaces with least dimension over 2 inches.
6. Consolidate all grout while installing.
 - a. Consolidate grout pours 12 inches or less in height by mechanical vibration or by puddling.
 - b. Consolidate grout pours exceeding 12 inches in height by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.

3.2 FIELD QUALITY CONTROL

A. Masonry Mortar and Grout Testing and Inspection:

1. Testing and inspection services will be provided by the Owner's special masonry inspector.
 - a. Do not include in the bid price the cost of these services.
2. Testing and inspection shall include, but is not limited to:
 - a. Observe proportions of site-prepared mortar and grout.
 - b. Observe grout space prior to grouting.
 - c. Grout compressive strength sampling, testing and reporting per ASTM C1019.
 - 1) One strength test shall be the average of three specimens from the same sample, tested at 28 days.
 - d. Grout slump test sampling, testing, and reporting per ASTM C143/C143M.
 - e. Frequency of sampling: One sample (three specimens) collected each grouting operation during masonry construction.

SECTION 04 05 23
MASONRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Masonry accessories.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 04 22 00 - Concrete Masonry.
 - 2. Section 05 50 00 - Metal Fabrications.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. ASTM International (ASTM):
 - a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - b. A951, Standard Specification for Steel Wire for Masonry Joint Reinforcement.
 - c. A1008, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - d. A1064, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - e. D412, Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
 - f. D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - g. D2000, Standard Classification System for Rubber Products in Automotive Applications.
 - h. D2240, Standard Test Method for Rubber Property—Durometer Hardness.
- B. Mock-Ups:
 - 1. Provide specified products for inclusion into mock-up panels required by Specification Section 04 22 00.
 - 2. Coordinate with built-in items.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Tear resistance of flashing material.
 - d. Manufacturer's recommendations for flashing adhesive.
 - e. Manufacturer's data sheet on each product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Weep vents for cavity wall construction:
 - a. Heckman Building Products Inc.
 - b. Hohmann & Barnard, Inc.
 - c. Wire Bond.
 - d. Mortar Net USA, Ltd.
2. Reglets:
 - a. Hohmann & Barnard, Inc.
 - b. Heckmann Building Products.
 - c. Superior Concrete Accessories, Inc.
3. Masonry anchors, horizontal joint reinforcing and miscellaneous anchors:
 - a. Heckman.
 - b. Hohmann & Barnard, Inc.
 - c. Wire Bond.
4. Thru wall flashing:
 - a. EPDM:
 - 1) Carlisle Syntech Systems, Inc.
 - 2) Holcim Elevate.
 - b. Stainless steel:
 - 1) Heckman Building Products.
 - 2) Hohmann & Barnard, Inc.
5. Weep joint mortar protection system:
 - a. Mortar Net USA, Ltd.
 - b. Hohmann & Barnard, Inc.
 - c. Wire Bond.
6. Preformed control joint inserts:
 - a. Hohmann & Barnard, Inc.
 - b. Wire Bond.
7. Grout screen:
 - a. Wire Bond.
 - b. Heckman Building Products.
 - c. Hohmann & Barnard, Inc.

2.2 MANUFACTURED UNITS

- A. and Stainless Steel DripFlashing Adhesive: As recommended by flashing manufacturer for sealing laps, sealing to vertical masonry and concrete surfaces and sealing to stainless steel surfaces.
- B. Weep Vent:
 1. 90% open mesh vent designed to be placed in vertical mortar joint.
 2. Mortar Net USA, Ltd. "Mortar Net Weep Vents."
 3. Color: Gray.
- C. Reglets:
 1. Products specified are manufactured by Hohmann & Barnard, Inc.
 2. For masonry construction: Type #MR - Masonry Reglet.
 3. For concrete construction: Type #CR - Concrete Reglet.
- D. Veneer Anchorage System for New Concrete Back-up:
 1. Anchors, dovetail:

- a. Stainless steel, Type 304 or 316, ASTM A666.
 - b. 16 GA corrugated steel with dovetail.
 - 1) 1 inches wide x 5-1/2 inches long minimum or as necessary by Project conditions.
 - a) Provide minimum 2 inches embedment into veneer mortar joint.
 - c. 3/16 inches diameter triangular wire tie.
 - 1) Length as necessary to provide minimum 2 inches embed into veneer mortar joint.
 - 2) Hohmann & Barnard #D/A 720 Series.
 - 2. Dovetail slots:
 - a. Stainless steel, Type 304 or 316, ASTM A666.
 - b. 22 GA steel.
 - c. 1 inches wide, 1 inch deep, nominal 5/8 inches throat with filler.
- E. Horizontal Joint Reinforcing:
- 1. General:
 - a. Conform to ASTM A951.
 - b. Cold drawn steel wire, ASTM A82.
 - c. 9 GA side rods.
 - d. 9 GA cross rods.
 - e. Hot-dipped galvanized, ASTM A153/A153M.
 - f. Prefabricated corner and tee sections with minimum length of 30 inches from point of intersection.
 - 2. Single wythe wall joint reinforcing: Ladder design.
- F. Rigid Steel Masonry Anchors:
- 1. 1 inches by 1/4 inches with ends turned up 2 inches.
 - 2. Hot-dipped galvanized steel, ASTM A153/A153M.
 - 3. Length:
 - a. 24 inches unless noted otherwise.
 - b. Where wall conditions such as jambs or other obstructions preclude the use of 24 inches anchors, shorter anchors may be used.
- G. Mesh Wall Ties:
- 1. Hot-dipped galvanized steel, ASTM A153/A153M.
 - 2. 16 GA, 1/2 inches square mesh.
 - 3. Width: 2 inches less than nominal wall thickness.
 - 4. Length: As necessary to embed minimum 6 inches into each wall.
- H. Grout Screen:
- 1. Polypropylene monofilament.
 - 2. 1/4 x 1/4 inches mesh.
 - 3. Width of grout screen to be 2 inches less than nominal width of CMU.
- I. Weep Joint Mortar Protection System:
- 1. 100% recycled polyester.
 - 2. 90% minimum open weave mesh.
 - 3. Minimum 10 inches high by full width of air cavity.
 - 4. Trapezoidal shape.
- J. Preformed Rubber Control Joint Inserts:
- 1. ASTM D2000, M2AA-805.

2. Hardness: ASTM D2240, Shore A Durometer, 80 +/-5.
3. Ultimate elongation: 350%, ASTM D412.
4. Tensile strength: 1000 psi, ASTM D412.
5. Hohmann & Barnard #RS Series.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Thru Wall Flashing and Stainless Steel Drip:
 1. Install to provide positive drainage of cavity moisture.
 2. Extend stainless steel drip beyond the exterior face of the wall to minimum distance possible while still allowing drip to perform intended purpose.
 3. Extend flashing horizontally beyond each edge of lintel or sills to next vertical mortar joint but not less than 4 IN and turn up edge one full veneer course.
 - a. Seal all joints.
 4. Where thru wall flashing and stainless steel drip steps up or down in the wall, provide end dam at step.
 - a. End dam shall extend up or down to tie into thru wall flashing step.
 - b. Seal all joints for continuous watertight barrier.
 5. Lap stainless steel drip minimum of 2 inches and bond two pieces together using stainless steel pop rivets and two beads of lap sealant.
 6. At concrete masonry unit back-up, install upper edge of flashing into block joint.
 7. At concrete back-up, secure upper edge of flashing into reglet and seal.
 8. Adhere vertical surface of flashing to back-up wall with adhesive recommended by flashing manufacturer.
 9. Extend flashing minimum of 6 inches above top of weep joint mortar protection system.
 10. Lap and seal flashing at all inside and outside corners to provide continuous uninterrupted barrier.
- C. Weeps:
 1. Provide open weep joints at maximum 16 inches on-center in head joint of first course of veneer immediately above thru wall flashing.
 - a. Omit mortar bed on top of thru wall flashing at each open weep joint location to allow moisture an unobstructed path to the exterior.
 - b. Weep joints shall be not more than 4 inches high.
 2. Provide weep vents maximum 16 inches OC in top of head joint of top course of veneer or as indicated on Drawings.
 - a. Do not use weep vents in weep joints at the bottom of the wall.
 - b. Set weep vents back away from face of veneer slightly so the front edge of the vent is contained within the mortar joint.
- D. Weep Joint Mortar Protection System:
 1. Install continuous row(s) of material.
 2. Provide multiple thicknesses of material compressed as necessary to completely fill the entire air cavity.
 - a. Thickness to be at least 10% wider than air cavity being filled.
 3. Set material directly on top of thru wall flashing.
- E. Butt joints of preformed control joint inserts tightly together and secure with adhesive or sealant acceptable to insert manufacturer.

F. Anchoring Veneer:

1. Veneer with concrete back-up:
 - a. Anchor veneer to new construction using dovetail anchors and slots.
 - b. Anchor veneer to existing construction using adjustable pintle and plate.
 - c. Provide veneer anchorage at not more than 16 inches on-center vertically and 16 inches on-center horizontally.

G. Reinforcing Masonry:

1. General:
 - a. Provide continuous horizontal joint reinforcing in all concrete masonry wall construction.
 - 1) Embed longitudinal side rods in mortar for entire length with minimum cover of 5/8 inches on exterior side of walls and 1/2 inches at other locations.
 - a) For interior partitions, the "exterior" side of the wall is considered the side having the most corrosive atmosphere or the corridor side of the wall.
 - 2) Lap reinforcement minimum of 12 inches at ends.
 - a) Remove cross wires on one side of the lap splice and bend the side rods slightly so the lap is provided with 12 inches of uninterrupted wire lap occurring in the same plane.
 - 3) Do not bridge control joints with horizontal joint reinforcing.
 - 4) Do not bridge expansion joints with horizontal joint reinforcing.
 - 5) At corners and wall intersections use prefabricated "L" and "T" horizontal joint reinforcing sections.
 - 6) Cut and bend as necessary.
 - b. Install reinforcing at 16 inches on-center vertically unless noted otherwise on Drawings.
 - c. Install reinforcing 8 inches on-center vertically for a minimum of 24 inches at starter courses.
 - 1) Do not install horizontal joint reinforcing in veneer mortar joint having through-wall flashing.
 - d. In concrete masonry, install horizontal joint reinforcing at 8 inches on-center in parapets.
 - 1) Parapets begin at the course immediately above the top of the roof structural member or top of concrete topping slab on precast roof structure.
 - e. In concrete masonry, install additional horizontal joint reinforcing 16 inches on-center in courses on each side of vertical control joints and on each jamb of openings for full height of joint or opening.
 - 1) Alternate with normal wall horizontal joint reinforcing.
 - 2) Extend reinforcing minimum 32 inches beyond joint or jambs of opening.
 - f. In concrete masonry, reinforce masonry openings over 12 inches wide with horizontal joint reinforcing placed in three horizontal joints above lintel and two horizontal joints below sill.
 - 1) Extend minimum of 32 inches beyond jambs of opening.
2. Reinforcing concrete masonry:
 - a. Install reinforcing bars where indicated on Drawings.
 - 1) Provide means necessary to ensure position of vertical steel reinforcing meets requirements of the building code.
 - b. At intersecting load-bearing walls, provide rigid steel anchors 16 inches on-center vertically, embed ends in grout filled cores.
 - 1) Alternate rigid steel anchors with horizontal joint reinforcing.
 - c. At intersecting non-load bearing walls or at intersecting load bearing/non-load bearing walls provide mesh wall ties in mortar joint at 16 inches on-center vertically.

- 1) Extend minimum 6 inches into each wall.
 - 2) Alternate mesh wall ties with horizontal joint reinforcing.
 - d. Anchor intersecting concrete masonry to intersecting cast-in-place or precast concrete using dovetail slots and anchors.
 - 1) Provide dovetail anchors at 16 inches OC or as noted on Drawings.
- 3. Repair all galvanized coatings damaged as a result of welding.
 - a. See Specification Section 05 50 00 for galvanizing repair system.
- 4. Reinforcing veneer:
 - a. Reinforce veneer with joint reinforcement placed in veneer mortar joints:
 - 1) In new masonry back-up construction alternate veneer horizontal joint reinforcing with random coursing veneer anchorage system.
 - 2) In new concrete back-up construction alternate veneer horizontal joint reinforcing with dovetail anchors.
 - 3) In existing concrete or masonry back-up construction alternate veneer reinforcing with adjustable pintle and plate type veneer anchorage system.
 - 4) In new or existing stud wall back-up construction alternate veneer reinforcing with mechanical veneer anchorage system.
- H. Install reglets as walls are being constructed.
 - 1. Set reglets true with wall, plumb and at consistent depth.
- I. Remove all excess mortar and grout from reglets as walls are being constructed and protect reglet openings from filling with mortar, grout and other construction debris.

END OF SECTION

SECTION 04 05 50
COLD AND HOT WEATHER MASONRY CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cold weather protection.
 - 2. Hot weather protection.
- B. Related Specification Sections include but are not necessarily limited to:

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Brick Industry Association (BIA):
 - a. Technical Note 1, Cold and Hot Weather Construction.
 - 2. National Concrete Masonry Association (NCMA).
 - a. TEK 3-1C, All Weather Concrete Masonry Construction.
 - 3. The Masonry Society (TMS):
 - a. 602, Specification for Masonry Structures.

1.3 DEFINITIONS

- A. As defined in TMS 602.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ERECTION AND APPLICATION

- A. General:
 - 1. Comply with NCMA TEK 3-1C recommendations and practices.
 - 2. Do not use frozen or ice coated materials.
 - 3. At end of each day or at shutdown, cover tops of all walls not enclosed or sheltered with clear polyethylene minimum 6 mil thick.
 - a. Extend down each side of wall minimum of 16 inches and secure.
- B. Temporary Facilities:
 - 1. Construct and maintain temporary protection required to permit continuous and orderly progress of work.
 - 2. Provide and maintain heat sufficient to assure temperature above 32 degrees F within protected areas.
 - 3. Remove all temporary facilities after completion of work.
- C. Cold Weather Construction and Protection Requirements:
 - 1. Prior to and during installation:
 - a. Air temperature 32 to 40 degrees F: Heat mixing water or aggregate to produce mortar temperatures between 40 and 120 degrees F.
 - b. Air temperature 25 to 32 degrees F:
 - 1) Heat mixing water or aggregate to produce mortar temperatures between 40 and 120 degrees F.
 - 2) Maintain mortar temperatures above freezing until used.

- c. Air temperature below 25 degrees F:
 - 1) Heat mixing water and aggregate to produce mortar temperatures between 40 and 120 degrees F.
 - 2) Maintain mortar temperatures above freezing until used.
 - 3) Maintain temperature of units until laid at not less than 40 degrees F.
 - 4) Provide heat on both sides of walls under construction to maintain air temperature above freezing.
 - 5) Provide windbreaks or shelters when wind is in excess of 15 mph.
 - a) Wind breaks or shelters shall be translucent.
 - 2. After installation:
 - a. Air temperature 32 to 40 degrees F: Protect from rain or snow for not less than 24 hours by covering with weather-resistive translucent membrane.
 - b. Air temperature 25 to 32 degrees F: Completely cover with translucent weather-resistive membrane for not less than 24 hours.
 - c. Air temperature 20 to 25 degrees F: Completely protect with insulating blankets for not less than 24 hours or provide other protection approved by Engineer.
 - d. Air temperature below 20 degrees F:
 - 1) Provide enclosed translucent shelters and heating to maintain air temperature on each side of wall above 32 degrees F for 24 hours.
 - 2) Do not allow rapid drop in temperature after removal of heat.
 - e. Promptly repair all tears, holes, etc., to translucent membrane and shelter using compatible patching material and tape as recommended by membrane manufacturer.
- D. Hot Weather Construction and Protection Requirements:
- 1. Comply with requirements of NCMA, BIA and TMS 602.
 - 2. Storage and preparation of materials.
 - a. Cover or shade masonry units and mortar materials from direct sun.
 - b. Maintain sand in a damp loose condition.
 - 1) Sand moisture shall be maintained at minimum 8%.
 - 2) Sprinkle with cool water as required to maintain moisture content.
 - c. Use cool water for mixing mortars.
 - d. Avoid using tools and equipment that have been sitting in the sun.
 - 1) Sprinkle mortar boards, mortar pans, wheel barrows, mixers, etc., with cool water.
 - e. Do not wet concrete masonry units prior to use.
 - 3. Installation:
 - a. Place masonry units within one minute of the spreading of the mortar.
 - 1) Mortar beds shall not be spread more than 4 feet ahead of the masonry unit being placed.
 - b. Provide wind screens and shading partitions as required to eliminate direct sunlight exposure.
 - c. Wet installed units using fog spray of clean water.
 - d. Cover installed work immediately after installation to slow rate of loss of moisture from units.
 - e. Fog-spray new masonry work until damp.
 - 1) Repeat fog spraying minimum of three times per day until masonry work has cured for 72 hours.
 - 2) In high humidity conditions, Engineer reserves the right to discontinue fog spraying if operation is found to be introducing excessive amounts of moisture into the Work.

END OF SECTION

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SECTION 04 22 00
CONCRETE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry construction (CMU), including:
 - a. Standard concrete masonry.
 - b. Architectural concrete masonry exterior single wythe walls.
 - c. Split-face masonry.
 - d. Hi-R-H Block masonry.
 - e. Precast concrete lintels.
2. Integral water repellent admixture.
3. Masonry special inspection.

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

1. Section 03 21 00 - Reinforcement.
2. Section 03 31 30 - Concrete, Materials and Proportioning.
3. Section 03 35 00 - Concrete Finishing and Repair of Surface Defects.
4. Section 04 01 20 - Masonry Cleaning.
5. Section 04 05 13 - Masonry Mortar and Grout.
6. Section 04 05 23 - Masonry Accessories.
7. Section 04 05 50 - Cold and Hot Weather Masonry Construction.
8. Section 07 21 00 - Building Insulation.
9. Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

A. Terminology:

1. Terminology indicated below are not defined terms and are not indicated with initial capital letters, but when used in this section have the meaning indicated below:
 - a. Terminology used in this Section are in accordance with "Standard Unit Nomenclature" Table 1, NCMA TEK 2-3A.

B. Reference Standards:

1. ASTM International (ASTM):
 - a. C33, Standard Specification for Concrete Aggregates.
 - b. C55, Standard Specification for Concrete Building Brick.
 - c. C90, Standard Specification for Loadbearing Concrete Masonry Units.
 - d. C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - e. C426, Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.
 - f. C1357, Standard Test Methods for Evaluating Masonry Bond Strength.
 - g. E514, Standard Test Method for Water Penetration and Leakage Through Masonry.
2. National Concrete Masonry Association (NCMA):
 - a. TEK 2-3A, Architectural Concrete Masonry Units.
 - b. TEK 3-4B, Bracing Concrete Masonry Walls During Construction.
 - c. TEK 8-2A, Removal of Stains from Concrete Masonry.

- d. TEK 8-3A, Control and Removal of Efflorescence.
- 3. The Masonry Society (TMS):
 - a. 602, Specification for Masonry Structures.

1.3 QUALITY ASSURANCE:

A. Regulatory Requirements:

- 1. Applicable construction codes including building code are indicated in Section 01 42 00 - References.

B. Qualifications:

- 1. Concrete masonry unit manufacturer shall be licensed or qualified, in writing, by manufacturer of integral water repellent admixture to produce masonry units containing manufacturer's admixture.
 - a. Concrete masonry unit manufacturer shall have not less than five years experience manufacturing masonry units containing admixture manufacturer's products.

C. Mockups:

- 1. Mockups – General: Prior to permanent wall construction, construct mockup.
 - a. Construct mockup on a concrete slab as necessary to demonstrate construction details.
 - 1) Minimum slab thickness: four inches.
 - b. Mockup shall show full color range, texture and bond pattern(s) of each type masonry required.
 - c. Size: As large as necessary to properly display all conditions required by masonry construction.
 - 1) Not less than four feet high by eight feet long.
 - a) Return corners and intersections not less than four feet.
 - 2) Mockup shall demonstrate:
 - a) Outside corner condition.
 - b) Inside corner condition.
 - c) Intersection of interior masonry partition.
 - d) Jamb condition demonstrating lintel bearing and flashing.
 - e) Masonry control joint.
 - d. Include all special corners and other special CMU detailing shown on the Drawings.
 - e. Include all types of masonry shown on the Drawings, including:
 - 1) Pre-colored masonry.
 - 2) Split-face masonry.
 - 3) Precast lintel.
 - 4) Cast stone.
 - f. Mockup shall include:
 - 1) Each type of masonry required for the Work.
 - a) Each type of special shape.
 - b) Each type of back-up wall system(s).
 - 2) Colored mortar
 - 3) Vertical wall reinforcing with grouted cell.
 - 4) Typical bond beam construction.
 - 5) Typical lintel construction.
 - 6) Positioning, securing and lapping of reinforcing steel.
 - 7) Masonry accessories:
 - a) Horizontal joint reinforcing.

- (1) Positioning and lapping of joint reinforcing.
 - b) Thru wall flashing and drip edge.
 - (1) Demonstrate inside and outside corner conditions showing thru wall flashing lapping, jointing and sealing.
 - c) Weep joint mortar protection system.
 - d) Weep joints and weep vents.
 - e) Typical control joint construction.
 - f) Mesh wall ties.
 - g) Rigid steel masonry anchors.
- 8) Insulation.
- 9) Cleaning of masonry work.
- 2. Step construction of mockup to allow observation of components.
- 3. Following acceptance of mockup by Engineer, shall constitute minimum standard of quality for the Work.
 - a. Maintain and safeguard mockup until Substantial Completion.
- 4. If not acceptable as determined by Engineer, provide additional mockups as necessary.
- 5. Remove mockups when directed by Engineer.
- 6. For HI-R-Hspecifications only Pre-installed two piece, interlocking, Concrete Masonry Unit Insulation.
 - 1) Description: Concrete Block Insulation Systems, Inc. expanded polystyrene Insulation Inserts made from flame-retardant treated expandable polystyrene, such as, KORFIL Hi-R Insulation, , and/or ICON Universal Inserts which are pre-installed in CMU's prior to delivery to jobsite;
- 7. Physical Properties of EPS:
 - a. Typical Density (lbs/cu.ft.) Min.: 1.05-1.50
 - b. Thermal Resistance (R) per inch: 5.00
 - c. Water Vapor Permeance: 1.10
 - d. Water Absorption% volume: <1.00
 - e. Flame Spread Rating: <5.00
- 8. Additional Properties of EPS Inserts:
 - a. Rot and Vermin resistance: Produced from expanded polystyrene – full resistant to rot; does not attract vermin, termites or rodents.
 - b. Components: Insulation shall contain no fluorocarbons and no formaldehyde.
Shape: Two-piece, interlocking insert shall overlap at both head & bed joints with edges of adjacent inserts of the same type. Keyway shall be provided for butt welded cross-rods of 16" o.c. ladder type horizontal wall reinforcement.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. Scaled (minimum 1/8 inches per foot) plans showing proposed locations of masonry control joints.
 - b. Wall elevations and sections, indicating special shapes, shape part numbers, applicable dimensions.
 - c. Detail drawings for:
 - 1) Precast concrete lintels.
 - a) Show profiles, cross-sections, reinforcement and steel components.
 - 2. Product Data:

- a. Manufacturer's information on aggregate and cement type used in manufacture.
 - b. Data sheet on each type of masonry unit required, including:
 - 1) Pre-colored masonry.
 - 2) Preparation instruction and recommendations.
 - 3) Storage and handling requirements and recommendations.
 - 4) Installation methods including written plan for cold and hot weather construction and masonry cleaning procedures.
 - 5) Split-face masonry.
 - c. Data sheets on integral water repellent admixture being used in masonry unit manufacturing.
 - d. Technical bulletins on cleaning masonry containing integral water repellent.
3. Samples:
- a. Concrete Masonry Finish Samples: Manufacturer's complete offering of colors and textures for each type of masonry required.
 - 1) Not less than three inches by three inches Samples for initial selection by Engineer, in consultation with Owner.
 - 2) Submit three, full size samples, of each type of masonry selected with the maximum color and texture variation range expected in the finished work for final approval by Engineer, in consultation with Owner.
 - 3) Samples of standard gray-colored masonry are not required.
- B. Informational Submittals: Submit the following:
- 1. Certifications:
 - a. Certification that concrete masonry units meet or exceed requirements of standards referenced.
 - b. Certification that fire-resistive rated units meet the requirements of applicable building code.
 - c. Certification that integral water repellent admixture will not affect the use of coloring processes or alter actual colors of factory colored masonry units.
 - d. Certification of integral water repellent admixture dosage rates from concrete masonry unit Supplier.
 - e. Concrete masonry Supplier shall certify that integral liquid water repellent admixture was furnished at dosage rate recommended by admixture manufacturer for use in exterior (outdoor) wall construction.
 - 2. Supplier Instructions:
 - a. Instructions for handling, storing, and installation.
 - 3. Source Quality Control Submittals:
 - a. Results of tests, inspections, and other quality control activities required by the Contract Documents and performed at the place of production or fabrication.
 - 4. Field Quality Control Submittals:
 - a. Results of tests, inspections, and other quality control activities required by the Contract Documents and performed at the Site.
 - 5. Qualifications:
 - a. Supplier of masonry units when requested by Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
- 1. Comply with Section 01 65 00 - Product Delivery Requirements.
 - 2. Inspect units upon delivery, to verify color match with mockup or approved samples, dimensional quality, and trueness of unit.

B. Storage and Handling Requirements:

1. Comply with Section 01 66 00 - Product Storage and Handling Requirements.
2. Covering material shall be weather-proof but vapor permeable to prevent accumulation of moisture under cover.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. Concrete Products Group – Hi-R-H Unit with one web and suited for 4" insulation insert.
 - a. Basalite Concrete Products, LLC, Dixon, CA, www.basalite.com
 - b. Orco Block Co., Inc., Stanton, CA, www.orco.com
 - c. Western Materials., Yakima, WA, www.westernmaterials.com
 2. Standard masonry units:
 - a. Any manufacturer capable of meeting the requirements of this Specification Section.
 3. Integral water repellent admixture:
 - a. GCP Applied Technologies, Inc.
 - b. ACM Chemistries, Inc.

2.2 MATERIALS

- A. Cement:
1. Type I or II Portland, ASTM C150.
 2. Type IL, ASTM C595
- B. Aggregate: ASTM C33.
- C. Reinforcing Bars: Refer to Section 03 21 00.
- D. Mortar: Refer to Section 04 05 13.
- E. Masonry Grout: Refer to Section 04 05 13.
- F. Masonry Accessories: Refer to Section 04 05 23.
- G. Insulation: Refer to Section 07 21 00.
- H. Sealants: Refer to Section 07 92 00.
- I. Integral Concrete Masonry Water Repellent:
1. Liquid polymeric admixture.
 2. GCP Applied Technologies, Inc., "DRY-BLOCK".

2.3 MANUFACTURED UNITS

- A. General:
1. Masonry units of each type, color, or face style shall be from a single production run by Supplier.
 2. Factory fabricate special shapes unless otherwise required.
 3. For purposes of manufacturing concrete masonry units using integral water repellent admixture, all concrete masonry units are considered to be installed in an exterior (outdoor) environment.
 4. Fire resistive units: Fabricate to comply with applicable building code.
 5. Fabricated in a manufacturing facility.
 6. Provide square corners unless required otherwise.

B. Concrete Masonry Units and Insulation:

1. Modular units:
 - a. Hollow Load Bearing Units: Provide unit type and size(s) indicated on the drawings
 - 1) Masonry units meeting all ASTM C 90 testing requirements and containing integral mixed color:
 - a) Spec-Thermal Hi-R-H insulated Masonry Units.
 - b) Spec-Surface smooth and dense masonry units for painting.
 - c) Spec-Split - Splitface masonry units
 - d) Polished and Textured specialty masonry units.
 - b. Unit Weight:
 - 1) Normal weight units.
 - 2) Density shall not be less than 125 pcf.
 - c. Linear shrinkage: Not to exceed 0.065 percent, ASTM C 90.
 - d. Unit Compressive Strength: Minimum net area compressive strength of 2,000 psi.
 - 1) Determine in accordance with TMS 602.
 - 2) Unit strength method, sampled and tested in accordance with ASTM C140.
 - e. Integral Water Repellent Concrete Masonry Units: Provide all exterior wall architectural concrete masonry units, including single wythe walls and facing units, containing the manufacturer's recommended type and amount of an integral polymeric water repellent admixture.
 - f. Color:
 - 1) As selected by Architect from manufacturer's standard colors
2. Pre-installed two-piece, interlocking Concrete Masonry Unit Insulating Inserts:
 - a. Product: Korfil Hi-R or Hi-R H inserts manufactured by Concrete Block Insulating Systems and distributed by members of the Concrete Products Group:
 - 1) Korfil Hi-R H insert (for 8" nominal height single web units)
 - 2) See specification 07 21 00
3. Provide masonry units manufactured with integral water repellent admixture for the following exposures:
 - a. Exterior veneer.
 - b. Exterior single-wythe construction.
 - c. Exterior composite wall construction.
 - d. Interior areas defined as wet and/or corrosive.
 - 1) See Specification Section 07 92 00 for definition of wet and/or corrosive areas.
4. Special shapes and faces:
 - a. Corner units.
 - 1) Corner units used in veneer wythe shall have a finished return leg one-half the length of a standard modular stretcher unit.
 - 2) Corner units shall maintain regular modular masonry coursing.
 - b. Finished end units.
 - c. Split face.
 - d. Other special shapes as indicated on Drawings or necessary to maintain coursing.

2.4 PERFORMANCE AND DESIGN REQUIREMENTS:

A. Integral Concrete Masonry Water Repellent:

1. Water permeance of masonry: Capable of achieving a Class E Rating when evaluated using ASTM E514 with the test extended to 72 hours, using the rating criteria specified in ASTM E514.
2. Flexural bond strength of masonry: An increase of 10%, minimum, in masonry flexural bond strength shall occur as a result of adding integral water-repellent concrete masonry and mortar admixtures when compared to a control (containing no admixtures) concrete masonry and mortar tested in accordance with ASTM C1357.
3. Compressive strength validation shall be per unit strength method.
4. Drying shrinkage of masonry: Maximum 5% increase in drying shrinkage of the concrete masonry units shall occur as a result of adding integral water repellent concrete masonry admixture when compared to a control (containing no admixtures) concrete masonry when tested in accordance with ASTM C426.
5. Grout shear bond strength: Maximum 5% decrease in grout shear bond strength shall occur as a result of adding integral water repellent admixture to the concrete masonry units when compared to a control (containing no admixtures).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that anchors and flashings are correct.
- B. Lay out walls in advance for uniform and accurate spacing of bond patterns and joints.
 1. Properly locate openings, movement type joints, returns, and offsets.

3.2 INSTALLATION

- A. General:
 1. Build in flashing, reinforcing, weeps, and related accessory items.
 - a. See Specification Section 04 05 23 for installation of accessory items.
 2. Perform all cutting using masonry saw blades.
 3. Drill holes using masonry drill bits or core drill.
 - a. Holes made by chipping unit will not be accepted.
 4. Install field units in running bond, unless noted otherwise.
 - a. Provide special coursing where indicated on the Drawings.
 5. Cut as required to maintain bond pattern.
 6. Use solid units where cutting or laying would expose holes and as noted on Drawings.
 7. Avoid use of less than half size units, whenever possible.
 8. Do not use chipped, cracked, spalled, stained or imperfect units exposed in finish work.
 9. Provide units of uniform color, within the range demonstrated on the approved mock-up.
 10. Do not wet concrete masonry units.
 11. Build chases and recesses as indicated and required for work of other trades.
 - a. Provide not less than 8 inches of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses unless detailed otherwise on the Drawings.
 12. In fire-resistive rated wall construction, install fire resistive units in accordance with the building code.
- B. Concrete Masonry Units:
 1. Grout solid all cells containing steel reinforcing and as indicated on Drawings.
 - a. Refer to Specification Section 04 05 13 for grouting.
- C. Laying and Tooling:
 1. Lay masonry units with completely filled bed and head joints.

- a. Provide full mortar bed on all block cross webs and completely fill head joints.
 - 1) Do not slush head joints.
 - 2) Protect cells requiring grout fill from mortar droppings.
 - 3) Omit mortar from head joint at weep joint opening.
 2. Maintain nominal 3/8 inches joint widths.
 - a. Cut joints flush where concealed.
 - b. Tool exposed joints concave.
 - c. Compress mortar in below ground joints and in joints concealed by insulation in cavity wall construction.
 - d. Provide wider joints where noted on Drawings.
 - 1) In no case shall any mortar joint be more than 3/4 inches wide.
 - e. Where masonry sits on top of steel support omit the mortar joint on top of the support and sit masonry directly on top of the thru wall flashing or the steel support member unless a mortar joint is required to maintain coursing.
 3. During tooling of joints, enlarge any voids or holes, and completely fill with mortar.
 4. Point-up all joints at corners, openings, and adjacent work to provide neat, uniform appearance.
 5. Remove masonry disturbed after laying.
 - a. Clean and relay in fresh mortar.
 - b. Do not pound units to fit.
 - c. If adjustments are required, remove units, clean, and reset in fresh mortar.
 6. Where work is stopped and later resumed, rack back 1/2 masonry unit length in each course.
 - a. Remove loose units and mortar prior to laying fresh masonry.
 7. As work progresses, build in items indicated on Drawings and specified.
 - a. Fill in solidly with mortar around built-in items.
 - b. Where built-in items are to be embedded in cores of hollow masonry units, place grout screen in joint below and fill core solid with mortar.
- D. Control Joints and Sealants:
1. Provide vertical expansion, control and isolation joints where indicated on Drawings.
 2. Where not indicated on Drawings, submit proposed control joint locations in accordance with the following requirements:
 - a. Provide control joints at maximum 24 feet OC.
 - b. Provide at all T intersections.
 - c. Locate joints so as to allow lintels and bond beams above and below openings to extend beyond the opening as indicated on the Drawings without control joints thru the lintel or bond beam.
 3. Rake out mortar in joint.
 4. Refer to Specification Section 07 92 00 for sealant installation requirements.
 - a. Seal control and expansion joints.
- E. Tolerances:
1. Maximum variation from plumb in vertical lines and surfaces of columns, walls, and arises:
 - a. 1/4 inches in 10 feet.
 - b. 3/8 inches in a story height not to exceed 20 feet.
 - c. 1/2 inches in 40 feet or more.
 2. Maximum variation from plumb for external corners, expansion joints, and other conspicuous lines:

- a. 1/4 inches in any story or 20 feet maximum.
 - b. 1/2 inches in 40 feet or more.
- 3. Maximum variation from level of grades for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:
 - a. 1/4 inches in any bay or 20 feet.
 - b. 1/2 inches in 40 feet or more.
- 4. Maximum variation from plan location of related portions of columns, walls, and partitions:
 - a. 1/2 inches in any bay or 20 feet.
 - b. 3/4 inches in 40 feet or more.
- 5. Maximum variation in cross-sectional dimensions of columns and thicknesses of walls from dimensions shown on Drawings:
 - a. Minus 1/4 inches.
 - b. Plus 1/2 inches.
- 6. Maximum variation in mortar joint width:
 - a. Bed joints: 3/32 inches in 10 feet.
 - b. Head joints:
 - 1) Minus 1/8 inches.
 - 2) Plus 1/8 inches.
- F. Protect against weather when work is not in progress.
 - 1. During inclement weather conditions, cover top of walls with translucent waterproof membrane.
 - 2. See Specification Section 04 05 50.
- G. Protect against cold/hot weather as specified in Specification Section 04 05 50.

3.3 FIELD QUALITY CONTROL

- A. Bracing Concrete Masonry Walls During Construction:
 - 1. At a minimum, provide bracing in accordance with NCMA TEK 3-4B.
 - 2. Contractor is responsible for adequately bracing all masonry during construction.
- B. Remove and replace loose, stained, damaged and other unacceptable units as directed by Engineer.
 - 1. Provide new units to match.
 - 2. Install in fresh mortar.
 - 3. Point to eliminate evidence of replacement.
- C. Special Masonry Inspection:
 - 1. Masonry inspection services will be provided during the following construction activities:
 - a. Cost of masonry inspection services will be paid by Owner.
 - b. During laying of units:
 - 1) During the first day of the masonry construction, inspect proportions of site prepared mortar, construction of mortar joints, location of all reinforcing and connectors, size and location of structural elements, type, size and location of anchors, protection of masonry during cold weather.
 - 2) Inspection to be continuous the first full day of masonry construction which requires special inspection.
 - a) Thereafter, a minimum of 3 hours every third day of construction until the concrete masonry work is complete.
 - 3) Inspection while laying masonry units may be made concurrently with other inspection duties provided all inspection duties are adequately performed.

- 4) When deficiencies are found, additional inspection shall be provided as required until deficiencies have been corrected.
- 5) If masonry crews change, an additional full day of inspection is required during the first day the new crew is on-site.
- c. Placement of reinforcing steel:
 - 1) Verification of all reinforcing including size, grade, lap lengths, and type.
 - 2) Inspection may be periodic as required to verify all reinforcing.
 - 3) Inspector to be present during the concrete pour in which any dowels connecting concrete to masonry are cast.
 - a) Inspector to verify proper location of dowels.
- d. Prior to each grouting operation, verify that grout space is clean, reinforcing is clean and connectors are properly placed, proportions of site-prepared grout are correct and mortar joints have been properly constructed.
 - 1) Inspection may be periodic as required to verify proper grout space.
- e. Verify compliance with building code and Specifications continuously during all grouting operations.
- f. Provide special inspection in accordance with the TMS 602 Level 2 Quality Assurance including observation of masonry work for conformance to the Contract Documents:
 - 1) Provide inspection reports to the Engineer, Building Official and Owner.
 - a) Notify Contractor of discrepancies for correction.
 - b) Notify Engineer, Building Official and Owner, in writing, when discrepancies have been satisfactorily corrected.
 - 2) Submit final signed report stating that work requiring special inspection was, to the best of the inspector's knowledge, in conformance to the Contract Documents and the applicable workmanship provisions of the building code.

3.4 CLEANING

- A. Clean concrete masonry as the wall is being constructed using fiber brushes, wooden paddles and scrapers.
 1. Do not use metal tools or wire brushes.
 2. No acid-based cleaning solutions shall be used unless approved in writing by Engineer.
- B. Remove dirt and stains in accordance NCMA TEK 8-2A.
- C. Remove primary efflorescence in accordance with NCMA TEK 8-3A.

END OF SECTION



DIVISION 05

METALS



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SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish labor, materials, tools, equipment, and services for Cold-Formed Metal Framing in accordance with provisions of Contract Documents.
- B. Completely coordinate with work of other trades.

1.2 QUALITY ASSURANCE

- A. ASTM International (ASTM):
 - 1. ASTM A1003 Standard Specification for Steel Sheet, Carbon, Metallic- and – Nonmetallic-Coated for Cold-Formed Framing Members.
 - 2. ASTM C1007 Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories
- B. American Iron and Steel Institute (AISI):
 - 1. AISI S200 Series North American Standards for Cold-Formed Steel Framing.
- C. Provide Cold-Formed Metal Framing engineered to support dead, live, and lateral (wind or seismic) loads indicated.
 - 1. Include headers and reinforcing members around openings.
 - 2. Required details defining method of fastening throughout system and attachments to supporting primary structure included in engineering requirement.
 - 3. Design cold-formed metal framing to accommodate building drift.

1.3 SUBMITTALS

- A. Product Data:
 - 1. For each type of material and accessory.
- B. Shop Drawings:
 - 1. Complete building elevations defining framing member sizes, locations, and connection details.
 - a. Show openings, edges and support conditions field verified and coordinated with respect to location, physical requirements of items to be installed in or on exterior wall system.
- C. Project Information:
 - 1. Structural calculations for Cold Formed Metal Framing indicating design conforms to specified design criteria, sealed by the Specialty Structural Engineer.
 - a. Submit concurrent with Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Cold-Formed Metal Framing:
 - 1. Base:
 - a. ClarkDietrich Building Systems
 - 2. Optional:
 - a. Telling Industries

- b. California Expanded Metal Products Co.
- c. Custom Stud Inc.
- d. Marino\WARE
- e. MBA Metal Framing
- f. MRI Steel Framing LLC
- g. The Steel Network

B. Galvanizing Repair Coating:

- 1. Base:
 - a. Tnemec
- 2. Optional:
 - a. ZRC Worldwide
 - b. Sherwin Williams

2.2 DESIGN CRITERIA

- A. Design Cold-Formed Metal Framing to satisfy requirements of applicable building codes as locally amended, but not less than loads shown in contract documents.
- 1. Design Exterior Soffits similarly.
 - 2. Include anticipated dead and live with lateral, wind or seismic, loads where details indicate cladding, soffits or equipment weights are carried by stud wall system.
- B. Limit lateral deflection of stud wall system due to wind or seismic as follows:

Maximum Allowable Deflection	
Exterior Finish Material	Deflection Limit
Marble, Granite and other Stone Veneers	L/720
Brick and Concrete Masonry Veneers	L/600
Portland Cement Plaster (Stucco)	L/360
Manufactured Stone Veneer, Adhered Stone Veneer, Thin Brick, Tile and similar Mortar-Set finishes.	L/360
Metal Panels, Curtain Walls, and other flexible wall finishes.	L/240

- C. Select stud gauge and spacing as required for strength and to limit deflection due to applied loads.
- 1. Utilize properties of metal stud only.
 - 2. Do not include contributions provided by wallboard or sheathing.
 - 3. Design connections such that anticipated structural movements will not adversely affect system or cladding supported by system
 - a. Allow for vertical beam deflections of span/600.
 - b. Allow for lateral interstory drift of story height/400.
 - 4. Design framing system to resist gravity loads and wind uplift at soffits.

2.3 MATERIALS

- A. Exterior Studs:
- 1. 33 ksi 227 MPA steel studs, runner channels and track, bracing, and accessories.
 - a. Revise thickness and minimum requirements if 50 ksi 345 MPa steel is used.
 - 2. Coatings:

- a. G60 Z180 galvanized
 - b. A60 ZF180, AZ50 AZ150, or GF30 ZGF90 EQ coatings.
- 3. Stud depth:
 - a. As indicated on Drawings.
- 4. Span:
 - a. As indicated on Drawings.
- 5. Stud spacing:
 - a. Use closer spacing as needed to satisfy load deflection criteria.
 - b. 12 inches 300 mm OC minimum.
 - c. 16 inches 400 mm OC maximum.
- 6. Stud, runner, and track thickness:
 - a. Minimum: 43 mils (18 GA) 1.09 mm.
 - b. Increase member thickness where needed to satisfy loading and deflection criteria.
- 7. Deep-leg runner flange:
 - a. Minimum: 2 inches 50 mm.
- 8. Headers:
 - a. C-shapes used to form header beams
 - b. Web depths and stiffened flanges as required.
 - c. Thickness: As determined by engineering calculations for specific opening.
- 9. Runner fasteners:
 - a. Power driven fasteners.
 - b. Minimum 190 pound 86 kg shear and bearing.
- B. Galvanizing Repair Coating:
 - 1. Tnemec Series 94-H20 Hydro-Zinc.
 - 2. ZRC Worldwide, Galviline 221.
 - 3. Sherwin Williams Zinc Clad III HS 100.
- C. Wood Sheathing:
 - 1. See Section 06 10 00.
- D. Gypsum Sheathing:
 - 1. See Section 09 29 00.
- E. Exterior Joint Sealants:
 - 1. See Section 07 92 00.
- F. Metal Blocking:
 - 1. C-shaped modified track runners.
 - a. Roll-form from corrosion-resistant galvanized steel.
 - b. Conform to ASTM C645.
 - 2. Galvanized: ASTM A653, G40.
 - 3. Backing height: 6 inches 150 mm minimum.
 - 4. Flange width: 1-1/4 inches 32 mm minimum.
 - 5. Thickness: 33 mil (20 GA) 0.762 mm minimum.
 - 6. Base product: Notched Track by Clark Dietrich.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrate for suitability to accept work.
- B. Start of work constitutes acceptance of substrate and responsibility for performance.

3.2 ERECTION

A. Studs and Runners:

1. Align outside deep leg runner track accurately according to exterior wall layout.
2. Fasten 12 inches 300 mm OC, or as needed to satisfy design criteria.
3. Position studs vertically in inside deep leg runners at required spacing.
4. Install minimum of two (2) studs each side of openings; use more if required to meet loadings.
5. Anchorage:
 - a. Top:
 - 1) Allow 3/4 inches 19 mm clearance between top of inside deep leg runner and outside deep leg runner.
 - 2) Do not fasten inside deep leg runner to outside deep leg runner.
 - 3) Fasten studs to inside deep leg runner.
 - b. Bottom:
 - 1) Anchor each stud at bottom to runners with two, 3/8 inches 9.5 mm minimum, type S-12 pan head screws.
6. Where stud design is outside edge of floor slab, provide galvanized connectors designed for loading requirements and allow individual floor movement without affecting integrity of stud system.
7. Shop weld assemblies as required to meet design requirements.
8. Touch-up burned off or abraded galvanizing with galvanizing repair coating.

B. Openings:

1. Install header, jamb, and sill framing system per approved engineering documents

C. Coordinate installation of wall blocking used to support wall-supported items with installation of Cold-Formed Metal Framing.

3.3 PROTECTION

- A. Protect erected wall and openings with temporary covers until finish, roofing, flashing, and windows are installed.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Custom fabricated metal items and certain manufactured units not otherwise indicated to be supplied under work of other Specification Sections.
 2. Design of all temporary bracing not indicated on Drawings.
 3. Design of systems and components, including but not limited to:
 - a. Stairs.
 - b. Landings.
 - c. Ladders.
 - d. Modular framing system.
- B. Related Specification Sections include but are not necessarily limited to:
1. Section 03 15 19 - Anchorage to Concrete.
 2. Section 03 31 30 - Concrete, Materials and Proportioning.
 3. Section 06 82 00 - Fiberglass Reinforced Plastic Fabrication.
 4. Section 09 96 00 - High Performance Industrial Coatings.

1.2 REFERENCES

- A. Definitions
1. Fasteners: As defined in ASTM F1789.
 2. Galvanizing: Hot-dip galvanizing per ASTM A123/A123M or ASTM A153/A153M with minimum coating of 2.0 oz of zinc per square foot of metal (average of specimens) unless noted otherwise or dictated by standard.
 3. Hardware: As defined in ASTM A153/A153M.
 4. Installer or Applicator:
 - a. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 - b. Installer and applicator are synonymous.
 5. PQR: Procedure Qualification Record
 6. MIC: Microbiologically induced corrosion.
- B. Referenced Standards: Standards referenced in this section include, but are not necessarily limited to, the following:
1. Aluminum Association (AA):
 - a. ADM 1, Aluminum Design Manual.
 2. American Association of State Highway and Transportation Officials (AASHTO):
 - a. HB, Standard Specifications for Highway Bridges.
 3. American Institute of Steel Construction (AISC):
 - a. 325, Manual of Steel Construction.
 - b. 360, Specifications for Structural Steel Buildings (referred to herein as AISC Specification).
 4. The American Ladder Institute (ALI):
 - a. A14.3, Ladders - Fixed - Safety Requirements.
 5. American Society of Civil Engineers (ASCE):

- a. 7, Minimum Design Loads for Buildings and Other Structures.
- 6. ASTM International (ASTM):
 - a. A6, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 - b. A36, Standard Specification for Carbon Structural Steel.
 - c. A47, Standard Specification for Ferritic Malleable Iron Castings.
 - d. A48, Standard Specification for Gray Iron Castings.
 - e. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - f. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
 - g. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - h. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - i. A197, Standard Specification for Cupola Malleable Iron.
 - j. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - k. A276, Standard Specification for Stainless Steel Bars and Shapes.
 - l. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - m. A312, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
 - n. A380/A380M, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
 - o. A500, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - p. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 - q. A536, Standard Specification for Ductile Iron Castings.
 - r. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.
 - s. A572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - t. A563, Standard Specification for Carbon and Alloy Steel Nuts.
 - u. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - v. A668, Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.
 - w. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - x. A786, Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
 - y. A992, Standard Specification for Steel for Structural Shapes.
 - z. A1064, Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - aa. A1011, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - bb. B26, Standard Specification for Aluminum-Alloy Sand Castings.
 - cc. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

- dd. B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- ee. B308, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- ff. B429, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- gg. B632, Standard Specification for Aluminum-Alloy Rolled Tread Plate.
- hh. F436, Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.
- ii. F467, Standard Specification for Nonferrous Nuts for General Use.
- jj. F468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
- kk. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- ll. F835, Standard Specification for Alloy Steel Socket Button and Flat Countersunk Head Cap Screws.
- mm. F879, Standard Specification for Stainless Steel Socket Button and Flat Countersunk Head Cap Screws.
- nn. F1789, Standard Terminology for F16 Mechanical Fasteners.
- oo. F3125, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- 7. American Welding Society (AWS):
 - a. A5.1/A5.1M, Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
 - b. D1.1, Structural Welding Code - Steel.
 - c. D1.2, Structural Welding Code - Aluminum.
 - d. D1.6/D1.6M, Structural Welding Code - Stainless Steel.
- 8. National Association of Architectural Metal Manufacturers (NAAMM):
 - a. AMP 510, Metal Stairs Manual.
 - b. AMP 555, Code of Standard Practice for the Architectural Metal Industry (Including Miscellaneous Iron).
 - c. MBG 531, Metal Bar Grating Manual.
- 9. NACE International (NACE).
- 10. Nickel Development Institute (NiDI):
 - a. Publication 11 007, Guidelines for the Welded Fabrication of Nickel-Containing Stainless Steels for Corrosion Resistant Services.
- 11. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

1.3 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - 2. Fabrication and/or layout drawings and details:
 - a. Submit drawings for all fabrications and assemblies.
 - 1) Include erection drawings, plans, sections, details and connection details.
 - b. Identify materials of construction, shop coatings and third party accessories.
 - 3. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Provide manufacturer's standard allowable load tables for the following:
 - 1) Grating and checkered plate.

- 2) Castings, trench covers and accessories.
- 3) Modular framing systems.
- 4. Contractor designed systems and components:
 - a. Certification that manufactured units meet all design loads specified.
 - b. Shop Drawings and engineering design calculations:
 - 1) Indicate design live loads.
 - 2) Sealed by a licensed professional engineer, registered in the State of Idaho.
 - 3) Engineer will review for general compliance with Contract Documents.
 - c. Contractor designed systems and components include the following:
 - 1) Metal Stairs and associated landings.
 - 2) Aluminum checkered plate.
- B. Informational Submittals:
 - 1. Certification of welders and welding processes.
 - a. Indicate compliance with AWS.
 - 2. NACE certification of surface preparation.
 - 3. NACE certification of paint application.
 - 4. Qualifications:
 - a. NACE inspector qualifications.

1.4 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Qualify welding procedures and welding operators in accordance with AWS.
 - a. All welders shall be qualified in all positions that will be utilized during welding. Welders shall utilize qualified PQR for testing.
 - b. For all stainless steel immersed in wastewater applications: Visual Appearance Welds- Due to concerns with MIC related corrosion, welds shall be visually inspected to ensure surfaces are free of undercut, pin holes, overlap or other weld defects that would create areas for MIC or other corrosion to occur.
 - 2. Fabricator shall have minimum of 10 years of experience in fabrication of metal items specified.
 - 3. Engineer for contractor-designed systems and components: Professional structural engineer licensed in the State of Idaho.
 - 4. NACE certified inspector shall have minimum of two years of experience performing inspections as indicated.
 - a. Have a current Level III coating inspector certification.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and handle fabrications to avoid damage.
- B. Store above ground on skids or other supports to keep items free of dirt and other foreign debris and to protect against corrosion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Abrasive stair nosings (embedded in concrete stairs):
 - a. American Safety Tread.
 - b. Balco.

2. Headed studs and deformed bar anchors:
 - a. Nelson Stud Welding Div., TRW Inc.
 - b. Stud Welding Products, Inc.
3. Mechanical anchor bolts:
 - a. See Section 03 15 19.
4. Epoxy adhesive anchor bolts:
 - a. See Section 03 15 19.
5. Concrete screw anchors:
 - a. See Section 03 15 19.
6. Castings, trench covers and accessories:
 - a. Neenah Foundry Co.
 - b. Deeter Foundry Co.
 - c. Barry Craft Construction Casting Co.
 - d. McKinley Iron Works.
7. Aluminum ladders:
 - a. Any manufacturer capable of meeting the requirements of this Specification Section.
8. Galvanizing repair paint:
 - a. Clearco Products Co., Inc.
 - b. ZRC Products.
9. Modular framing system:
 - a. Unistrut Building Systems.
 - b. B-Line Systems.
 - c. Kindorf.
 - d. Superstrut.
10. Ladder safety extension post:
 - a. Bilco.

2.2 MATERIALS

A. Steel:

1. Structural:
 - a. W-shapes and WT-shapes: ASTM A992, Grade 50.
 - b. All other plates and rolled sections: ASTM A36.
2. Pipe: ASTM A53, Types E or S, Grade B or ASTM A501.
3. Structural tubing:
 - a. ASTM A500, Grade B (46 ksi minimum yield).
4. Bolts, high strength:
 - a. ASTM F3125, Grade A325.
5. Nuts, high strength:
 - a. ASTM A563.
6. Washers (hardened):
 - a. ASTM F436.
 - b. Provide two (2) washers with all bolts.
7. Bolts and nuts (unfinished):
 - a. ASTM A307, Grade A.
8. Welding electrodes: AWS D1.1, E70 Series.
9. Steel forgings: ASTM A668.

- B. Iron:
 - 1. Ductile iron: ASTM A536.
 - 2. Gray cast iron: ASTM A48 (minimum 30,000 psi tensile strength).
 - 3. Malleable iron: ASTM A47, ASTM A197.
- C. Stainless Steel:
 - 1. Stainless steel in welded applications: Low carbon 'L' type.
 - 2. Minimum yield strength of 30,000 psi and minimum tensile strength of 75,000 psi.
 - a. Bars, shapes: ASTM A276, Type 304.
 - b. Tubing and pipe: ASTM A269, ASTM A312 or ASTM A554, Type 304 or 316.
 - c. Strip, plate and flat bars: ASTM A666, Type 304 or 316.
 - d. Bolts and nuts: ASTM F593, Type 304 or 316.
 - 3. Minimum yield strength of 25,000 psi and minimum tensile strength of 70,000 psi.
 - a. Strip, plate and flat bar for welded connections, ASTM A666, Type 304L or 316L.
 - 4. Welding electrodes: In accordance with AWS for metal alloy being welded.
- D. Aluminum:
 - 1. Alloy 6061-T6, 32,000 psi tensile yield strength minimum.
 - a. ASTM B221 and ASTM B308 for shapes including beams, channels, angles, tees and zees.
 - b. Weir plates, baffles and deflector plates, ASTM B209.
 - 2. Alloy 6063-T5 or T6, 15,000 psi tensile yield strength minimum.
 - a. ASTM B221 and ASTM B429 for bars, rods, wires, pipes and tubes.
 - 3. ASTM B26 for castings.
 - 4. ASTM F468, alloy 2024 T4 for bolts.
 - 5. ASTM F467, alloy 2024 T4 for nuts.
 - 6. Electrodes for welding aluminum: AWS D1.2, filler alloy 4043 or 5356.
- E. Washers: Same material and alloy as found in accompanying bolts and nuts.
- F. Embedded Anchor Bolts:
 - 1. See Specification Section 03 15 19.
- G. Mechanical Anchor Bolts and Adhesive Anchor Bolts:
 - 1. See Specification Section 03 15 19.
- H. Headed Studs: ASTM A108 with a minimum yield strength of 50,000 psi and a minimum tensile strength of 60,000 psi.
- I. Deformed Bar Anchors: ASTM A1064 with a minimum yield strength of 70,000 psi and a minimum tensile strength of 80,000 psi.
- J. Iron and Steel Hardware: Galvanized in accordance with ASTM A153/A153M when required to be galvanized.
- K. Galvanizing Repair Paint:
 - 1. High zinc dust content paint for regalvanizing welds and abrasions.
 - 2. ASTM A780.
 - 3. Zinc content: Minimum 92% in dry film.
 - 4. ZRC "ZRC Cold Galvanizing" or Clearco "High Performance Zinc Spray."
- L. Dissimilar Materials Protection: See Specification Section 09 96 00.

2.3 MANUFACTURED UNITS

A. Ladders:

1. General:
 - a. Fully welded type.
 - 1) All welds to be full penetration welds, unless otherwise specified.
 - b. All ladders of a particular material shall have consistent construction and material shapes and sizes unless noted otherwise on the Drawings.
 - c. Design ladder in accordance with OSHA Standards, ANSI A14.3, ASCE 7 and the building code.
 - d. Ladders shall be designed to support a minimum concentrated live load of 300 pounds at any point to produce the maximum stress in the member being designed.
 - 1) Apply additional 300 pound loads for each section of ladder exceeding 10 feet.
 - e. Maximum allowable stresses per AA ADM 1.
 - f. Maximum lateral deflection: Side rail span/240 when lateral load of 100 pounds is applied at any location.
2. Material:
 - a. Aluminum.
 - b. Finish:
 - 1) Mill.
3. Rails:
 - a. Round pipe or rectangular tubing:
 - 1) Round pipe:
 - a) 1-1/2 inches nominal diameter.
 - b) Schedule 80.
 - 2) Rectangular tubing:
 - a) Cross-section: 3 by 2 inches maximum.
 - b) Thickness: 0.125 inches minimum.
 - b. Spacing:
 - 1) Minimum clear distance between rails to be 18 inches.
 - 2) Step-through ladder extensions: 24 inches, clear minimum, 30 inches maximum.
 - 3) Ladders equipped with ladder safety system: 36 inches clear.
 - c. Provide cap at exposed top and bottom of side rails.
 - 1) Provide weep holes as necessary to prevent the accumulation of moisture within hollow members.
 - d. Extend side rails of step-through ladders a minimum of 42 inches above the landing.
4. Rungs:
 - a. Minimum 1 inch diameter or 1 inch square solid bar.
 - 1) Integral non-slip finish on all sides.
 - a) Non-slip finish: Coarse knurling or extruded serrations.
 - b) Shop or field-applied grit tape and cap type non-slip finishes are not acceptable.
 - b. Rungs shall penetrate inside wall of side rails.
 - 1) Do not extend rungs beyond the outside face of the side rail.
 - 2) Provide fillet weld all around rung at inside face of side rail and plug weld at outside face of side rail.
 - c. Rung spacing:

- 1) Equally spaced not less than 10 inches and not more than 14 inches as measured between the centerlines of the rungs.
 - a) Ladder rungs and steps in elevator shafts shall be spaced not less than 6 inches and not more than 16.5 inches as measured between the centerlines of the rungs.
- 2) Top rung shall be level with landing or platform.
 - a) Where top of ladder terminates at grating cover, floor access door, roof hatch or similar condition; locate top rung as close as practicable to, but not more than 6 inches below, adjacent walking surface.
5. Brackets:
 - a. Angle or bent plate brackets welded to side rails:
 - 1) 3/8 inches by 2-1/2 inches by length required.
 - 2) Provide punched holes for 3/4 inches bolts or anchors.
 - 3) Minimum distance from centerline of rung to wall or any obstruction: 7 inches.
 - 4) Maximum spacing: 4 feet OC.
 - b. For floor supported ladders, provide 3/8 by 2-1/2 by 4 inches rectangular bracket or 3/8 by 6 by 6 inches square plate welded to rails with punched holes for 3/4 inches bolts.
 - 1) Provide wall brackets on floor supported units if vertical run is over 4 feet.
6. Landings:
 - a. Construct landing, railing and all supports of same material as the ladder.
 - b. Design live load for landing platform and supporting structure:
 - 1) 100 PSF, uniform load.
 - 2) 300 LBS concentrated load on 4 inches square area.
 - 3) All components to be adequate for the uniform load or the concentrated load, whichever requires the stronger component.
 - 4) Maximum deflection: 1/300 of span under a superimposed live load of 100 psf.
 - c. Grating:
 - 1) Per this Specification Section.
 - d. Structural support: Channel or tubular sections with bracing, plates, angles, etc., to support guardrail and grating and to support landing from the side of the structure.
 - 1) Weld or bolt all connections using galvanized bolts, nuts and washers.
 - e. Guardrails:
 - 1) Match ladder side rails.
 - a) Space intermediate rails equally between top rail and top of kickplate.
 - 2) Provide 4 inches high x 3/8 inches thick toeboard each side of landing.
7. Gates:
 - a. Constructed of same material and sizes as the railing system.
 - b. Hinges:
 - 1) Stainless steel.
 - 2) Heavy-duty, self-closing.
 - c. Gate stop:
 - 1) Aluminum.
8. Ladder safety extension post:
 - a. Telescoping tubular aluminum section that automatically locks into place when fully extended.
 - b. Non-ferrous corrosion-resistant spring and hardware.
 - c. Factory assembled with all hardware necessary for mounting to ladder.
 - d. Bilco "LadderUp" safety post.

9. Deflector plate:
 - a. For aluminum ladders: Minimum 0.0625 inches aluminum plate, ASTM B209.
 - b. For stainless steel ladders: Minimum 0.0625 inches stainless steel plate, ASTM A666.
 - c. For steel ladders: Minimum 0.0625 inches steel plate, ASTM A6.
 - d. Profile as shown on Drawings.
 - e. Fabricate to shapes and sizes required to meet OSHA Standards.
- B. Bollards:
 1. 8 inches diameter extra strength steel pipe, ASTM A53.
 - a. Galvanized.
 - b. See Specification Section 09 96 00 for painting requirements.
- C. Abrasive Stair Nosings:
 1. Exterior cast-in-place concrete stairs:
 - a. One piece cast aluminum with wing anchors.
 - b. Diamond abrasive pattern.
 - c. Babcock Davis "BSTCA-C3W".
 2. Interior stairs:
 - a. Two component consisting of an embedded subchannel and an abrasive tread plate with integral photoluminescent strip.
 - b. Subchannel: 6063-T5 extruded aluminum.
 - 1) Complete with concrete anchors.
 - c. Tread plate:
 - 1) 6063-T5 extruded aluminum.
 - 2) Solid epoxy abrasive filler.
 - a) Color: Safety yellow.
 - d. Balco "DXH-330".
 - e. Finish: Mill.
 3. Length:
 - a. Concrete stairs and landings:
 - 1) 4 inches less than overall stair width.
 - 2) Where tread mounted railing post occurs, hold nosing back 4 inches clear from railing centerline.
 - b. Concrete filled metal pan stairs: Full length of tread.
 - c. Concrete landings at metal stairs: 4 inches less than clear width between stringers.
- D. Metal Stairs:
 1. Treads: Grating as specified.
 - a. Provide integral corrugated non-slip nosing.
 2. Risers:
 - a. Grating treads:
 - 1) Solid plate welded to trailing edge of tread or landing.
 - 2) Minimum 3/16 inches thick by 4 inches high.
 - b. Checkered plate treads: Solid checkered plate riser integral with tread.
 3. Landings:
 - a. Grating as specified.
 - b. Provide integral corrugated non-slip nosing at edge acting as stair tread/nosing.
 4. Design live load for landing platform and supporting structure:

- a. 100 PSF, uniform load.
 - b. 300 LBS concentrated load on 4 inches square area.
 - c. All components to be adequate for the uniform load or the concentrated load, whichever requires the stronger component.
 - d. Maximum deflection: $1/300$ of span under a superimposed live load of 100 psf.
5. Design, fabricate, and install in compliance with NAAMM and applicable codes.
- a. NAAMM AMP 510:
 - 1) Exterior at site structures and equipment: Industrial Class.
 - 2) Interior or exterior at buildings: Service Class.
6. Handrails and guardrails: Refer to Specification Section 05 52 46.
7. Material:
- a. Aluminum.
- E. Stairs, Concrete Filled Steel Pan:
- 1. Fabricated as indicated.
 - a. ASTM A36 steel.
 - 2. Treads: Minimum 14 GA pans with self-furring metal lath welded in pan.
 - 3. Risers: Minimum 14 GA.
 - 4. Landings: minimum 10 GA pans with angle supports as required to support loading indicated and concrete.
 - a. Provide self-furring metal lath reinforcing welded in the pan.
 - 5. Design live load for landing platform and supporting structure:
 - a. 100 PSF, uniform load.
 - b. 300 LBS concentrated load on 4 inches square area.
 - c. All components to be adequate for the uniform load or the concentrated load, whichever requires the stronger component.
 - d. Maximum deflection: $1/300$ of span under a superimposed live load of 100 psf.
 - 6. Design, fabricate, and install in compliance with NAAMM and applicable codes.
 - a. NAAMM AMP 510: Commercial Class.
 - b. ICC A117.1.
 - 7. Nosings:
 - a. Abrasive nosings as specified.
 - b. Coordinate riser height to compensate for thickness of nosing.
 - 8. Handrails and guardrails: Refer to Specification Section 05 52 46.
 - 9. Galvanize entire assembly after fabrication.
- F. Steel Checkered Plate:
- 1. Provide galvanized checkered plate and edge supports.
 - 2. Conform to ASTM A786.
 - a. Diamond pattern: No.3 (large) or No.4 (medium).
 - b. Use one pattern throughout Project.
 - c. Material: 36 ksi minimum yield strength.
 - 3. Design live load (unless noted otherwise on Drawings):
 - a. 100 psf, uniform load.
 - b. 300 pounds concentrated load on 4 inches square area.
 - c. All components to be adequate for the uniform load or the concentrated load, whichever requires the stronger component.
 - d. Maximum deflection: $1/300$ of span under a superimposed live load of 50 psf.

4. Reinforce as necessary with steel angles welded to underside of checkered plate.
 5. Plate sections:
 - a. Maximum 3 feet wide.
 - b. Minimum 1/4 inches thick.
 - c. Maximum 100 pounds per section if required to be removable.
 6. Provide joints at center of all openings unless shown otherwise.
 - a. Reinforce joints and openings with additional angles to provide required load carrying capacity.
 7. Unless shown otherwise, frame for opening with steel checkered plate cover:
 - a. Steel support angles:
 - 1) 3 by 2 by 1/4 inches minimum size with long leg vertical.
 - 2) 5/8 inches diameter adhesive anchor bolts spaced at maximum of 24 inches on-center along each side with not less than two anchor bolts per side.
 - b. Steel concrete insert seats:
 - 1) 2 by 2 by 1/4 inches minimum size.
 - 2) Auto-welded studs or strap anchors, ASTM A108 at 18 inches on-center with not less than two studs or anchors per side.
 - c. Drill and tap frame to receive 3/8 inches diameter fasteners at not more than 24 inches on-center with not less than two fasteners per side.
 - 1) Fasteners: Flat countersunk cap screws, ASTM F835.
 - a) Galvanized, ASTM A153/A153M.
- G. Aluminum Checkered Plate:
1. Conform to ASTM B632.
 - a. Diamond pattern: Use one pattern throughout Project.
 - b. Material: Type 6061-T6.
 2. Design live load:
 - a. 100 psf, uniform load.
 - b. 300 pounds concentrated load on 4 inches square area.
 - c. All components to be adequate for the uniform load or the concentrated load, whichever requires the stronger component.
 - d. Maximum deflection: 1/300 of span under a superimposed live load of 50 psf.
 3. Reinforce as necessary with aluminum angles.
 4. Plate sections:
 - a. Maximum 3 feet wide.
 - b. Minimum 1/4 inches thick.
 - c. Maximum 100 pounds per section if required to be removable.
 5. Provide joints at center of all openings unless shown otherwise.
 - a. Reinforce joints and openings with additional angles to provide required load carrying capacity.
 6. Unless shown otherwise, frame for openings with aluminum checkered plate cover:
 - a. Aluminum support angles:
 - 1) 3 by 2 by 1/4 inches minimum size with long leg vertical.
 - 2) 5/8 inches diameter adhesive anchor bolts spaced at maximum of 24 inches on-center along each side with not less than two anchor bolts per side.
 - b. Aluminum concrete insert seats:
 - 1) 2 by 2 by 1/4 inches minimum size.

- 2) Auto-welded studs or strap anchors at 18 inches on-center with not less than two studs or anchored per side.
 - c. Drill and tap frame to receive 3/8 inches diameter fasteners at not more than 24 inches on-center with not less than two fasteners per side.
 - 1) Fasteners: Stainless steel flat countersunk cap screws: ASTM F879.
- H. Aluminum Grating:
1. NAAMM MBG 531.
 2. Bearing bars: Rectangular, 1-1/2 by 3/16 inches at 1-3/16 inches on-center spacing OR I-bar, 1-1/2 inches deep with minimum 1/16 inches thick bar and minimum 1/4 inches flange width at 1-3/16 inches on-center spacing (unless noted otherwise on Drawings).
 3. Cross bars:
 - a. Welded, swaged or pressure locked to bearing bars:
 - b. Maximum 4 inches/OC spacing.
 4. Top edges of bars: Grooved or serrated.
 5. Finish: Mill, standard.
 6. Clips and bolts: Stainless steel.
 7. Seat angles: Aluminum or stainless steel
- I. Steel Grating:
1. NAAMM MBG 531.
 2. Bearing bars:
 - a. Rectangular 1-1/2 by 3/16 inches unless otherwise noted on Drawings.
 - b. Maximum 1-3/16 inches on-center spacing.
 3. Cross bars:
 - a. Welded, swagged or pressure locked to bearing bars.
 - b. Maximum 4 inches on-center spacing.
 4. Top edges of bars: Serrated or grooved.
 5. Removable grating sections: Not wider than 3 feet and not more than 100 pounds.
 6. Finish:
 - a. Galvanized.
 - b. Clips and bolts: Stainless steel.
 - c. Seat angles: Galvanized steel.
 7. Ends and perimeter edges: Banded.
 8. Openings through grating: Reinforced to provide required load carrying capacity and banded with 4 inches high toe plate.
 9. Provide joints at openings between individual grating sections.
- J. Heavy-Duty Castings, Trench Covers, and Accessories:
1. Prefabricated, cast iron ASTM A48 or ductile iron ASTM A536.
 2. Design load: AASHTO HS-20 wheel loading for indicated span.
 3. Machine horizontal mating surfaces.
- K. Access Cover:
1. Tank type manhole frame and solid lid: ASTM A48 or ASTM A536, cast iron.
 2. Unless shown otherwise, design of cover shall be such that top of frame extends several inches above slab to prevent surface water from entering tank.
 3. Equip lid with four stainless steel screws to secure lid to frame.
- L. Loose Lintels:

1. Steel, ASTM A36 or ASTM A572 Grade 50, sizes as indicated on Drawings.
2. Hot-dip galvanized per ASTM A123/A123M.

M. Modular Framing System:

1. Materials:
 - a. Steel: ASTM A1011, carbon steel, Grade 33.
 - 1) Hot-dipped galvanized, ASTM A123 or ASTM A153.
 - b. Aluminum: ASTM B221 or ASTM B209.
 - c. Stainless steel: ASTM A666.
 - d. Fiberglass: See Specification Section 06 82 00.
2. Channels and inserts:
 - a. Steel or stainless steel: Minimum 12 GA.
 - b. Aluminum: Minimum 0.080 inches.
 - c. Channels to have one side with a continuous slot with in-turned lips.
 - 1) Width: 1-5/8 inches.
 - 2) Depth and configuration as necessary for loading conditions.
3. Fittings: Same material as system major components.
4. Fasteners:
 - a. Nuts: Toothed grooves in top of nuts to engage the in-turned lips of channel.
 - b. Bolts: Hex-head cap screws.
 - c. Same material as system major components.
5. End caps:
 - a. At each exposed end of each piece mounted on walls, or guardrails, or suspended from framing 7 feet or less above the floor or platform.
 - a) Plastic for all exposed ends 7 feet or more above floor or platform.
 - b) Plastic or metallic for all other exposed ends.
6. Schedule:
 - a. Interior wet areas: Stainless steel.
 - b. Interior corrosive areas: Stainless steel.
 - c. Exterior areas: Aluminum.
 - d. All other areas not listed above: Hot-dipped galvanized steel.
7. Provide dissimilar materials protection in accordance with Specification Section 09 96 00.
8. Repair all cut ends or otherwise damaged areas of galvanized steel in accordance with ASTM A780.

2.4 FABRICATION

- A. Verify field conditions and dimensions prior to fabrication.
- B. Form materials to shapes indicated with straight lines, true angles, and smooth curves.
 1. Grind smooth all rough welds and sharp edges.
 - a. Round all corners to approximately 1/32 - 1/16 inches nominal radius.
- C. Provide drilled or punched holes with smooth edges.
 1. Punch or drill for field connections and for attachment of work by other trades.
- D. Weld Shop Connections:
 1. Stainless steel connections subject to corrosive environments or immersion service will be subject to the following enhanced visual and welding requirements:
 - a. Fabricator

- 1) Fabricator shall have QC program and procedures in place to avoid cross contamination with carbon steel products and material.
- b. Weld Procedures
 - 1) Weld procedures shall be qualified for all positions that will be welded, qualified by testing in accordance with applicable welding code AWS D1.6 requirements.
 - 2) Procedure Qualification Record (PQR) shall document all essential variables to perform consistent quality welds. PQR shall include maximum heat input per pass and shall be tested for CVN properties, macro hardness, G48 mass loss ferric chloride pitting corrosion test, and macro/micro hardness testing.
2. Welds shall be continuous fillet type unless indicated otherwise.
3. Full penetration butt weld at bends in stair stringers and ladder side rails.
4. Weld structural steel in accordance with AWS D1.1 using Series E70 electrodes conforming to AWS A5.1/A5.1M.
5. Weld aluminum in accordance with AWS D1.2.
6. Weld stainless steel in accordance with AWS D1.6.
7. All headed studs to be welded using automatically timed stud welding equipment.
8. Grind smooth welds that will be exposed.
- A. Make provisions to prevent carbon steel/free iron contamination of stainless steel surfaces (i.e., contact between carbon steel or iron and stainless steel component). Do not use cutting/grinding/drilling tools, wire brushes, or wire wheels on stainless steel that have been previously used on carbon steel or iron. Do not support or hang stainless steel weldments or fixtures with carbon steel cables or dunnage.
- B. Passivate stainless steel items and stainless steel welds after they have been ground smooth. In accordance with ASTM A380/A380M.
- C. Passivation Requirements:
 1. For components/assemblies to be used only in dry air service environments:
 - a. No post-fabrication passivation treatments are required for external corrosion control.
- D. Conceal fastenings where practicable.
- E. Fabricate work in shop in as large assemblies as is practicable.
- F. Tolerances:
 1. Rolling:
 - a. ASTM A6.
 - b. When material received from the mill does not satisfy ASTM A6 tolerances for camber, profile, flatness, or sweep, the Contractor is permitted to perform corrective work by the use of controlled heating and mechanical straightening, subject to the limitations of the AISC Specification.
 2. Fabrication tolerance:
 - a. Member length:
 - 1) Both ends finished for contact bearing: 1/32 inches.
 - 2) Framed members:
 - a) 30 feet or less: 1/16 inches.
 - b) Over 30 feet: 1/8 inches.
 - b. Member straightness:
 - 1) Compression members: 1/1000 of axial length between points laterally supported.
 - 2) Non-compression members: ASTM A6 tolerance for wide flange shapes.
 - c. Specified member camber (except compression members):
 - 1) 50 feet or less: -0/+1/2 inches.

- 2) Over 50 feet: -0/+1/2 inches (+1/8 inches per 10 feet over 50 feet).
 - 3) Members received from mill with 75% of specified camber require no further cambering.
 - 4) Beams/trusses without specified camber shall be fabricated so after erection, camber is upward.
 - 5) Camber shall be measured in fabrication shop in unstressed condition.
 - d. At bolted splices, depth deviation shall be taken up by filler plates.
 - 1) At welded joints, adjust weld profile to conform to variation in depth.
 - 2) Slope weld surface per AWS requirements.
 - e. Finished members shall be free from twists, bends and open joints.
 - 1) Sharp kinks, bends and deviation from above tolerances are cause for rejection of material.
- G. Fabricate grating, checkered plate, stairs, ladders and accessories using aluminum unless shown otherwise on Drawings.
- 1. Finish:
 - a. Mill, unless noted otherwise.
 - b. Coat surfaces in contact with dissimilar materials.
 - 1) See Specification Section 09 96 00.
- H. Fabricate grating in accordance with NAAMM MBG 531.
- 1. Maximum tolerance for difference in depth between grating depth and seat or support angle depth: 1/8 inches.
 - 2. Distance between edge of grating and face of embedded seat angle or face of wall or other structural member: 1/4 inches.
 - a. Tolerance: NAAMM MBG 531.
 - 3. Removable sections: Not wider than 3 feet and not heavier than 100 pounds.
 - 4. Ends and perimeter edges: Banded, with alternate bearing bars welded to band.
 - a. Provide full depth banding unless noted otherwise.
 - b. Banding at trenches and sumps to be 1/4 inches less than grating depth to allow for drainage.
 - 5. Openings through grating: Reinforced to provide required load carrying capacity and banded with 4 inches high toe plate.
 - 6. Provide joints at openings between individual grating sections.
 - 7. Fabricate grating so that bearing bars and cross bars in adjacent sections are aligned.
- I. Fabricate checkered plate and miscellaneous metals in accordance with NAAMM AMP 555.
- 1. Workmanship: Class 2 unless noted otherwise.
- J. See Specification Section 09 96 00 for preparation and painting of ferrous metals and other surfaces.

2.5 SOURCE QUALITY CONTROL

- A. Surface Preparation:
- 1. Refer to Specification Section 09 96 00 for surface preparation requirements.
 - 1. All miscellaneous metal fabrication item surfaces shall be observed and approved, prior to application of shop-applied coatings, by a NACE Certified Coatings Specialist (CIP-3) with at least 4 years of experience in similar inspections.
 - a. Inspection shall be performed to determine depth of blast profile and cleanliness of surface.
 - b. Fabricator shall reblast and or re-clean surfaces as required until acceptable.

B. Shop Applied Coating Application:

1. Refer to Specification Section 09 96 00 for coating requirements.
2. After surface has been accepted in writing by NACE certified coatings inspector, fabricator may proceed with application of coatings.
3. Application of coatings shall be observed and certified by NACE certified coatings inspector.

C. Shop Inspection and Testing:

1. Owner will employ and pay for the services of a qualified independent testing agency to inspect and test all structural steel work for compliance with Contract Documents.
2. Contractor responsible for testing to qualify shop and field welders and as needed for Contractor's own quality control to ensure compliance with Contract Documents.
3. Independent testing agency shall have a minimum of five years performing similar work and shall be subject to Owner's approval.

D. Responsibilities of Testing Agency:

1. Inspect shop and field welding in accordance with AWS Code including the following non-destructive testing:
 - a. Visually inspect all welds.
 - b. In addition to visual inspection, test 50% of full penetration welds and 20% of fillet welds with liquid dye penetrant or mag particle.
 - c. Test 20% of liquid dye penetrant tested full penetration welds with ultrasonic or radiographic testing.
 - d. For all surfaces intended to be immersed or intended to be water tight:
 - 1) 100% of all fillet welds shall be PT tested to ensure water-tight surfaces are free of surface defects that would create areas for MIC.
 - 2) 100% of all completed SS welds and material shall be passivated in accordance with ASTM A370.
2. Inspect high-strength bolting in accordance with the RCSC Specification for Structural Joints Using High-Strength Bolts, Section 9.
 - a. Verify direct tension indicator gaps, if applicable.
3. Inspect structural steel which has been erected.
4. Inspect stud welding in accordance with AWS Code.
5. Prepare and submit inspection and test reports to Engineer.
 - a. Assist Engineer to determine corrective measures necessary for defective work.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide items to be built into other construction in time to allow their installation.
1. If such items are not provided in time for installation, cut in and install.
- B. Prior to installation, inspect and verify condition of substrate.
- C. Correct surface defects or conditions which may interfere with or prevent a satisfactory installation.
1. Field welding aluminum is not permitted unless approved in writing by Engineer.

3.2 INSTALLATION

- A. Set metal work level, true to line, plumb.
1. Shim and grout as necessary.
- B. Contractor is solely responsible for safety.

1. Construction means and methods and sequencing of work is the prerogative of the Contractor.
 2. Take into consideration that full structural capacity of many structural members is not realized until structural assembly is complete; e.g., until slabs, decks, and diagonal bracing or rigid connections are installed.
 3. Partially complete structural members shall not be loaded without an investigation by the Contractor.
 4. Until all elements of the permanent structure and lateral bracing system are complete, temporary bracing for the partially complete structure will be required.
- C. Adequate temporary bracing to provide safety, stability and to resist all loads to which the partially complete structure may be subjected, including construction activities and operation of equipment is the responsibility of the Contractor.
1. Plumb, align, and set structural steel members to specified tolerances.
 2. Use temporary guys, braces, shoring, connections, etc., necessary to maintain the structural framing plumb and in proper alignment until permanent connections are made, the succeeding work is in place, and temporary work is no longer necessary.
 3. Use temporary guys, bracing, shoring, and other work to prevent injury or damage to adjacent work or construction from stresses due to erection procedures and operation of erection equipment, construction loads, and wind.
 4. Contractor shall be responsible for the design of the temporary bracing system and must consider the sequence and schedule of placement of such elements and effects of loads imposed on the structural steel members by partially or completely installed work, including work of all other trades.
 - a. If not obvious from experience or from the Drawings, confer with the Engineer to identify those structural steel elements that must be complete before the temporary bracing system is removed.
 5. Remove and dispose of all temporary work and facilities off-site.
- D. Examine work-in-place on which specified work is in any way dependent to ensure that conditions are satisfactory for the installation of the work.
1. Report defects in work-in-place which may influence satisfactory completion of the work.
 2. Absence of such notification will be construed as acceptance of work-in-place.
- E. Field Measurement:
1. Take field measurements as necessary to verify or supplement dimensions indicated on the Drawings.
 2. Contractor responsible for the accurate fit of the work.
- F. Check the elevations of all finished footings or foundations and the location and alignment of all anchor bolts before starting erection.
1. Use surveyor's level.
 2. Notify Engineer of any errors or deviations found by such checking.
- G. Framing member location tolerances after erection shall not exceed the frame tolerances listed in the FIELD QUALITY CONTROL Article in PART 3 of this Specification Section.
- H. Erect plumb and level; introduce temporary bracing required to support erection loads.
- I. Use light drifting necessary to draw holes together.
1. Drifting to match unfair holes is not allowed.
- J. Welding:
1. Comply with AWS D1.1, AWS D1.2, and AWS D1.6 (as applicable for the material welded) and requirements of this Section's "Fabrications" Article in "Part 2 - Products".

2. When joining two sections of steel of different ASTM designations, welding techniques shall be in accordance with a qualified AWS D1.1 procedure.
 3. 100% of all completed stainless steel welds and material shall be passivated in accordance with ASTM A370/A370M.
- K. Shore existing members when unbolting of common connections is required.
1. Use new bolts for rebolting connections.
- L. Clean stored material of all foreign matter accumulated prior to the completion of erection.
- M. Bolt Field Connections: Where practicable, conceal fastenings.
- N. Field Welding:
1. Follow AWS procedures.
 2. Grind welds smooth where field welding is required.
 3. 100% of all completed stainless steel welds and material shall be passivated in accordance with ASTM A370/A370M.
- O. Field cutting grating or checkered plate to correct fabrication errors is not acceptable.
1. Replace entire section.
- P. Remove all burrs and radius all sharp edges and corners of miscellaneous plates, angles, framing system elements, etc.
- Q. Unless noted or specified otherwise:
1. Connect steel members to steel members with 3/4 inches diameter ASTM F3125, Grade A325 high strength bolts.
 2. Connect aluminum to aluminum with 3/4 inches diameter stainless bolts.
 3. Connect aluminum to structural steel using 3/4 inches diameter stainless steel bolts.
 - a. Provide dissimilar metals protection.
 4. Connect aluminum and steel members to concrete and masonry using stainless steel mechanical anchor bolts or adhesive anchor bolts unless shown otherwise.
 - a. Provide dissimilar materials protection.
 5. Provide washers for all bolted connections.
 6. Where exposed, bolts shall extend a maximum of 3/4 inches and a minimum of 1/2 inches above the top of installed nut.
 - a. If bolts are cut off to required maximum height, threads must be dressed to allow nuts to be removed without damage to the bolt or the nuts.
- R. Install and tighten ASTM F3125, Grade A325 high-strength bolts in accordance with the AISC 325, Allowable Stress Design (ASD).
1. Provide hardened washers for all Grade A325 bolts.
 - a. Provide the hardened washer under the element (nut or bolt head) turned in tightening.
- S. After bolts are tightened, upset threads of ASTM A307 bolts or anchor bolts to prevent nuts from backing off.
- T. Secure metal to wood with lag screws of adequate size with appropriate washers.
- U. Do not field splice fabricated items unless said items exceed standard shipping length or change of direction requires splicing.
1. Provide full penetration welded splices where continuity is required.
- V. Provide each fabricated item complete with attachment devices as indicated or required to install.
- W. Anchor such that work will not be distorted nor fasteners overstressed from expansion and contraction.

- X. Set beam and column base plates accurately on nonshrink grout as indicated on Drawings.
 - 1. See Division 03 Specification Sections for non-shrink grout and anchorage.
 - 2. Set and anchor each base plate to proper line and elevation.
 - a. Use metal wedges, shims, or setting nuts for leveling and plumbing columns and beams.
 - 1) Wedges, shims and setting nuts to be of same metal as base plate they support.
 - 2) Tighten nuts on anchor bolts.
 - b. Fill space between bearing surface and bottom of base plate with nonshrink grout.
 - 1) Fill space until voids are completely filled and base plates are fully bedded on wedges, shims, and grout.
 - c. Do not remove wedges or shims.
 - 1) Where they protrude, cut off flush with edge of base plate.
 - d. Fill sleeves around anchor bolts solid with non-shrink grout.
- Y. Tie anchor bolts in position to embedded reinforcing steel using wire.
 - 1. Tack welding prohibited.
 - a. Coat projecting bolt threads and nuts with heavy coat of clean grease.
 - 2. Anchor bolt location tolerance:
 - a. Per Section 03 15 19.
- Z. Install bollards as detailed on Drawings.
 - 1. Fill pipe with concrete and round off at top.
- AA. Provide abrasive stair nosings in each tread and landing of all concrete stairs and at each concrete stair landing having metal stair structure attaching to the concrete landing.
 - 1. Center stair nosings in stair width.
- BB. Accurately locate and place frames for openings before casting into floor slab so top of plate is flush with surface of finished floor.
 - 1. Keep screw holes clean and ready to receive screws.
- CC. Attach grating to end and intermediate supports with grating saddle clips and bolts.
 - 1. Maximum spacing: 2 feet on-center with minimum of two per side.
 - 2. Attach individual units of aluminum grating together with clips at 2 feet on-center maximum with a minimum of two clips per side.
- DD. Coat aluminum surfaces in contact with dissimilar materials in accordance with Specification Section 09 96 00.
- EE. Repair damaged galvanized surfaces in accordance with ASTM A780.
 - 1. Prepare damaged surfaces by abrasive blasting or power sanding.
 - 2. Apply galvanizing repair paint to minimum 6 mils DFT in accordance with manufacturer's instructions.
- FF. Anchor ladder to concrete structure with minimum 3/4 inches stainless steel anchor bolts with minimum 6 inches embedment.
- GG. Anchor ladder to masonry structure with minimum 3/4 inches stainless steel anchor bolts with minimum 6 inches embedment.
 - 1. When anchoring into masonry, fill masonry cores with grout at anchor locations and each masonry core within 8 inches of anchor
 - 2. When anchoring into cavity wall construction, provide minimum 6 inches embedment into concrete or masonry back-up wall.

- a. At each anchor location, provide sleeve between back face of veneer and cavity face of concrete or masonry back-up wall.
 - b. Cut cavity insulation as required and seal around sleeve.
 - 1) Sleeve to be 1 inch diameter schedule 40 stainless steel tubing, TP-304L, ASTM A269.
 - a) Minimum wall thickness to be .065 inches.
 - 2) Continuously weld 4 by 4 by 1/4 inches Type 304 stainless steel, ASTM A666 flange onto each end of pipe.
 - a) Drill 1 inch hole in flange to match pipe.
 - b) Attach sleeve to concrete or masonry back-up with 1/4 inches concrete screw anchors.
 - 3) Grout solid, area around bolt where bolt penetrates veneer.
 - 4) Accurately locate sleeves to align with bolt locations on ladder.
- HH. Anchor ladder to metal stud walls using minimum 1/2 inches stainless steel bolts, nuts and washers.
- 1. Verify that stud wall has been provided with adequate backing to accept ladder anchors.
- II. Install ladder safety extension post in accordance with manufacturer's instructions.
- 1. Mount device opposite the climbing side.
 - 2. Provide ladder safety extension device for all ladders unless noted otherwise.
- JJ. Mount ladder fall protection system with rail offset from ladder side rail approximately 3 inches.
- KK. Install factory pre-fabricated stairs in location indicated in the Contract Documents and approved submittals.

3.3 FIELD QUALITY CONTROL

- A. Tolerances (unless otherwise noted on the Drawings):
 - 1. Frame placement, after assembly and before welding or tightening.
 - a. Deviation from plumb, level and alignment: 1 inch 500, maximum.
 - b. Displacement of centerlines of columns: 1/2 inches maximum, each side of centerline location shown on Drawings.

3.4 CLEANING

- A. After fabrication, erection, installation, or application, clean all miscellaneous metal fabrication surfaces of all dirt, weld slag and other foreign matter.
- B. Provide surface acceptable to receive field applied paint coatings specified in Specification Section 09 96 00.

END OF SECTION

SECTION 05 52 46
MECHANICALLY FASTENED ALUMINUM RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aluminum handrail, stair rail and guardrail.
 - 2. Aluminum guardrail gates.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 05 50 00 - Metal Fabrications.
 - 4. Section 09 96 00 - High Performance Industrial Coatings.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Aluminum Association (AA):
 - a. ADM 1, Aluminum Design Manual.
 - b. DAF 45, Designation System for Aluminum Finishes.
 - 2. ASTM International (ASTM):
 - a. B108, Standard Specification for Aluminum-Alloy Permanent Mold Castings.
 - b. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - c. B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - d. B247, Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings.
 - e. B308, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
 - f. B429, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
 - 3. National Association of Architectural Metal Manufacturers (NAAMM):
 - a. AMP 521, Pipe Railing Systems Manual.
 - 4. U.S. Department of Justice, Architectural and Transportation Barriers Compliance Board (Access Board):
 - a. Americans with Disabilities Act (ADA):
 - 1) Accessibility Guidelines for Buildings and Facilities (ADAAG).
 - 5. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

1.3 DEFINITIONS

- A. Guardrail: A system of building components located near the open sides of elevated walking surfaces for the purpose of minimizing the possibility of an accidental fall from the walking surface to the lower level.
- B. Handrail: A horizontal or sloping rail intended for grasping by the hand for guidance or support.
- C. Railing: A generic term referring to guardrail, handrail and/or stair rails.

- D. Stair Rail: A guardrail, installed at the open side of stairways with either a handrail mounted to the inside face of the guardrail, or where allowed by applicable codes, with the top rail mounted at handrail height and serving the function of a handrail.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Fabrication and/or layout drawings:
 - a. Drawings showing profile, location, and fabrication details.
 - b. Type and details of anchorage.
 - c. Location and type of expansion joints.
 - d. Materials of construction, shop coatings and all third-party accessories.
 - 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation details.
 - 3. Certification that railings have been designed and fabricated to meet the loading requirements specified.
 - 4. Calculations for all proposed deviations from the Specification.
 - a. Calculations shall be performed, sealed, signed and dated by a registered professional structural engineer licensed in the State of Idaho.
 - b. Calculations shall be specific to this Project and shall include all assumptions, references and design interpretations used to achieve the results obtained by the Engineer.
 - c. Reduction in load criteria is not acceptable as reason for deviation from sizes indicated in the Specification.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver and handle railings to preclude damage.
- B. Store railings on skids, keep free of dirt and other foreign matter which will damage railings or finish and protect against corrosion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Mechanically fastened component railing systems.
 - a. Golden Railing – Friction Railing System.
 - b. Moultrie Manufacturing Company – Wesrail II.
 - c. Peak-to-Peak Engineered Railings – Tang Railing System.
 - d. Tuttle Railing Systems – TABCO 8000.
- B. Submit request for substitution in accordance with Specification Section 01 25 00.

2.2 MATERIALS

- A. Alloy 6061-T6.
 - 1. ASTM B209 for sheets and plates.
 - 2. ASTM B221 and ASTM B308 for shapes - beams, channels, angles, tees, and zeeks.
 - 3. ASTM B247 for forgings.
- B. Alloy 6063-T5 or T6.
 - 1. ASTM B221 and ASTM B429 for bars, rods, wires, pipes and tubes.

- C. Fittings:
 - 1. Cast aluminum: ASTM B108.
 - 2. Machined aluminum: 6063-T5 or T6 alloy.
- D. Shims: Aluminum of same alloy as component being shimmed.
- E. Fasteners: Stainless steel.
- F. Expansion and Adhesive Anchors: See Specification Section 03 15 19.

2.3 FABRICATION

- A. General:
 - 1. Verify field conditions and dimensions prior to fabrication.
 - 2. For fabrication of items which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
 - 3. Form exposed work with smooth, short radius bends, accurate angles and straight edges.
 - a. Ease exposed edges to a radius of approximately 1/32 inches.
 - b. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - c. Drill or punch holes with smooth edges.
 - 4. Form exposed connections with flush, smooth, hairline joints, using stainless steel or aluminum splice locks to splice sections together.
 - a. Ease the edges of splices and expansion joints and remove all burrs left from cutting.
 - 5. Provide for anchorage of type indicated on Drawings or as required by field conditions.
 - a. Drill or punch holes with smooth edges.
 - 6. Design railings and anchorage system in accordance with NAAMM AMP 521 to resist loading as required by the building code.
 - a. Maximum allowable stresses per AA ADM 1.
 - 7. Design railings in accordance with accessibility requirements per the building code and ADAAG.
- B. Custom fabricate railings to dimensions and profiles indicated.
 - 1. Guardrails:
 - a. Posts: Minimum 1 1/2 inches nominal diameter Schedule 80 pipe.
 - 1) Space vertical posts as required by loading requirements but not more than 4 feet on center.
 - b. Rails: Minimum 1 1/2 inches nominal diameter Schedule 40 pipe.
 - 1) Where details are not indicated, space intermediate rails to requirements of the building code or OSHA Standards, whichever requires the more restrictive design.
 - 2. Handrail: Minimum 1 1/4 inches nominal diameter Schedule 40 pipe.
 - a. Outside diameter: 1 1/2 inches minimum, 2 inches maximum.
 - b. Space handrail brackets as required by loading requirements but not more than 4 feet on center.
 - 3. Mounting:
 - a. Provide manufacturer's standard cast or machined flanges or brackets as necessary for conditions shown on Drawings.
 - 1) Railing posts shall be secured using socket-head stainless steel set screws.
 - a) Bolts, TEK screws, rivets, or adhesive are not acceptable.
 - b. Flanges and brackets shall allow for removal of railing sections where removable railings are indicated on the Drawing.

- 1) Completed assembly shall be designed to withstand the loading capacity specified.
4. Toeboards:
 - a. 1/4 inches thick by 4 inches high extruded toeboard with stiffener ribs.
 - 1) Moultrie "WIKP20" contour kickplate.
5. Guardrail gates:
 - a. Constructed of same material and sizes as the guardrail system.
 - b. Width of gate as shown on Drawings.
 - c. Hinges:
 - 1) Aluminum.
 - 2) Self-closing.
 - a) Stainless steel torsion spring.
 - d. Gate latch and stop:
 - 1) Cast aluminum.
 - 2) Spring-loaded pin latch.
 - a) Stainless steel spring.
- C. Railing Fabrication:
 1. All railings are to be mechanically fastened component system.
 2. Railing system shall be an engineered system designed specifically for use as guardrail system.
 - a. Fittings shall be internally connected, flush-fitting aluminum or stainless steel.
 - b. Fasteners shall be 302 series stainless steel Allen head set screws.
 - 1) Rivets, adhesive or headed screws are not acceptable.
 3. Fit exposed ends of guardrails and handrails with solid terminations.
 - a. Return ends of handrail to wall, but do not attach to wall.
 - b. Where guardrail terminates at a wall, provide a vertical post or end-loop 4 inches off the wall to center of vertical member.
 4. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly of units at project site.
 5. Provide weeps to drain water from hollow sections of railing at exterior and high humidity conditions.
 - a. Drill 1/4 inches weep hole in railings closed at bottom:
 - 1) 1 inches above walkway surface at bottom of posts set in concrete.
 - 2) 1 inches above base flange or reinforcing spud where applicable.
 - 3) At low point of intermediate rails.
 - b. Do not drill weep holes:
 - 1) In bottom of base flange.
 6. Expansion joints:
 - a. Joints to be designed to allow expansion and contraction of railing and still meet design loads required.
 - 1) Top rail splices and expansion joints shall be located within 8 inches of post or other support.
 - 2) Where railings span building expansion joints; provide a railing expansion joint in the span crossing the building expansion joint.
 - b. Provide expansion joints in any continuous run exceeding 20 feet in length.
 - 1) Space expansion joints at not more than 40 feet on center.
 - c. Provide minimum 0.10 inches of expansion joint for each 20 feet length of top rail for each 25 DEGF differential between installation temperature and maximum design temperature.

- 1) Maximum expansion joint width at time of installation shall not exceed 3/8 inches.
 - a) Provide additional expansion joints as required to limit expansion joint width.
- d. Provide slip-joint with internal sleeve.
 - 1) Extend slip joint min 2 inches beyond joint at maximum design width.
 - 2) Fasten internal sleeve securely to one side.
 - a) Provide Allen-head set screw located in bottom of rail.
 - b) Rivets or exposed screw heads are not acceptable.
- D. Finish:
 1. Architectural Class 1 coating per AA DAF 45:
 - a. AA-M12C22A41 clear anodized.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to installation, inspect and verify condition of substrate.
- B. Correct surface defects or conditions which may interfere with or prevent a satisfactory installation.

3.2 INSTALLATION

- A. Install handrails and guardrails to meet loading requirements of the building code and OSHA.
- B. Install products in accordance with manufacturer's instructions.
- C. Set work accurately in location, alignment and elevation; plumb, level and true.
 1. Measure from established lines and items which are to be built into concrete, masonry or similar construction.
- D. Align railings prior to securing in place to assure proper matching at butting and expansion joints and correct alignment throughout their length.
 1. Provide shims as required.
- E. Install proper sized expansion joints based on temperature at time of installation and differential coefficient of expansion of materials in all railings as recommended by manufacturer.
 1. Lubricate expansion joint splice bar for smooth movement of railing sections.
- F. Provide removable railing sections where indicated on Drawings.
- G. Provide toeboards on walkway side of all elevated walkways, platforms and stair landings, and where indicated on the Drawings or required by OSHA Standards.
- H. Attach handrails to walls or guardrail with brackets designed for condition:
 1. Provide brackets which provide a minimum 2-1/4 inches clearance between handrail and nearest obstruction.
 - a. Handrails shall not project more than 4-1/2 inches into required stairway width.
 2. Anchor handrail brackets to concrete or masonry walls with stainless steel adhesive anchors with stainless steel hex head bolts.
 - 3.
- I. Anchor railings to concrete with stainless steel adhesive anchors with stainless steel bolts, nuts and washers unless noted otherwise in the Contract Documents.
 1. Where exposed, bolts shall extend minimum 1/2 inches and maximum 3/4 inches above the top nut.
 - a. If bolts are cut off to required height, threads must be dressed to allow nuts to be removed without damage to the bolt or the nut.

- b. Bevel the top of the bolt after cutting to provide a smooth surface.
- J. Anchor railings to metal structure with stainless steel bolts, nuts and washers.
- K. Install toeboards to fit tight to the walking surface.
 - 1. Attach to railing vertical post with manufacturer's standard mounting clamp:
 - a. Adjustable.
 - b. Designed to engage in extruded slot on back of toeboard.
 - 2. Provide splice bars, corner splices and brackets:
 - a. Manufacturer's standard items as required for a complete installation.
 - 3. Provide spacer bar and U-bracket where necessary for toeboard to clear mounting flange..
 - 4. Bottom of toeboard shall not exceed 1/4 inches above walking surface.
- L. Coat aluminum in contact with dissimilar metal or concrete in accordance with Specification Section 09 96 00.
- M. Provide railings as required for stair construction identified in Specification Section 05 50 00.
- N. Install guardrail gate plumb and level in location shown on Drawings.
 - 1. Center gate in opening.
 - 2. Top of gate to match top of guardrail.
 - 3. Fasten hinges to gate and jamb post:
 - a. Minimum three (3) 1/4 inches stainless steel countersunk machine screws per leaf.
 - b. Drill and tap into railing and gate vertical posts.
 - 4. Provide not less than two hinges per gate.
 - 5. Install gate latch and stop on strike side of opening.
 - a. Fasten to gate with 1/4 inches stainless steel countersunk machine screws.
 - b. Drill and tap into gate vertical post.
 - c. Drill hole in railing vertical post to receive latch pin.
 - 6. Adjust to provide smooth operation:
 - a. Self-closing and self-latching.

END OF SECTION



DIVISION 06

WOOD, PLASTICS, AND COMPOSITES



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07SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rough carpentry.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 03 15 19 – Anchorage to Concrete
 - 2. Section 07 54 25 - Fully Adhered TPO Roofing.
 - 3. Section 07 62 00 - Flashing and Sheet Metal.
 - 4. Section 07 92 00 - Joint Sealants.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. The Engineered Wood Association (APA):
 - a. PRP-108, Performance Standards and Qualification Policy for Structural Use Panels.
 - b. U450, Storage and Handling of APA Trademarked Panels.
 - c. Y510, Plywood Design Specification.
 - 2. ASTM International (ASTM):
 - a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - b. D2898, Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.
 - c. D4442, Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 - d. D4444, Standard Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters.
 - e. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. American Wood Protection Association (AWPA):
 - a. M2, Standard for Inspection of Preservative Treated for Industrial Use.
 - b. M3, Standard for the Quality Control of Preservative Treated Products for Industrial Use.
 - c. M4, Standard for the Care of Preservative-Treated Wood Products.
 - d. T1 Processing and Treatment Standard.
 - e. U1, Use Category System: User Specification for Treated Wood.
 - 4. American National Standards Institute/Single Ply Roofing Industry (ANSI/SPRI):
 - a. ES-1, Wind Design Standard for Edge Systems Used with Low Slope Roof Systems.
 - 5. Environmental Protection Agency (EPA).
 - 6. FM Global (FM):
 - a. 1-49, Property Loss Prevention Data Sheets - Perimeter Flashing.
 - 7. National Institute of Standards and Technology (NIST):
 - a. PS 1, Quantitative NMR (Benzoic Acid).
 - b. PS 20, American Softwood Lumber Standard.
 - 8. Underwriters Laboratories, Inc. (UL):
 - a. 723, Standard for Test for Surface Burning Characteristics of Building Materials.

B. Qualifications:

1. Wood Treatment Plant: AWPA M3.
2. Treated Wood Inspection: AWPA M2.

C. Miscellaneous:

1. Factory marking:
 - a. Lumber:
 - 1) Identify type, grade, moisture content, inspection service, producing mill, and other qualities specified.
 - 2) Marking may be omitted, as allowed by the building code, if certificate of inspection is provided for each shipment.

1.3 SUBMITTALS

A. Shop Drawings:

1. Fabrication drawings of all fabricated items.
2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions for all products specified.
3. Certifications:
 - a. Chemicals used in treatment process are registered with and approved by EPA.
 - b. Moisture content of material prior to treatment: 25% maximum.
 - c. Material has been kiln-dried after treatment (KDAT) to the moisture content specified.
4. Documentation of treatment of treated material in accordance with standards referenced.

1.4 DELIVERY AND STORAGE

A. Delivery, storage and handling of untreated wood products:

1. Lumber: As recommended by the grading agency indicated on the grade stamp.
2. Plywood: APA U450.

B. Delivery, storage, handling and disposal of treated wood products: AWPA M4.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Articles below are acceptable.

2.2 MATERIALS

A. General:

1. Lumber (for framing, blocking, nailers, furring, grounds and similar members):
 - a. NIST PS 20.
 - b. Species:
 - 1) Treated material: As indicated in the appropriate AWPA standard.
 - a) Provide species of FRTM as necessary to achieve UL rating listed.
 - c. Grade:
 - 1) For nominal sizes up to and including 2 x 4: Standard and better.
 - 2) For nominal sizes up to 2 inches thick and wider than 4 inches: #2 and better.
2. Non-structural plywood:
 - a. NIST PS 1.
 - b. C-D plugged:

- 1) Exposure: EXP1.
- 2) Thickness: 5/8 inches.
- 3) Touch sanded.

B. Preservative Treated Material:

1. Moisture content:
 - a. Prior to treatment: 25%.
 - b. Kiln-dry after treatment (KDAT), ASTM D4442 and ASTM D4444:
 - 1) Lumber: 19% maximum.
 - 2) Plywood: 18% maximum.
2. Preservative:
 - a. Waterborne: AWWA T1.
 - b. As indicated in the appropriate AWWA standard.
3. Pressure-treat material in accordance with AWWA U1.
4. Wherever practicable, material to be treated shall be manufactured in its final form prior to treatment.

C. Fire-Retardant Treated Material (FRTM):

1. Acceptable manufacturer:
 - a. Hoover Treated Wood Products, Inc.:
 - 1) Interior: "Pyro-Guard".
 - 2) Exterior: "Exterior Fire-X".
2. Maximum moisture content:
 - a. Prior to treatment: 25%.
 - b. Kiln-dry after treatment (KDAT), ASTM D4442 and ASTM D4444:
 - 1) Lumber: 19% (KDAT).
 - 2) Plywood: 15% (KD-15).
3. Fire-retardant preservative:
 - a. Provide protection against decay:
 - 1) EPA registered for use as a wood preservative.
 - b. Shall not bleed-through or adversely affect bond of any finish.
4. Pressure-treat material in accordance with AWWA U1.
5. UL Classified:
 - a. FR-S, UL 723.
 - b. Exterior: No increase in classification when subjected to the Standard Rain Test, ASTM D2898.
 - c. Provide UL mark on each piece of FRTM.
6. Maximum flame spread rating: 25, ASTM E84.
7. Wherever practicable, material to be treated shall be manufactured in its final form prior to treatment.

D. Fasteners and Anchors:

1. Nails and screws:
 - a. Dry, non-corrosive exposure: Hot dipped galvanized meeting ASTM A153 or Type 304 stainless steel.
 - b. Wet, corrosive, marine, and/or below grade: Type 316 stainless steel.
2. Adhesive anchors, expansion anchors, self-tapping concrete anchors, bolts, nuts, and washers: See Specification Section 03 15 19.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify measurements, dimensions, and shop drawing details before proceeding.
- B. Coordinate location of studs, nailers, blocking, grounds and similar supports for attached work.
- C. Eliminate sharp projections which would puncture roofing, flashing or underlayment material.

3.2 ERECTION AND INSTALLATION

- A. General:
 - 1. Provide preservative treated material for all wood used:
 - a. Outside building.
 - b. Below grade.
 - 2. Provide fire-retardant treated material for all wood used:
 - a. Inside building.
 - b. Exterior building walls.
 - c. Roof construction.
 - d. Parapet walls.
 - e. Roofing nailers.
- B. Attach work securely by anchoring and fastening as indicated or required to support applied loading.
 - 1. Anchor wood to concrete using adhesive or expansion anchors as specified in Specification Section 03 15 19.
 - a. Separate wood from direct contact to concrete with polyethylene foam gasket strip.
 - 1) Size: 1/4 inches by width of wood member.
 - 2) Owens Corning "SillSealR".
 - 2. Anchor wood to metal using bolts and nuts as specified in Specification Section 03 15 19.
 - 3. Provide flat washers under all bolt heads and nuts.
 - 4. Fasten plywood in accordance with APA recommendations.
 - 5. Use fasteners of size that will not penetrate members where opposite side will be exposed to view or receive finish materials.
 - 6. Install fasteners without splitting of wood; predrill as required.
 - 7. Do not drive threaded friction type fasteners.
 - 8. Tighten bolts and lag screws at installation and retighten as required.
- C. Set work to required levels and lines, plumb, true.
 - 1. Shim as required.
 - 2. Cut and fit accurately.
- D. Provide wood grounds, nailers, or blocking where required for attachment of other work and surface applied items.
 - 1. Form to shapes indicated or required.
 - a. FRTM lumber:
 - 1) Do not rip or mill.
 - 2) Cross-cutting and drilling are allowable in accordance with manufacturer's recommendations and UL requirements.
 - 3) Resurfacing, planing or fabrication of special shapes or profiles shall be done prior to treatment.
 - b. FRTM plywood:

- 1) Cross-cutting, ripping and drilling are allowable in accordance with manufacturer's recommendations and UL requirements.
 - c. Light sanding of FRTM as permitted by UL to remove raised grain or prepare for finishing is allowable.
 - d. Field treat cuts and holes in preservative treated material in accordance with AWPA M4 and manufacturer's published recommendations.
2. Grounds:
 - a. Dressed, key beveled lumber minimum 1-1/2 inches wide of thickness required to bring face of ground even with finish material.
 - b. Remove temporary grounds when no longer required.
3. Install roofing nailers as necessary for attachment of flashing, curbs, fascia, coping, and related accessories:
 - a. Match height of nailers to insulation.
 - b. Anchor nailers to resist force of 300 PLF unless required otherwise by FM Global or roofing manufacturer.
 - 1) Metal decking attachment:
 - a) Attach base nailer to metal roof deck using self-tapping stainless steel sheet metal screws (STSMS) with plate washers or with minimum 3/8 inches Type 304 stainless steel hex head bolts with nuts and washers.
 - b) Countersink heads of bolts flush with top of nailer.
 - 2) Concrete decking attachment:
 - a) Attach base nailer to concrete roof deck using minimum 3/8 inches stainless steel adhesive anchors with minimum 3 inches embedment.
 - b) Countersink heads of bolts flush with top of nailer.
 - 3) Provide size and spacing of anchorage as required to meet loading criteria specified.
 - a) Fasten blocking for perimeter flashing in accordance with ANSI/SPRI ES-1 and FM Global 1-49.
 - c. Provide 1/2 inches vent spaces between lengths of nailers.
 - d. Install nailers over vapor retarder.
- E. When wood has been exposed to moisture allow to completely dry out prior to covering with additional wood or another material.
- F. Correct or replace wood which shows bowing, warping or twisting to provide a straight, plumb and level substrate for applications of other materials.

END OF SECTION

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SECTION 06 82 00
FIBERGLASS REINFORCED PLASTIC FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fiberglass reinforced plastic (FRP) fabrications including but not limited to:
 - a. Solid plate.
 - b. Grating.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Section 05 50 00 - Metal Fabrications.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American National Standards Institute (ANSI):
 - a. A14.3, Safety Requirements for Fixed Ladders and Workplace Surfaces Package.
 - 2. ASTM International (ASTM):
 - a. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

1.3 DEFINITIONS

- A. Skid-resistant:
 - 1. Manufacturer's standard applied abrasive grit coating.
 - 2. Abrasive coated tape is not acceptable.
- B. FRP: Fiberglass Reinforced Plastic.

1.4 SYSTEM DESCRIPTION

- A. All fiberglass reinforced plastic support systems shall be designed by a registered professional structural engineer licensed in the State of Idaho.

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Manufacturer's recommendations on reinforcing field cut openings.
 - 2. Fabrication and/or layout drawings.
 - a. Plan showing profile, location, section and details of each item including anchorage or support system(s).
 - b. Locations and type of expansion joints.
 - c. Materials of construction including shop applied coatings.
 - d. Listing of all accessory items being provided indicating material, finish, etc.
 - 3. Certifications:
 - a. Certification of Structural Engineer's qualifications.

- b. Certification that all components and systems have been designed and fabricated to meet the loading requirements specified.
- 4. Manufacturer's full line of colors available for each component.
- B. Informational Submittals:
 - 1. Complete design calculations of all supporting structure and fastening conditions.
 - a. Design calculations to be for information only.
 - b. Engineer will not review or take any action on submittal.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and handle each item to preclude damage.
- B. Store all items on skids above ground.
 - 1. Keep free of dirt and other foreign matter which will damage items or finish and protect from corrosion and UV exposure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Grating and solid plate:
 - a. American Grating.
 - b. Enduro Composites.
 - c. Fibergrate Composite Structures, Inc.
 - d. Harsco Industrial IKG.
 - e. International Grating Inc.
 - f. Mona Composites.
 - g. Seasafe, Inc.
 - h. Strongwell Corporation.

2.2 MATERIALS

- A. Fiberglass Reinforced Plastic (FRP):
 - 1. Vinyl ester with fiberglass reinforcing.
 - a. Type V.
 - 2. Fire retardant.
 - a. Flame spread: ASTM E84, 25 or less.
 - 3. Color: To be selected by Engineer when more than one color is available for any one component.
- B. Fasteners, Clips, Saddles, and Miscellaneous Components:
 - 1. Fiberglass where possible.
 - 2. Stainless steel may be used if fiberglass component is not available.
- C. Adhesive: Recommended by manufacturer.
- D. Skid-resistant Surfacing: Manufacturer-applied abrasive grit coating.

2.3 FABRICATION

- A. General:
 - 1. Verify field conditions and dimensions prior to fabrication.
 - 2. Preassemble items in shop to greatest extent possible.

3. All components shall be treated with UV inhibitor.
 4. Drill or punch holes with smooth edges.
- B. Grating and Solid Plate Material:
1. Design live load:
 - a. 100 psf uniform live load.
 - b. 300 pounds concentrated load.
 - c. Maximum deflection of $l/300$ of span under a superimposed live load.
 - d. Design for the most severe loading condition noted above.
 2. Minimum grating depth: 1-1/2 inches.
 3. Bar span: Maximum of 1-1/2 inches center to center.
 4. Walking surface: Manufacturer's standard applied abrasive grit coating.
- C. Embedded Grating Supports:
1. Fiberglass.
 2. Size to suit depth of grating.
 3. Provide leg or strap for embedding and anchoring into concrete.
 4. Similar to Strongwell "Duradek Fiberglass Curb Angle."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Set work accurately in location, alignment and elevation, plumb, level, and true.
1. Measure from established lines and levels.
 2. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
 3. Tolerances:
 - a. Maximum variation from plumb in vertical line: 1/8 inches in 3 feet.
 - b. Maximum variation from level of horizontal line: 1/4 inches in 20 feet.
 - c. Maximum variation from plan location: 1/4 inches in 20 feet.
- C. Coat all exposed surfaces of stainless steel fasteners with minimum 15 mil gel coating to match component being anchored.
- D. stainless steel Attach grating to each end and intermediate support clip or saddle with bolts, nuts and washers.
1. Maximum spacing: 2 feet on-center with minimum of two per side.
 2. Attach clips or saddles to bearing bars only.
 3. Reinforce all field cut openings in accordance with manufacturer's recommendations.
- E. Attach stair treads at ends to stair stringer with hold-down clips, bolts, nuts, and washers.
1. Minimum two clips per end.
- F. File cut ends of all fiberglass to a 1/32 inches radius.
- G. Seal cut ends of all items with catalyzed resin as recommended by manufacturer.
1. Provide same resin used in fabrication of item as a minimum.
- H. Provide all modular framing components as required to suit condition.
1. Install in accordance with manufacturer's recommendations.

END OF SECTION

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