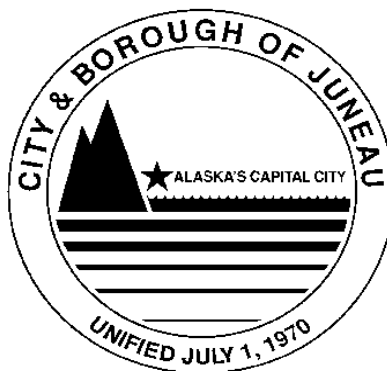


CBJ HEADWORKS IMPROVEMENTS

VOLUME I OF II

Contract No. BE17-033

File No. 1940



ENGINEERING DEPARTMENT

SECTION 00005 - TABLE OF CONTENTS

DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT

BIDDING and CONTRACT REQUIREMENTS		No. of Pages
00005	Table of Contents	3
00030	Notice Inviting Bids	3
00100	Instructions to Bidders	9
00300	Bid	3
00310	Bid Schedule	1
00320	Bid Bond	1
00360	Subcontractor Report.....	2
00400	Disadvantage Business Enterprises (DBE) Overview.....	5
00410	DBE MBE/WBE Forms	3
00430	Equal Employment Opportunity	3
00440	Prevailing Wage Rates.....	1
00470	American Iron and Steel Acknowledgement	5
00480	Debarment Certification	1

CONTRACT FORMS

00500	Agreement	7
00610	Performance Bond	2
00620	Payment Bond	2

CONDITIONS OF THE CONTRACT

00700	General Conditions	47
00800	Supplementary General Conditions	6
00830	Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination and Davis Bacon Requirements.....	20
00840	Federal Labor Standards, Reporting, and Prevailing Wage Rate Determination	18

TECHNICAL SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS

011100	Summary of Work	4
011120	Modifications to CBJ Standard Specifications	3
011413	Site Access and Storage.....	2
012000	Measurement and Payment.....	2
012500	Substitution Procedures	4
012600	Contract Modification Procedures	2
012900	Payment Procedures.....	2
013100	Project Management and Coordination.....	7
013200	Construction Progress Documentation.....	4
013223	Survey and Layout Data.....	1
013300	Submittal Procedures	10
014000	Quality Requirements	6
014200	References	3
015000	Temporary Facilities and Controls.....	5
016000	Product Requirements.....	5
017300	Execution.....	8

SECTION 00005 - TABLE OF CONTENTS

DIVISION 01 – GENERAL REQUIREMENTS (Cont’d.)		No. of Pages
017700	Closeout Procedures	3
017823	Operation and Maintenance Data.....	6
DIVISION 02 – EXISTING CONDITIONS		
024119	Selective Demolition.....	3
DIVISION 03 - CONCRETE		
033000	Cast in Place Concrete	17
DIVISION 04 - MASONRY		
042200	Concrete Unit Masonry.....	10
DIVISION 05 - METALS		
051200	Structural Steel Framing	5
055100	Metal Stairs.....	3
055213	Pipe and Tube Railings.....	5
055300	Metal Grating.....	4
DIVISION 06 – WOOD, PLASTICS AND COMPOSITES		
061000	Rough Carpentry.....	3
061753	Shop Fabricated Wood Trusses	4
067413	Fiberglass Reinforced Gratings.....	2
DIVISION 07 – THERMAL AND MOISTURE PROTECTION		
072100	Building Insulation	5
074213.13	Formed Metal Wall Panels	9
074213.53	Metal Soffit Panels	6
075423	Thermoplastic Polyolefin (TPO) Roofing.....	11
076200	Sheet Metal Flashing and Trim.....	7
079200	Joint Sealants	6
DIVISION 08 - OPENINGS		
081113	Doors and Frames	5
083323	Overhead Coiling Doors	5
085313	Vinyl Windows.....	4
087100	Door Hardware	7
DIVISION 09 - FINISHES		
092900	Gypsum Board	3
099113	Exterior Painting.....	4
099700	Special Coatings	9
DIVISION 26 - ELECTRICAL		
260050	Electrical Work, General	8
260519	Low-Voltage Electrical Power Conductors and Cables	4
260523	Control-Voltage Electrical Power Cables	6
260529	Hangers and Supports for Electrical Systems	4
260533	Raceways and Boxes for Electrical Systems.....	6
260543	Underground Ducts and Raceways for Electrical Systems	10
260544	Sleeves, Sleeve Seals for Electrical Raceway & Cabling.....	4

SECTION 00005 - TABLE OF CONTENTS

DIVISION 26 – ELECTRICAL (Cont’d.)		No. of Pages
260553	Identification for Electrical Systems	6
262816	Enclosed Switches and Circuit Breakers.....	5
267610	Gas Detection	8

DIVISION 40 – PROCESS INTERCONNECTIONS

400502	Piping and Equipment Identification	2
400505	Exposed Piping Installation	16
400506	Couplings, Adapters and Specials for Process Piping.....	4
400507	Hangers and Supports for Process Piping.....	4
400509	Wall Pipes, Floor Pipes, and Pipe Sleeves.....	2
400519	Ductile Iron Process Pipe and Fittings.....	4
400524	Steel Process Pipe and Fittings	2
400531	Thermoplastic Pipe	4
400553	Process Valves	4
400559	Stop Logs.....	5
404113	Process Piping Heat Tracing.....	3
407188	Flume Inserts	3

DIVISION 41 – MATERIAL PROCESSING AND HANDLING EQUIPMENT

412213.23	Mobile (Davit) Cranes	3
-----------	-----------------------------	---

DIVISION 46 – WATER AND WASTEWATER EQUIPMENT

462153	Perforated Plate Screens	11
462173	Screening Washing and Compacting Equipment.....	10

LIST OF DRAWINGS

Drawings as listed on the Index Sheet

END OF SECTION

SECTION 00030 NOTICE INVITING BIDS

OBTAINING CONTRACT DOCUMENTS. The Contract Documents are entitled:

**CBJ Headworks Improvements
Contract No. BE17-033**

The Contract Documents may be obtained at the City & Borough of Juneau (CBJ) Engineering Department, 3rd Floor Marine View Center, upon payment of \$75.00 (non-refundable) for each set of Contract Documents (including Technical Specifications and Drawings) or may be downloaded for free at the CBJ Engineering Department webpage at: www.juneau.org/engineering

PRE-BID CONFERENCE. Prospective Bidders are encouraged to attend a pre-Bid conference to discuss the proposed WORK, which will be conducted by the OWNER at 9:00 a.m. on November 18, 2016, at the Mendenhall Valley Wastewater Treatment Plant, 2009 Radcliffe Road. The object of the conference is to acquaint Bidders with the project and bid documents. There will be a walk-through of both facilities following the meeting.

DESCRIPTION OF WORK. The WORK is generally described as follows:

Mendenhall Valley Wastewater Treatment Plant (MWWTP): The improvements to the headworks includes removal of one existing automatic screen and grinder system and one manual bar screen, the installation of two new perforated plate screens and screening washer/compactors including new electrical connections to the screens and compactors, dismantling and removing an oil/water separation tank, relocating an existing grit classifier clarifier and conveyor, and modifications to the piping in the influent pump station, painting of pipe, installation of gas alarms, and miscellaneous related WORK. Installation of the new screens will require construction sequencing to dismantle and replace existing 16-inch and 18-inch ductile iron pipe and new 24-inch process piping to make space for the new screens.

Juneau-Douglas Wastewater Treatment Plant (JDTP): The improvements to the headworks includes the installation of two new perforated plate automatic screens and screening washer/compactors including new electrical connections to the screens and compactors, construction of new concrete influent channels and piping to connect the new influent channels to existing piping, construction of a new building around the new channels and miscellaneous related WORK. Site grading includes the installation of two new catch basins, new storm drain lines, and asphalt restoration. Demolition includes the removal of the existing automatic screen and manual screen, removal of existing concrete steps, removal of a timber framed wall and soffit, and removal of electrical feeds to the existing screens. Construction sequencing will be required to maintain the existing headworks in operation while the new screens and channels are construction.

COMPLETION OF WORK. The WORK must be completed according to the table below.

<u>Work Description</u>	<u>Completion Date</u>
MWWTP	September 1, 2017
JDTP	November 1, 2017

DEADLINE FOR BIDS: Sealed bids must be received by the Purchasing Division **prior to 2:00 p.m., Alaska Time on December 6, 2016**, or such later time as may be announced by addendum at any time prior to the deadline. Bids will be time and date stamped by the Purchasing Division, which will establish the official time of receipt of bids. Bids will be opened immediately thereafter in the Assembly Chambers of the Municipal Building, 155 S. Seward Street, unless otherwise specified.

SECTION 00030 NOTICE INVITING BIDS

Bid documents delivered in person or by courier service must be delivered to:

Bid documents delivered by U.S. Postal Service must be mailed to:

PHYSICAL LOCATION:

City and Borough of Juneau, Purchasing Division
105 Municipal Way, Room 300
Juneau, AK 99801

MAILING ADDRESS:

City and Borough of Juneau, Purchasing Division
155 South Seward Street
Juneau, AK 99801

Please affix the label below to outer envelope in the lower left hand corner.

IMPORTANT NOTICE TO BIDDER		
To submit your Bid:		
1. Print your company name and address on the upper left corner of your envelope.		
2. Complete this label and place it on the lower left corner of your envelope.		
S E A L E D	BID NUMBER: <u>BE17-033</u>	B I D
	SUBJECT: <u>CBJ HEADWORKS IMPROVEMENTS</u>	
	DEADLINE DATE: _____	
	PRIOR TO 2:00PM ALASKA TIME	

Mailing/delivery times to Alaska may take longer than other areas of the U.S. Late bids will not be accepted and will be returned.

SITE OF WORK. The site of the WORK is The Mendenhall Valley Wastewater Treatment Plant, 2009 Radcliffe Road, and Juneau-Douglas Treatment Plant, 1540 Than Road, both in Juneau, Alaska.

BIDDING, CONTRACT, or TECHNICAL QUESTIONS. All communications relative to this WORK, prior to opening Bids, shall be directed to the following:

Greg Smith, Contract Administrator
CBJ Engineering Department, 3rd Floor, Marine View Center
Email: greg.smith@juneau.org
Telephone: (907) 586-0873
Fax: (907) 586-4530

DEADLINE FOR BIDDER QUESTIONS: All questions must be received by the Contract Administrator prior to close of business, **November 29, 2016.**

DBE GOAL. The Disadvantaged Business Enterprise goal for this project is 5.91%.

BID SECURITY. Each Bid shall be accompanied by a certified or cashier's check or Bid Bond, in the amount of 5% percent of the Bid, payable to the City and Borough of Juneau, Alaska, as a guarantee that the Bidder, if

SECTION 00030 NOTICE INVITING BIDS

its Bid is accepted, will promptly execute the Agreement. A Bid shall not be considered unless one of the forms of Bidder's security is enclosed with it.

CONTRACTOR'S LICENSE. All contractors are required to have a current Alaska Contractor's License, prior to submitting a Bid, and a current Alaska Business License prior to award.

BID TO REMAIN OPEN. The Bidder shall guarantee the Bid for a period of 120 Days from the date of Bid opening. Any component of the Bid may be awarded anytime during the 120 Days.

OWNER'S RIGHTS RESERVED. The OWNER reserves the right to reject any or all Bids, to waive any informality in a Bid, and to make award to the lowest responsive, responsible Bidder as it may best serve the interests of the OWNER.

OWNER: City and Borough of Juneau

By: 

Greg Smith, Contract Administrator

11/9/2016
Date

END OF SECTION

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1.0 DEFINED TERMS. Terms used in these Instructions to Bidders and the Notice Inviting Bids, which are defined in the General Conditions, have the meanings assigned to them in the General Conditions. The term "Bidder" means one who submits a Bid directly to the OWNER, as distinct from a sub-bidder, who submits a Bid to a Bidder.

2.0 INTERPRETATIONS AND ADDENDA.

- A. **INTERPRETATIONS.** All questions about the meaning or intent of the Contract Documents are to be directed to the Engineering Contracts Administrator. Interpretations or clarifications considered necessary by the Engineering Contracts Administrator in response to such questions will be issued by Addendum, mailed, faxed, or delivered to all parties recorded by the Engineering Contracts Administrator, or OWNER, as having received the Contract Documents. Questions received less than seven Days prior to the Deadline for Bids may not be answered. Only questions answered by formal written Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect.
- B. **ADDENDA.** Addenda may be issued to modify the Contract Documents as deemed advisable by the OWNER. Addenda may be faxed or, if addendum format warrants, addenda may be posted to the CBJ Engineering Department website. In any event, notification of addendum issuance will be faxed to planholders. Hard copies are available upon request. The OWNER will make all reasonable attempts to ensure that all planholders receive notification of Addenda, however, it is strongly recommended by the OWNER that bidders independently confirm the contents, number, and dates of each Addendum prior to submitting a Bid.

3.0 FAIR COMPETITION. More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. If the OWNER believes that any Bidder is interested in more than one Bid for the WORK contemplated, all Bids in which such Bidder is interested will be rejected. If the OWNER believes that collusion exists among the Bidders, all Bids will be rejected.

4.0 RESPONSIBILITY OF BIDDERS. Only responsive Bids from responsible Bidders will be considered. A Bid submitted by a Bidder determined to be not responsible may be rejected. The OWNER may find a bidder to be not responsible for any one of the following reasons, but is not limited in its responsibility analysis to the following factors:

- A. Evidence of bid rigging or collusion;
- B. Fraud or dishonesty in the performance of previous contracts;
- C. Record of integrity;
- D. More than one bid for the same work from an individual, firm, or corporation under the same or different name;
- E. Unsatisfactory performance on previous or current contracts;
- F. Failure to pay, or satisfactorily settle, all bills due for labor and material on previous contracts;

SECTION 00100 - INSTRUCTIONS TO BIDDERS

- G. Uncompleted work that, in the judgment of the OWNER, might hinder or prevent the bidder's prompt completion of additional work, if awarded;
- H. Failure to reimburse the OWNER for monies owed on any previous contracts;
- I. Default under previous contracts;
- J. Failure to comply with any qualification requirements of the OWNER; special standards for responsibility, if applicable, will be specified. These special standards establish minimum standards or experience required for a responsible Bidder on a specific contract;
- K. Engaging in any activity that constitutes a cause for debarment or suspension under the CBJ Procurement Code 53.50 or submitting a bid during a period of debarment;
- L. Lack of skill, ability, financial resources, or equipment required to perform the contract; or
- M. Lack of legal capacity to contract.
- N. Bidders must be registered as required by law and in good standing for all amounts owed to the OWNER per Paragraph 21.0 of this Section.
- O. Failure to submit a complete Subcontractor Report as required in section Section 00360 – Subcontractor Report.

Nothing contained in this section deprives the OWNER of its discretion in determining the lowest responsible bidder. Before a Bid is considered for award, a Bidder may be requested to submit information documenting its ability and competency to perform the WORK, according to general standards of responsibility and any special standards which may apply. It is Bidder's responsibility to submit sufficient, relevant, and adequate information. OWNER will make its determination of responsibility and has no obligation to request clarification or supplementary information.

5.0 NON-RESPONSIVE BIDS. Only responsive Bids will be considered. Bids may be considered non-responsive and may be rejected. Some of the reasons a Bid may be rejected for being non-responsive are:

- A. If a Bid is received by the CBJ Purchasing Division after the Deadline for Bids.
- B. If the Bid is on a form other than that furnished by the OWNER, or legible copies thereof; or if the form is altered or any part thereof is detached; or if the Bid is improperly signed.
- C. If there are unauthorized additions, conditional or alternate Bids, or irregularities of any kind which may tend to make the bid incomplete, indefinite, ambiguous as to its meaning, or in conflict with the OWNER's Bid document.
- D. If the Bidder adds any unauthorized conditions, limitations, or provisions reserving the right to accept or reject any award, or to enter into a contract pursuant to an award. This does not exclude a Bid limiting the maximum gross amount of awards acceptable to any one Bidder at any one Bid opening, provided that any selection of awards will be made by the OWNER.

SECTION 00100 - INSTRUCTIONS TO BIDDERS

- E. If the Bid does not contain a Unit Price for each pay item listed, except in the case of authorized alternate pay items.
- F. If the Bidder has not acknowledged receipt of each Addendum.
- G. If the Bidder fails to furnish an acceptable Bid guaranty with the Bid.
- H. If any of the Unit Prices Bid are excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the OWNER.
- I. If a Bid modification does not conform to Article 15.0 of this Section.

6.0 BIDDER'S EXAMINATION OF CONTRACT DOCUMENTS AND SITE. It is the responsibility of each Bidder before submitting a Bid:

- A. To examine thoroughly the Contract Documents, and other related data identified in the Bidding documents (including "technical data" referred to below):
 - 1. To visit the site to become familiar with and to satisfy the Bidder as to the general and local conditions that may affect cost, progress, or performance, of the WORK,
 - 2. To consider federal, state and local laws and regulations that may affect cost, progress, or performance of the WORK,
 - 3. To study and carefully correlate the Bidder's observations with the Contract Documents, and other related data; and
 - 4. To notify the ENGINEER of all conflicts, errors, or discrepancies in or between the Contract Documents and such other related data.

7.0 REFERENCE IS MADE TO THE SUPPLEMENTARY GENERAL CONDITIONS FOR IDENTIFICATION OF:

- A. Those reports of explorations and tests of subsurface conditions at the site which have been utilized by the Engineer of Record in the preparation of the Contract Documents. The Bidder may rely upon the accuracy of the technical data contained in such reports, however, the interpretation of such technical data, including any interpolation or extrapolation thereof, together with non-technical data, interpretations, and opinions contained therein or the completeness thereof is the responsibility of the Bidder.
- B. Those Drawings of physical conditions in or relating to existing surface and subsurface conditions (except underground utilities) which are at or contiguous to the site have been utilized by the Engineer of Record in the preparation of the Contract Documents. The Bidder may rely upon the accuracy of the technical data contained in such Drawings, however, the interpretation of such technical data, including any interpolation or extrapolation thereof, together with nontechnical data, interpretations, and opinions contained in such Drawings or the completeness thereof is the responsibility of the Bidder.
- C. Copies of such reports and Drawings will be made available by the OWNER to any Bidder on request if said reports and Drawings are not bound herein. Those reports and Drawings are not part of the Contract Documents, but the technical data contained therein upon which the Bidder is entitled to rely, as provided in Paragraph SGC-4.2 of the Supplementary General Conditions, are incorporated herein by reference.

SECTION 00100 - INSTRUCTIONS TO BIDDERS

- D. Information and data reflected in the Contract Documents with respect to underground utilities at or contiguous to the site is based upon information and data furnished to the OWNER and the Engineer of Record by the owners of such underground utilities or others, and the OWNER does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary General Conditions, or in Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements.
- E. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, underground utilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.2, 4.3, and 4.4 of the General Conditions.
- F. Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and underground utilities) at or contiguous to the site or otherwise which may affect cost, progress, or performance of the WORK and which the Bidder deems necessary to determine its Bid for performing the WORK in accordance with the time, price, and other terms and conditions of the Contract Documents.
- G. On request in advance, the OWNER will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and shall clean up and restore the site to its former condition upon completion of such explorations.
- H. The lands upon which the WORK is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the CONTRACTOR in performing the WORK are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the CONTRACTOR. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the OWNER unless otherwise provided in the Contract Documents.
- I. The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of Article 6.0, "Bidder's Examination of Contract Documents and Site" herein, that without exception the Bid is premised upon performing the WORK required by the Contract Documents and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the WORK.

8.0 BID FORM.

- A. The Bid shall be made on the Bid Schedule(s) bound herein, or on the yellow Bid packet provided, or on legible and complete copies thereof, and shall contain the following: Sections 00300, 00310, the required Bid Security, and any other documents required in Section 00300 – Bid.
- B. All blanks on the Bid Form and Bid Schedule must be completed in ink or typed.

SECTION 00100 - INSTRUCTIONS TO BIDDERS

- C. Bids by corporations must be executed in the corporate name by the president, a vice-president (or other corporate officer). The corporate address and state of incorporation must appear below the signature.
- D. Bids by partnerships must be executed in the partnership name and be signed by a managing partner, and the official address of the partnership must appear below the signature.
- E. The Bidder's Bid must be signed. All names must be printed or typed below the signature.
- F. The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid form. Failure to acknowledge Addenda may render Bid non-responsive and may cause its rejection.
- G. The address to which communications regarding the Bid are to be directed must be shown.

9.0 QUANTITIES OF WORK. The quantities of WORK, or material, stated in Unit Price items of the Bid are supplied only to give an indication of the general scope of the WORK; the OWNER does not expressly or by implication agree that the actual amount of WORK, or material, will correspond therewith, and reserves the right after award to increase or decrease the amount of any Unit Price item of the WORK by an amount up to and including 25 percent of any Bid item, without a change in the Unit Price, and shall include the right to delete any Bid item in its entirety, or to add additional Bid items up to and including an aggregate total amount not to exceed 25 percent of the Contract Price (see Section 00700 - General Conditions, Article 10 Changes In the WORK).

10.0 SUBSTITUTE OR "OR-EQUAL" ITEMS. Substitution requests are not accepted during the bidding process. The procedure for the submittal of substitute or "or-equal" products is specified in Section 013300 – Submittal Procedures.

11.0 SUBMISSION OF BIDS. The Bid shall be delivered by the time and to the place stipulated in Section 00030 - Notice Inviting Bids. It is the Bidder's sole responsibility to see that its Bid is received in proper time. Oral, telegraphic, emailed, or faxed Bids will not be considered. The envelope enclosing the sealed Bids shall be plainly marked in the upper left-hand corner with the name and address of the Bidder and shall also include the label included in Section 00030 – Notice Inviting Bids. The Bid Security shall be enclosed in the same envelope with the Bid

12.0 BID SECURITY, BONDS, AND INSURANCE. Each Bid shall be accompanied by a certified, or cashier's check, or approved Bid Bond in an amount of at least 5 percent of the total Bid price. The "total Bid price" is the amount of the Base Bid, plus the amount of alternate Bids, if any, which total to the maximum amount for which the CONTRACT could be awarded. Said check or Bond shall be made payable to the OWNER and shall be given as a guarantee that the Bidder, if offered the WORK, will enter into an Agreement with the OWNER, and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond; each of said Bonds, if required, and insurance amounts shall be as stated in the Supplementary General Conditions. In case of refusal or failure to enter into said Agreement, the check or Bid Bond, as the case may be, may be forfeited to the OWNER. If the Bidder elects to furnish a Bid Bond as its Bid security, the Bidder shall use the Bid Bond form bound herein, or one conforming substantially to it in form. Bid Bonds must be accompanied by a legible Power of Attorney.

SECTION 00100 - INSTRUCTIONS TO BIDDERS

13.0 RETURN OF BID SECURITY. The OWNER will return all Bid security checks (certified or cashier's) accompanying such of the Bids as are not considered in making the award. All other Bid securities will be held until the Agreement has been executed. Following execution of the Agreement, all other Bid security checks will be returned to the respective Bidders whose Bids they accompanied and Bid security bonds will be appropriately discarded.

14.0 DISCREPANCIES IN BIDS. In the event there is more than one Pay Item in a Bid Schedule, the Bidder shall furnish a price for all Pay Items in the schedule, and failure to do so may render the Bid non-responsive and cause its rejection. In the event there are Unit Price Pay Items in a Bid Schedule and the "amount" indicated for a Unit Price Bid Item does not equal the product of the Unit Price and quantity, the Unit Price shall govern and the amount will be corrected accordingly, and the Bidder shall be bound by said correction. In the event there is more than one Pay Item in a Bid Schedule and the total indicated for the schedule does not agree with the sum of the prices Bid on the individual items, the prices Bid on the individual items shall govern and the total for the schedule will be corrected accordingly, and the Bidder shall be bound by said correction.

15.0 BID MODIFICATIONS AND UNAUTHORIZED ALTERNATIVE BIDS.

- A. Any bidder may deliver a modification to a bid in person, by mail or fax (907-586-4561), provided that such modification is received by the Purchasing Division no later than the deadline for bids. Modifications will be time and date stamped by the Purchasing Division, which will establish the official time of receipt of the modification. The modification must not reveal the bid price but should be in the form of an addition or subtraction or other modification so that the final prices will not be known until the sealed bid is opened.

The Bid modifications shall be provided on the **Bid Modification Form** located at the end of this Section. Submittal of any other form by the vendor may deem the modification unacceptable by the OWNER. **A mail or fax modification should not reveal the Bid price but should provide the addition or subtraction or other modification so that the final prices will not be known by the City and Borough until the sealed Bid is opened.** Submitted Modification forms shall include the modification to the unit price or lump sum amount of each pay item modified.

FAX DISCLAIMER: It is the responsibility of the bidder to submit modifications in a timely manner. Bidders' use of a fax machine to modify their bid shall be at bidders' sole risk. The Purchasing Division will attempt to keep the fax machine in good working order but will not be responsible for bid modifications that are late due to mechanical failure, a busy fax machine, or any other cause arising from bidder's use of a fax machine, even if bidder submits a transmission report or provides other confirmation indicating that the bidder transmitted a bid modification prior to the deadline. The City will not be responsible for its failure to receive the modification whether such failure is caused by equipment or human error, or otherwise. Bidders are therefore strongly encouraged to confirm receipt of their bid modification with the Purchasing Division (907-586-5258) prior to deadline.

- B. Conditioned bids, limitations, or provisos attached to the Bid or bid modification will render it unauthorized and cause its rejection as being non-responsive. The completed Bid forms shall be without interlineations, alterations, or erasures in the printed text. All changes shall be initialed by the person signing the Bid. Alternative Bids will not be considered unless called for.

SECTION 00100 - INSTRUCTIONS TO BIDDERS

16.0 WITHDRAWAL OF BID. Prior to the Deadline for Bids, the Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative. Such written request must be delivered to the place stipulated in the Notice Inviting Bids for receipt of Bids.

17.0 AWARD OF CONTRACT.

- A. Award of a contract, if it is awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Technical Specifications and will be made to the lowest responsive, responsible Bidder whose Bid complies with all the requirements prescribed. Unless otherwise specified, any such award will be made within the period stated in the Notice Inviting Bids that the Bids are to remain open. Unless otherwise indicated, a single award will be made for all the Bid items in an individual Bid Schedule.
- B. If the OWNER has elected to advertise this Project with a Base Bid and Alternates, the OWNER may elect to award the contract for the Base Bid, or the Base Bid in combination with one or more Alternates selected by the OWNER. In either case, award shall be made to the responsive, responsible bidder offering the lowest total Bid for the WORK to be awarded.

18.0 EXECUTION OF AGREEMENT.

- A. All Bids of value greater than \$1,000,000 must be approved by the CBJ Assembly. After the CBJ Assembly has approved the award and after the Bid protest period, the OWNER will issue a Notice of Intent to Award to the approved Bidder. The Bidder to whom award is made shall execute a written Agreement with the OWNER on the Agreement form, Section 00500, collect insurance, and shall furnish all certificates and Bonds required by the Contract Documents within 10 Days (calendar) from the date of the Notice of Intent to Award letter.
- B. Failure or refusal to enter into the Agreement as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for annulment of the award and forfeiture of the Bid security. If the lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the contract to the second lowest responsive, responsible Bidder. If the second lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the contract to the third lowest responsive, responsible Bidder. On the failure or refusal of such second or third lowest Bidder to execute the Agreement, each such Bidder's Bid securities shall be likewise forfeited to the OWNER.

19.0 LIQUIDATED DAMAGES. Provisions for liquidated damages if any, are set forth in Section 00500 - Agreement.

20.0 FILING A PROTEST.

- A. A Bidder may protest the proposed award of a competitive sealed Bid by the City and Borough of Juneau. The protest shall be executed in accordance with CBJ Ordinance 53.50.062 PROTESTS and CBJ Ordinance 53.50.080 ADMINISTRATION OF PROTEST. The entire text of the CBJ Purchasing Ordinance can be accessed at the CBJ

SECTION 00100 - INSTRUCTIONS TO BIDDERS

website, <http://www.juneau.org/law/code/code.php>, or call the CBJ Purchasing Division at (907) 586-5258 for a copy of the ordinance.

B. Late protests shall not be considered by the CBJ Purchasing Officer.

21.0 CONTRACTOR'S GOOD STANDING WITH CBJ FINANCE DEPARTMENT: Contractors must be in good standing with the CBJ prior to award, and prior to any contract renewals, and in any event no later than *seven business days* following notification by the CBJ of intent to award. **Good standing** means: all amounts owed to the CBJ are current and the Contractor is not delinquent with respect to any taxes, fees, assessment, or other monies due and owed the CBJ, or a Confession of Judgment has been executed and the Contractor is in compliance with the terms of any stipulation associated with the Confession of Judgment, including being current as to any installment payments due; and Contractor is current in all CBJ reporting obligations (such as sales tax registration and reporting and business personal property declarations). Failure to meet these requirements may be cause for rejection of your bid. To determine if your business is in good standing, or for further information, contact the CBJ Finance Department's Sales Tax Division at (907) 586-5265 for sales tax issues, Assessor's Office at (907)586-0930 for business personal property issues, or Collections Division at (907) 586-5268 for all other accounts.

22.0 PERMITS AND LICENSES. The CONTRACTOR is responsible for all WORK associated with meeting any local, state, and/or federal permit and licensing requirements.

SECTION 00100 - INSTRUCTIONS TO BIDDERS

CITY AND BOROUGH OF JUNEAU
PURCHASING DIVISION
FAX NO. 907-586-4561

BID MODIFICATION FORM

Modification Number: _____

Modification Page ____ of ____

Note: All modifications shall be made to the original bid amount(s). If more than one Modification form is submitted by any one bidder, changes from all Modification forms submitted will be combined and applied to the original bid. Changes to the modified Bid amounts will be calculated by the OWNER. Bidder may use multiple modification pages if required.

PAY ITEM NO.	PAY ITEM DESCRIPTION	MODIFICATIONS TO UNIT PRICE OR LUMP SUM (indicate +/-)

Base Bid Total Increase or Decrease: \$ _____

PAY ITEM No.	ALTERNATE PAY ITEM DESCRIPTION	MODIFICATIONS TO UNIT PRICE OR LUMP SUM (indicate +/-)

Alternate Total Increase or Decrease: \$ _____

Name of Bidding Firm

Responsible Party Signature

Printed Name (must be an authorized signatory for Bidding Firm)

END OF SECTION

SECTION 00300 - BID

BID TO: THE CITY AND BOROUGH OF JUNEAU

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the OWNER in the form included in the Contract Documents (as defined in Article 6 of the Agreement) to perform the WORK as specified or indicated in said Contract Documents entitled

**CBJ Headworks Improvements
Contract No. BE17-033**

2. Bidder accepts all of the terms and conditions of the Contract Documents, including without limitation those in the "Notice Inviting Bids" and "Instructions to Bidders," dealing with the disposition of the Bid Security.
3. This Bid will remain open for the period of time stated in the "Notice Inviting Bids" unless otherwise required by law. Bidder will enter into an Agreement within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders," and will furnish insurance certificates, Payment Bond, Performance Bond, and any other documents as may be required by the Contract Documents.
4. Bidder has familiarized itself with the nature and extent of the Contract Documents, WORK, site, locality where the WORK is to be performed, the legal requirements (federal, state and local laws, ordinances, rules, and regulations), and the conditions affecting cost, progress or performance of the WORK and has made such independent investigations as Bidder deems necessary.
5. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
6. To all the foregoing, and including all Bid Schedule(s) and information required of Bidder contained in this Bid form, said Bidder further agrees to complete the WORK required under the Contract Documents within the Contract Time stipulated in said Contract Documents, and to accept in full payment therefore the Contract Price based on the Total Bid Price(s) named in the aforementioned Bid Schedule(s).
7. Bidder has examined copies of all the Contract Documents including the following addenda (receipt of all of which is hereby acknowledged by the Undersigned):

Addenda No.	Date Issued	Addenda No.	Date Issued

Give number and date of each addenda above. Failure to acknowledge receipt of all addenda may cause the Bid to be non-responsive and may cause its rejection.

SECTION 00300 - BID

8. The Bidder has read this Bid and agrees to the conditions as stated herein by affixing his/her signature in the space provided below.

Dated: _____	Bidder: _____ (Company Name)
Alaska CONTRACTOR's Business License No: _____	By: _____ (Signature)
Alaska CONTRACTOR's License No: _____	Printed Name: _____ Title: _____
Telephone No: _____	Address: _____ (Street or P.O. Box)
Fax No: _____	_____ (City, State, Zip)
Email: _____	

9. TO BE CONSIDERED, ALL BIDDERS MUST COMPLETE AND INCLUDE THE FOLLOWING AT THE TIME OF THE DEADLINE FOR BIDS:

- Bid, Section 00300 (includes addenda receipt statement)
- Completed Bid Schedule, Section 00310
- Bid Security (Bid Bond, Section 00320, or by a certified or cashier's check as stipulated in the Notice Inviting Bids, Section 00030)
- **Disadvantaged Business Enterprises (Minority and Women-Owned Business Enterprises) Compliance Statement, (Section 00410).**
- **Use of American Iron and Steel, Section 00470, Page 3, CONTRACTOR**

10. The apparent low Bidder is required to complete and submit the following document by 4:30 p.m. on the fifth business day following the date of the Posting Notice.

- Subcontractor Report, Section 00360

11. The apparent low Bidder who fails to submit a completed Subcontractor Report within the time specified in this Section may be found to be not a responsible bidder and may be required to forfeit the bid security. The OWNER may then consider the next lowest Bidder for award of the Contract.

12. The successful Bidder will be required to submit, within ten calendar Days after the date of the "Notice of Intent to Award" letter, the following executed documents:

- Agreement Forms, Section 00500
- Performance Bond, Section 00610
- Payment Bond, Section 00620
- Certificates of Insurance, (CONTRACTOR) Section 00700 and Section 00800
- Equal Employment Opportunity Statement of Acknowledgement, Section 00400
- Disadvantaged Business Enterprises (Minority and Women-Owned Business Enterprises) Report of Participation, Section 00410

SECTION 00300 - BID

- Disadvantaged Business Enterprises (Minority and Women-Owned Business Enterprises) Contact Documentation, Section 00410 – if goal is not met
- EEO Statement of Acknowledgement, Section 00430, signed by CONTRACTOR and all Subcontractors
- EEO Employer Information Report EEO-1, signed by CONTRACTOR and all Subcontractors
- Employment Data, signed by CONTRACTOR and all Subcontractors
- Use of American Iron and Steel, Section 00470, Page 3, Subcontractors
- Contractor Acknowledgement of American Iron & Steel Requirement, Page 5
- Certification Regarding Debarment, Suspension and Other Responsibility Matters, Section 00480

END OF SECTION

SECTION 00310 - BID SCHEDULE

Bid Schedule for construction of **BE17-033 named CBJ Headworks Improvements**, in accordance with the Contract Documents.

MENDENHALL VALLEY WASTEWATER TREATMENT PLANT HEADWORKS IMPROVMEENTS - Furnish all labor, equipment and materials to remove one existing automatic screen and grinder system and one manual bar screen, the installation of two new perforated plate screens and screening washer/compactors including new electrical connections to the screens and compactors, dismantling and removing an oil/water separation tank, relocating an existing grit classifier clarifier and conveyor, and modifications to the piping in the influent pump station, painting of pipe, installation of gas alarms, and miscellaneous related WORK. Installation of the new screens will require construction sequencing to dismantle and replace existing 16-inch and 18-inch ductile iron pipe with new 24-inch process piping to make space for the new screens, and perform all WORK as described in these Contract Documents.

MENDENHALL VALLEY WASTEWATER TREATMENT PLANT HEADWORKS IMPROVEMENTS BID

\$ _____
(Price in Figures)

JUNEAU-DOUGLAS WASTEWATER TREATMENT PLANT HEADWORKS IMPROVEMENTS - Furnish all labor, equipment and materials and perform all WORK for the installation of two new perforated plate automatic screens and screening washer/compactors including new electrical connections to the screens and compactors, construction of new concrete influent channels and piping to connect the new influent channels to existing piping, construction of a new building around the new channels and miscellaneous related WORK. Site grading includes the installation of two new catch basins, new storm drain lines, and asphalt restoration. Demolition includes the removal of the existing automatic screen and manual screen, removal of existing concrete steps, removal of a timber framed wall and soffit, and removal of electrical feeds to the existing screens. Construction sequencing will be required to maintain the existing headworks in operation while the new screens and channels are constructed.

JUNEAU-DOUGLAS WASTEWATER TREATMENT PLANT HEADWORKS IMPROVEMENTS BID:

\$ _____
(Price in Figures)

TOTAL BID \$ _____
(Price in Figures)

Date: _____

Bidder: _____
(Company Name)

END OF SECTION

SECTION 00320 - BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that _____
_____ as Principal, and _____
as Surety, are held and firmly bound unto **THE CITY AND BOROUGH OF JUNEAU** hereinafter called
"OWNER," in the sum of _____
_____dollars, (not less than five percent of the total amount of the Bid) for the
payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators,
successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under
the Bid Schedule of the OWNER's Contract Documents entitled.

**CBJ Headworks Improvements
Contract No. BE17-033**

NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and
in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders" enters into a written
Agreement on the form of Agreement bound with said Contract Documents, furnishes the required certificates
of insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be
null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by
said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit,
including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this _____ day of _____, 20____

(SEAL) _____
(Principal)

(SEAL) _____
(Surety)

By: _____
(Signature)

By: _____
(Signature)

END OF SECTION

SECTION 00360 - SUBCONTRACTOR REPORT

LIST OF SUBCONTRACTORS (AS 36.30.115)

The apparent low Bidder must submit a list of Subcontractors that the Bidder proposes to use in the performance of this contract *on the fifth business day* following the Posting Notice of Bids. If the fifth day falls on a weekend or holiday, the report is due by close of business on the next business Day following the weekend or holiday. The Subcontractor Report list must include each Subcontractor's name, address, location, evidence of valid Alaska Business License, and valid Alaska Contractor's Registration under AS 08.18. *If no Subcontractors are to be utilized in the performance of the WORK, write in ink or type "NONE" on line (1) below.*

<u>SUBCONTRACTOR</u>	¹ AK Contractor License No.	¹ Contact Name	Type of	Contract	✓ if
<u>ADDRESS</u>	² AK Business License No.	² Phone No.	<u>Work</u>	<u>Amount</u>	<u>DBE</u>
1. _____ _____ _____	1 _____ 2 _____	_____ _____	_____ _____	\$ _____	<input type="checkbox"/>
2. _____ _____ _____	1 _____ 2 _____	_____ _____	_____ _____	\$ _____	<input type="checkbox"/>
3. _____ _____ _____	1 _____ 2 _____	_____ _____	_____ _____	\$ _____	<input type="checkbox"/>
4. _____ _____ _____	1 _____ 2 _____	_____ _____	_____ _____	\$ _____	<input type="checkbox"/>

I certify that the above listed Alaska Business License(s) and CONTRACTOR Registration(s), if applicable, were valid at the time Bids were opened for this Project.

CONTRACTOR, Authorized Signature

CONTRACTOR, Printed Name

COMPANY

SECTION 00360 - SUBCONTRACTOR REPORT

- A. A Bidder may replace a listed Subcontractor if the Subcontractor:
1. fails to comply with AS 08.18;
 2. files for bankruptcy or becomes insolvent;
 3. fails to execute a contract with the Bidder involving performance of the WORK for which the Subcontractor was listed and the Bidder acted in good faith;
 4. fails to obtain bonding;
 5. fails to obtain insurance acceptable to the OWNER;
 6. fails to perform the contract with the Bidder involving work for which the Subcontractor was listed;
 7. must be substituted in order for the CONTRACTOR to satisfy required state and federal affirmative action requirements;
 8. refuses to agree or abide with the Bidder's labor agreement; or
 9. is determined by the OWNER not to be responsible.
 10. is not in "Good Standing" with the OWNER as required in Article 21.0 in Section 00100 – Instructions to Bidders.
- B. If a Bidder fails to list a Subcontractor or lists more than one Subcontractor for the same portion of WORK, the Bidder shall be considered to have agreed to perform that portion of WORK without the use of a Subcontractor and to have represented the Bidder to be qualified to perform that WORK.
- C. A Bidder who attempts to circumvent the requirements of this section by listing as a Subcontractor another contractor who, in turn, sublets the majority of the WORK required under the contract violates this section.
- D. If a contract is awarded to a Bidder who violates this section, the OWNER may:
1. cancel the contract; or
 2. after notice and a hearing, assess a penalty on the Bidder in an amount that does not exceed 10 percent of the value of the subcontract at issue.
- E. On the Subcontractor Report, the apparent low Bidder must list any Subcontractors anticipated to perform WORK with a value of greater than one-half of one percent of the intended award amount, or \$2,000, whichever is less.
- F. An apparent low Bidder who fails to submit a completed Subcontractor Report within the time specified in this section may be found to be not a responsible Bidder and may be required to forfeit the Bid security. The OWNER will then consider the next lowest Bidder for award of the contract.

END OF SECTION

**SECTION 00400 - STATE OF ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DISADVANTAGE BUSINESS ENTERPRISES OVERVIEW AND REQUIREMENTS**

**STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALASKA CLEAN WATER FUND & ALASKA DRINKING WATER FUND**

**DISADVANTAGE BUSINESS ENTERPRISES
(DBE) OVERVIEW**

The loan recipient, consultant and contractor of an Alaska Clean Water or Drinking Water Fund revolving loan project are required to comply with EPA regulations (40 CFR Part 33) concerning the use of disadvantage owned businesses enterprises (DBE). Also required is compliance with EEO/Affirmative Action Regulations of the Department of Labor (see attached Statement of Acknowledgement). These regulations help ensure that economic opportunities are available to all people of this country.

The expenditure of Federal funds must reflect equal opportunity, anti-discrimination provisions of the 1964 Civil Rights Act, affirmative action and DBE or more specifically small, minority and women-owned businesses utilization under EPA's DBE program. Utilization may be through prime contracting, subcontracting, joint-venture, procurement of supplies, material or equipment, or other business participation utilized in completing a project. For all situations, contractors must take necessary and reasonable steps to ensure DBE's have the maximum opportunity to compete for and/or perform contracts. Contractors shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of projects where assistance is provided from an ADEC revolving loan fund program.

NOTE: On March 26, 2008, the Environmental Protection Agency (EPA) Office of Small Business Programs (OSBP) published its final rule, "Participation by Disadvantaged Business Enterprises in Procurement under Environmental Protection Agency Financial Assistance Agreements (DBE Rule) in the Federal Register (40 CFR part 30-40). The final rule took effect on May 25, 2008." The EPA DBE Program encompasses many of the components of the former MBE/WBE Program and also includes changes.

Some changes are:

- Creation of the Disadvantaged Business Enterprise (DBE) Program (formerly the Minority Business Enterprise/Women's Business Enterprise (MBE/WBE) Program).
- Recipients receiving a total of \$250K or less in financial assistance in a given fiscal year are exempt from this requirement.
- The "Six Affirmative Steps" and "Six Positive Efforts" were combined into the "Six Good Faith Efforts."
- A recipient must require its prime contractor to pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the recipient.
- The loan recipient must be notified in writing by its prime contractor prior to any termination of a DBE subcontractor.

SECTION 00400 - STATE OF ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION DISADVANTAGE BUSINESS ENTERPRISES OVERVIEW AND REQUIREMENTS

- If a DBE subcontractor fails to complete work under the subcontract for any reason, the prime contractor must use the Six Good Faith Efforts in selecting a replacement subcontractor.
- The prime contractor must employ the Six Good Faith Efforts even if the prime has achieved its Fair Share Objectives.
- Recipients who reported quarterly under the old MBE/WBE program will report semi-annually. [Note – this has been recently updated to now only require annual reporting.]
- MBE's and WBE's can no longer self-certify. They must be certified by EPA, Small Business Administration (SBA), Department of Transportation (DOT) or by state, local, Tribal or private entities whose certification criteria match EPA's. (MBEs and WBEs must be certified in order to be counted toward a recipient's MBE/WBE accomplishments.) The new requirements affect all financial assistance agreements entered into from the effective date of the rule (May 25, 2008). The new DBE rule won't affect those financial assistance agreements entered into before May 25, 2008; those will still operate under the old MBE/WBE program requirements.

SUMMARY OF GOALS

Stated simply, in meeting DBE goals under this program, the prime contractor must either 1) achieve the goal of contracting to Minority or Women-Owned Enterprises (MBE/WBE), or 2) follow the proper procedures in thoroughly documenting good faith efforts to achieve MBE/WBE goal participation. A prime contractor who is an MBE/WBE firm can also be counted towards the goal. (see attached current participation goals for the Department)

REQUIREMENTS

A. Definitions

- Disadvantaged Business Enterprise – Per EPA requirements for projects funded under the Alaska Drinking Water Fund and Alaska Clean Water Fund loan programs, Disadvantage Business Enterprises only include entities owned and/or controlled by socially and economically disadvantaged individuals (as described in 42 USC 7601 and 42 USC 4370d) – which includes Women's Business Enterprises (WBE) and Minority Business Enterprises (MBE). (for more information go to: <http://www.epa.gov/osbp/grants.htm>)
- Minority Business Enterprise or Women Owned Business Enterprise – means a small business concern which is owned and controlled by one or more minorities or women. Owned and controlled means a business:
 1. Which is at least 51 percent owned by one or more minorities or women, or in the case of a publicly owned business, at least 51% of the stock is owned by one or more minorities or women;

**SECTION 00400 - STATE OF ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DISADVANTAGE BUSINESS ENTERPRISES OVERVIEW AND REQUIREMENTS**

2. Whose management and daily business operations are controlled by one or more such individuals.
- Socially Disadvantage Individual – means a person who is a citizen or lawful permanent resident of the United States and who is:
- Black;
 - Hispanic;
 - Portuguese;
 - Asian American;
 - American Indian and Alaskan Native; and
 - Members of other groups, or other individuals, found to be economically and socially disadvantaged by the United States Small Business Administration under section 8(a) of the federal Small Business Act.
- Economically Disadvantaged Individual – those socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital or credit opportunities, as compared to others in the same business area who are not socially disadvantaged.

B. Implementation for DBE Procurement

As part of ADEC’s capitalization grants for both the ADWF and ACWF loan programs, the programs have an overall Fair Share (or utilization goal) objective of 3.89% for MBE entities and 2.02% for WBE entities for construction only (effective July 1, 2013 – June 30, 2016). The loan recipient, engineering firm responsible for construction phase services, and prime contractor are required to adopt this same fair objective. The fair share objective is not a quota, EPA cannot penalize ADEC, the loan recipient, engineering firm, or the prime contractor for not meeting MBE or WBE participation objectives.

The prime contractor and consulting engineer responsible for construction phase services are required to make the good faith efforts and apply necessary administrative requirements. If the good faith efforts are not made when subcontracts are considered for the prime construction contract or for engineering construction phase services, the ability of ADEC to fund the project, or portion thereof, may be jeopardized.

C. How to Count DBE (MBE/WBE) Goals

The proposed MBE/WBE firms to be used must be declared by the Bidder before contract award. The MBE/WBE may act as a prime contractor, subcontractor, joint venture partner, or supplier. To be counted toward a goal, the MBE/WBE must perform a commercially useful function. To calculate the minimum dollar value for MBE/WBE participation, multiply the total estimated contract price (including additives or alternates, if any) by the goal percentage.

D. How to Obtain DBE (MBE/WBE) Participation

Prior to the scheduled pre-bid conference, solicit MBE/WBE participation to meet the goal. By contract award, the Bidder must either meet the goal or have made good faith efforts to do so. Good faith efforts include, but are not limited to the following:

**SECTION 00400 - STATE OF ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DISADVANTAGE BUSINESS ENTERPRISES OVERVIEW AND REQUIREMENTS**

1. Including qualified small, minority and women's business enterprises on solicitation lists.
2. Assuring that small, minority and women's businesses are solicited. If the MBE/WBE is only certified as a DBE, such as through the Alaska Department of Transportation, and the bidder has exhausted all efforts to determine the subcontractor MBE/WBE status, the bidder may document either category of certification to meet goal objectives.
3. Dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority and women's businesses.
4. Establish delivery schedules, where requirements of the work permit, which will encourage participation by small, minority and women's businesses.
5. Using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce, as appropriate.
6. If the prime contractor or proposer awards subcontracts/procurements, require the subcontractor to take the affirmative steps 1 through 5 above.

E. How to Credit DBE (MBE/WBE) Participation

If the Bidder's firm is a qualified Minority or Women-Owned Business Enterprise, credit will be given for the portion of the contract for which the Bidder performs a commercially useful function, and for that portion that is subcontracted to other MBE/WBE firms. For example, a MBE/WBE prime contractor proposes to perform 60% of a project quoted at \$500,000, and subcontracts 20% to a majority firm and the remaining 20% to another MBE/WBE. This means the credited MBE/WBE participation will be 80% for the project (60% + 20%) or \$400,000.

F. The DBE (MBE/WBE) Reporting Package

To meet the MBE/WBE reporting requirements of the program, the following forms need to be submitted during the course of bidding, contract award, and administration of this project:

1. COMPLIANCE STATEMENT - acknowledges the MBE/WBE requirement by the bidder. It must be provided with the bid.
2. REPORT OF PARTICIPATION – documents the level of anticipated MBE/WBE participation. It is submitted after bid opening, but before contract award.
3. CONTACT DOCUMENTATION – documents the efforts taken to attain the MBE/WBE goals and it, or other documentation should be submitted with the Report of Participation if the bidder did not meet the established goal.
4. CONTRACT & PROCUREMENT ANNUAL REPORT – documents the actual MBE/WBE contracts executed by the Prime Contractor and submitted to the Community. In the first week of October each year (reporting period, Oct – Sep), the Community will submit a listing of the executed contracts (for the previous reporting period) through

**SECTION 00400 - STATE OF ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DISADVANTAGE BUSINESS ENTERPRISES OVERVIEW AND REQUIREMENTS**

ADEC's Municipal Matching Grants & Loans online reporting form "SRF loan – MBE/WBE Utilization Form" under the OASys "Reports" tab at the following link:

<https://dec.alaska.gov/Applications/Water/OASys/ValidationInfo.aspx>

G. Create and Maintain a Bidders List

Any entity that receives an ACWF or ADWF SRF loan is required to create and maintain a bidders list if the loan recipient is subject to, or chooses to follow, competitive bidding requirements. **The list must include all firms that bid or quote on prime contracts, or bid or quote subcontracts, including both MBE/WBEs and non-MBE/WBEs** and must be maintained until the end of the project.

H. DBE Anti-Discrimination Contract Clause

Under 40 CFR part 33, Appendix A, the following statement must be included in **every contract** issued by an ACWF/ADWF borrower to a prime contractor. The statement cannot be changed, modified, or altered in any way.

"The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies."

SECTION 00410 - DBE MBE/WBE FORMS
STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DISADVANTAGE BUSINESS ENTERPRISES
(MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES)
COMPLIANCE STATEMENT

To be eligible for award of this contract, the bidder/proposer must execute and submit, as part of his or her bid proposal, this statement relating to Disadvantage Business Enterprises (Minority and Woman-Owned Business Enterprises). This statement shall be deemed a material factor in the City's evaluation of this bid proposal. Failure to complete and submit this statement, or the inclusion of a false statement, shall render the bid proposal non-responsive.

*The _____ (Company Name) acknowledges that Minority/Woman-Owned Business Enterprises (MBE/WBE) goal of **5.91%** participation (with a good faith effort of **3.89%** MBE and **2.02%** WBE, Effective July 1, 2013 thru June 30, 2016) has been established for this contract, and hereby assures that it will meet the goal or provide documentation to show that the mandatory good faith efforts have been made.*

The undersigned certifies that this bidder/proposer is aware of and will comply with MBE/WBE goals of this project and all applicable federal and state statutes and regulations concerning Disadvantage Business Enterprises (Minority and Woman-owned Business Enterprises).

We certify that should we be declared successful bidder/best proposer we shall submit such data as required for award of the contract within the time limits set forth in the contract specifications unless otherwise specified. In addition, we acknowledge that Minority/Woman-Owned Business Enterprises Contract and Procurement Reports will be submitted to the City for each half year of active construction.

We understand that if we are the successful bidder/best proposer and we fail to meet the MBE and/or WBE goals, or fail to demonstrate that we have made the required good faith effort the City can render the bid proposal non-responsive.

Company Name _____ RFP/Contract _____

Authorized Signature _____

Title _____

SECTION 00410 - DBE MBE/WBE FORMS

**STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

**DISADVANTAGE BUSINESS ENTERPRISES
(MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES)
REPORT OF PARTICIPATION**

Project Name _____ RFP/Contract No. _____

Company Name _____ Prepared By _____

The successful bidder/proposer must complete and submit this form after bid time, but prior to contract award. Please list below the name and address of each DBE (MBE/ WBE) subcontractor who will perform work under this contract, along with the contracted amount that will be applicable to the goal. Indicate whether the firm is MBE or WBE, and include your own firm if MBE/WBE eligible. A proposal submitted without adequate MBE/WBE participation or showing of good faith efforts to achieve such participation can render the bid proposal non-responsive. One copy of each executed MBE/WBE subcontract must be provided to the City by the successful prime contractor. Any changes to the list below must have prior approval by the City. Please note, if the MBE/WBE is only certified as a DBE, such as through the Alaska Department of Transportation, and the bidder has exhausted all efforts to determine the subcontractor MBE/WBE status, the bidder may document either category of certification to meet goal objectives.

Firm Name	AK Contractor's License No.	Contact Name & Phone No.	Type of Work	Contract Amount	MBE/WBE
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____
_____	_____	_____	_____	\$ _____	_____

Contract(s) Total: \$ _____ MBE/WBE Goal: _____ % Achieved: _____ % = \$ _____

Authorized Representative's Signature _____ Date _____

SECTION 00410 - DBE MBE/WBE FORMS

**STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DISADVANTAGE BUSINESS ENTERPRISES
(MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES)
CONTACT DOCUMENTATION**

Project Name _____ **RFP/Contract No.** _____

Company Name _____ **Authorized Signature/Title** _____

This form is provided for your convenience to document your efforts in meeting DBE (MBE/WBE) utilization goals. You may use additional sheets if needed. If you do not meet the MBE/WBE goal, you may return this form, or other supporting documentation (explanations, advertising notices, solicitations, etc.) with your MBE/WBE Report of Participation.

Firm _____ **MBE** _____ **WBE** _____
Address _____

Type of Work _____ **Bid Amount \$** _____
Dates of Contact _____
Method of Contact _____
Contact's Name _____
Results of Contact _____
If rejected, why _____

Firm _____ **MBE** _____ **WBE** _____
Address _____

Type of Work _____ **Bid Amount \$** _____
Dates of Contact _____
Method of Contact _____
Contact's Name _____
Results of Contact _____
If rejected, why _____

Firm _____ **MBE** _____ **WBE** _____
Address _____

Type of Work _____ **Bid Amount \$** _____
Dates of Contact _____
Method of Contact _____
Contact's Name _____
Results of Contact _____
If rejected, why _____

SECTION 00430 - EQUAL EMPLOYMENT OPPORTUNITY

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

EQUAL EMPLOYMENT OPPORTUNITY
STATEMENT OF ACKNOWLEDGEMENT

This statement of acknowledgement is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b)(1)) and must be completed by each Bidder and proposed Subcontractor participating in this contract.

PLEASE CHECK THE APPROPRIATE BOXES

THE Bidder proposed Subcontractor hereby CERTIFIES:

PART A. Bidders and proposed subcontractors with 50 or more employees and a federal contract amounting to \$50,000 or more are required to submit one federal Standard Report Form 100 during each year the two conditions (50 employees and a \$50,000 federal contract) exist.

The company named below (Part C) is exempt from the requirements of submitting the Standard Report Form 100 this year.

NO (go to PART B) YES (go to PART C)

PART B. The company named below (Part C) has submitted the Standard Report Form 100 this year, or intends to at this time.

NO YES

NOTE: Bidders and proposed Subcontractors who file Standard Report Form 100 may also be required to file Form CC-257 Monthly Employment Utilization Report if the project has significant financial impact on a community, or the bidder/subcontractor has signed an agreement to do so. At a minimum, the bidder/subcontractor is required to maintain records which reflect the reporting requirements of CC-257. Standard Report Form 100 and instructions may be obtained by writing to:

EEO-1 Joint Reporting Committee
P.O. Box 19100
Washington, DC 20036-9100
Telephone (866) 286-6440
Email: el.techassistance@eoc.gov

PART C.

Signature of Authorized Representative of Company

Date

Name of Company

() _____
Telephone No.

Address of Company

Zip Code

Project Name

Contract Number

SECTION 00430 - EQUAL EMPLOYMENT OPPORTUNITY

- Joint Reporting Committee
- Equal Employment Opportunity Commission
- Office of Federal Contract Compliance Programs (Labor)

EQUAL EMPLOYMENT OPPORTUNITY
EMPLOYER INFORMATION REPORT EEO-1

Standard Form 100
 REV. 01/2006
 O.M.B. No. 3045-0007
 EXPIRES 01/2009
 100-214

Section A—TYPE OF REPORT

Refer to instructions for number and types of reports to be filed.

1. Indicate by marking in the appropriate box the type of reporting unit for which this copy of the form is submitted (MARK ONLY ONE BOX).

(1) Single-establishment Employer Report

Multi-establishment Employer:

(2) Consolidated Report (Required)

(3) Headquarters Unit Report (Required)

(4) Individual Establishment Report (submit one for each establishment with 50 or more employees)

(5) Special Report

2. Total number of reports being filed by this Company (Answer on Consolidated Report only) _____

Section B—COMPANY IDENTIFICATION (To be answered by all employers)

1. Parent Company					OFFICE USE ONLY
a. Name of parent company (owns or controls establishment in item 2) omit if same as label					a.
Address (Number and street)					b.
City or town	State	ZIP code			c.
2. Establishment for which this report is filed. (Omit if same as label)					
a. Name of establishment					d.
Address (Number and street)	City or Town	County	State	ZIP code	e.
b. Employer identification No. (IRS 9-DIGIT TAX NUMBER)					f.
c. Was an EEO-1 report filed for this establishment last year? <input type="checkbox"/> Yes <input type="checkbox"/> No					

Section C—EMPLOYERS WHO ARE REQUIRED TO FILE (To be answered by all employers)

Yes No 1. Does the entire company have at least 100 employees in the payroll period for which you are reporting?

Yes No 2. Is your company affiliated through common ownership and/or centralized management with other entities in an enterprise with a total employment of 100 or more?

Yes No 3. Does the company or any of its establishments (a) have 50 or more employees AND (b) is not exempt as provided by 41 CFR 60-1.5, AND either (1) is a prime government contractor or first-tier subcontractor, and has a contract, subcontract, or purchase order amounting to \$50,000 or more, or (2) serves as a depository of Government funds in any amount or is a financial institution which is an issuing and paying agent for U.S. Savings Bonds and Savings Notes?

If the response to question C-3 is yes, please enter your Dun and Bradstreet identification number (if you have one):

NOTE: If the answer is yes to questions 1, 2, or 3, complete the entire form, otherwise skip to Section G.

SECTION 00430 - EQUAL EMPLOYMENT OPPORTUNITY

Section D-EMPLOYMENT DATA

Employment at this establishment - Report all permanent full- and part-time employees including apprentices and on-the-job trainees unless specifically excluded as set forth in the instructions. Enter the appropriate figures on all lines and in all columns. Blank spaces will be considered as zeros.

Job Categories	Number of Employees (Report employees in only one category)														Total Col A - N
	Race/Ethnicity														
	Hispanic or Latino		Not-Hispanic or Latino						Female						
	Male	Female	White	Black or African American	Native Hawaiian or Other Pacific Islander	Asian	American Indian or Alaska Native	Two or more races	White	Black or African American	Native Hawaiian or Other Pacific Islander	Asian	American Indian or Alaska Native	Two or more races	
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
Executive/Senior Level Officials and Managers	1.1														
First/Mid-Level Officials and Managers	1.2														
Professionals	2														
Technicians	3														
Sales Workers	4														
Administrative Support Workers	5														
Craft Workers	6														
Operatives	7														
Laborers and Helpers	8														
Service Workers	9														
TOTAL	10														
PREVIOUS YEAR TOTAL	11														

1. Date(s) of payroll period used: _____ (Omit on the Consolidated Report.)

Section E - ESTABLISHMENT INFORMATION (Omit on the Consolidated Report.)

1. What is the major activity of this establishment? (Be specific, i.e., manufacturing steel castings, retail grocer, wholesale plumbing supplies, title insurance, etc. Include the specific type of product or type of service provided, as well as the principal business or industrial activity).

Section F - REMARKS

Use this item to give any identification data appearing on the last EEO-1 report which differs from that given above, explain major changes in composition of reporting units and other pertinent information.

Section G - CERTIFICATION

- Check 1 All reports are accurate and were prepared in accordance with the instructions. (Check on Consolidated Report only.)
 2 This report is accurate and was prepared in accordance with the instructions.

Name of Certifying Official	Title	Signature	Date
Name of person to contact regarding this report	Title	Address (Number and Street)	
City and State	Zip Code	Telephone No. (including Area Code and Extension)	Email Address

All reports and information obtained from individual reports will be kept confidential as required by Section 708(e) of Title VII. WILLFULLY FALSE STATEMENTS ON THIS REPORT ARE PUNISHABLE BY LAW, U.S. CODE, TITLE 18, SECTION 1001

SECTION 00440 –PREVAILING WAGE RATES

Projects receiving State of Alaska Department of Environmental Conservation Revolving Loan Program require Contractors to comply with the Federal and State of Alaska Prevailing Wage Rates. The ADEC Revolving Loan Program requires the Contractor to pay the higher of the prevailing wage rates (Federal or State of Alaska). The required information and documentation for Labor Standards, Reporting, and Prevailing Wage Rate Determinations can be found in Sections 00830 and 00840.

State of Alaska, Department of Labor, Laborers' and Mechanics' Minimum Rates of Pay, AS 36.05.010 and AS 36.05.050, Wage and Hour Administration Pamphlet No. 600, the latest edition published by the State of Alaska, Department of Labor inclusive, are made a part of this contract by reference.



STATE OF ALASKA
MUNICIPAL GRANTS & LOANS
ALASKA CLEAN/DRINKING WATER FUND
USE OF AMERICAN IRON AND STEEL

From the “Consolidated Appropriations Act, 2014” H.R. 3547
(PL113-76, enacted 1/17/2014) , and as codified under section 608 of the
FWPCA (Federal Water Pollution Control Act)

“SEC. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j-12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the “Administrator”) finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency’s capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.”



STATE OF ALASKA
MUNICIPAL GRANTS & LOANS
ALASKA CLEAN/DRINKING WATER FUND
USE OF AMERICAN IRON AND STEEL

CERTIFICATION BY THE OWNER
OF COMPLIANCE WITH THE
USE OF AMERICAN IRON AND STEEL LAW
enacted on 1/17/2014

(To be completed by the duly authorized Utility System representative and provided to the Municipal Grants & Loans (MGL) Program prior to start of construction.)

We, the Owner (Utility System) named, _____, having obtained a loan from the State of Alaska Clean/Drinking Water State Revolving Fund, to fund the Project named _____, and identified as Project # _____ hereby submit to the MGL Program, certification from each contractor working on the Project that the use of American Iron and Steel in the construction of the Project complies with the law, or that a waiver has been obtained from the U.S. Environmental Protection Agency.

Signature of Official

Printed name

Date

Attachment: Certification by Owner



STATE OF ALASKA
MUNICIPAL GRANTS & LOANS
ALASKA CLEAN/DRINKING WATER FUND
 USE OF AMERICAN IRON AND STEEL

CERTIFICATION BY BIDDER
 OF COMPLIANCE WITH THE
USE OF AMERICAN IRON AND STEEL LAW
 enacted on 1/17/2014

We, the bidding prime contractor and subcontractors, as named below, hereby certify that all the American iron and steel used in the Project named _____, also identified as Project Loan No _____ will comply with the Use of American Iron and Steel Law, or obtain the necessary waiver(s) from the U.S. Environmental Protection Agency.

Prime Contractor Name: _____

Signature of Official	Printed name	Date

<u>Subcontractor Name</u>	<u>Signature of Official</u>	<u>Date</u>



STATE OF ALASKA
MUNICIPAL GRANTS & LOANS
ALASKA CLEAN/DRINKING WATER FUND
USE OF AMERICAN IRON AND STEEL

Sample Step Manufacturer Certification

(Documentation must be provided on company letterhead)

Date

Company Name

Company Address

City, State Zip

Subject:

American Iron and Steel Step Manufacturer Certification for
Project Name _____

I, _____ (company representative), certify that the _____
(melting, bending, coating, galvanizing, cutting, etc.) process for _____
(manufacturing or fabricating) the following products and/or materials shipped or provided for
the project is in full compliance with the American Iron and Steel requirement as mandated in
EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

- 1. _____
- 2. _____
- 3. _____

Such process took place at the following location: _____(address)

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

Company representative

Signature

Date

00470 - AMERICAN IRON AND STEEL ACKNOWLEDGEMENT

**CONTRACTOR ACKNOWLEDGEMENT OF
AMERICAN IRON AND STEEL REQUIREMENT**

The Contractor acknowledges to and for the benefit of the City & Borough of Juneau (“Purchaser”) and the State of Alaska Department of Environmental Conservation (the “State”) that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as “American Iron and Steel;” that requires all of the iron and steel products used in the project to be produced in the United States (“American Iron and Steel Requirement”) including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney’s fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Contractor Signature

Date

Contractor Printe Name

Company Name

SECTION 00480 - DEBARMENT CERTIFICATION



EPA Project Control Number

United States Environmental Protection Agency
Washington, DC 20460

**Certification Regarding
Debarment, Suspension, and Other Responsibility Matters**

The prospective participant certifies to the best of its knowledge and belief that it and the principals:

- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- (b) Have not within a three year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction: violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- (c) Are not presently indicted for otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and
- (d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated or cause or default.

I understand that a false statement on this certification may be ground for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to \$10,000 or imprisonment for up to 5 years, or both.

Typed Name & Title of Authorized Representative

Signature of Authorized Representative Date

I am unable to certify to the above statements. My explanation is attached.

EPA Form 5700-49 (11-88)

SECTION 00500 - AGREEMENT

THIS AGREEMENT is between THE CITY AND BOROUGH OF JUNEAU (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR) OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

CONTRACTOR shall complete the WORK as specified or as indicated under the Bid Schedule of the OWNER's Bid Documents entitled **Contract No. BE17-033, CBJ Headworks Improvements.**

The WORK is generally described as follows:

Mendenhall Valley Wastewater Treatment Plant (MWWTP): The improvements to the headworks includes removal of one existing automatic screen and grinder system and one manual bar screen, the installation of two new perforated plate screens and screening washer/compactors including new electrical connections to the screens and compactors, dismantling and removing an oil/water separation tank, relocating an existing grit classifier clarifier and conveyor, and modifications to the piping in the influent pump station, painting of pipe, installation of gas alarms, and miscellaneous related WORK. Installation of the new screens will require construction sequencing to dismantle and replace existing 16-inch and 18-inch ductile iron pipe and new 24-inch process piping to make space for the new screens.

Juneau-Douglas Wastewater Treatment Plant (JDTP): The improvements to the headworks includes the installation of two new perforated plate automatic screens and screening washer/compactors including new electrical connections to the screens and compactors, construction of new concrete influent channels and piping to connect the new influent channels to existing piping, construction of a new building around the new channels and miscellaneous related WORK. Site grading includes the installation of two new catch basins, new storm drain lines, and asphalt restoration. Demolition includes the removal of the existing automatic screen and manual screen, removal of existing concrete steps, removal of a timber framed wall and soffit, and removal of electrical feeds to the existing screens. Construction sequencing will be required to maintain the existing headworks in operation while the new screens and channels are construction.

The WORK to be paid under this contract shall include the following: Total Bid as shown in Section 00310 - Bid Schedule.

ARTICLE 2. CONTRACT COMPLETION TIME.

The WORK shall be completed according to the following table:

<u>Work Description</u>	<u>Completion Date</u>
MWWTP	September 1, 2017
JDTP	November 1, 2017

ARTICLE 3. DATE OF AGREEMENT

The date of this Agreement will be the date of the last signature on page three of this section.

ARTICLE 4. LIQUIDATED DAMAGES.

OWNER and the CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the WORK is not completed within the time specified in Article 2 herein,

SECTION 00500 - AGREEMENT

plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual damages suffered by the OWNER if the WORK is not completed on time. Accordingly, instead of requiring any such proof, the OWNER and the CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) the CONTRACTOR shall pay the OWNER for each Day that expires after the completion time specified in Article 2 herein. The amount of liquidated damages specified below is agreed to be a reasonable estimate based on all facts known as of the date of this Agreement.

<u>Work Description</u>	<u>Completion Date</u>	<u>Liquidated Damages</u>
MWWTP	September 1, 2017	\$650
JDTP	November 1, 2017	\$650

ARTICLE 5. CONTRACT PRICE.

OWNER shall pay CONTRACTOR for completion of the WORK in accordance with the Contract Documents in the amount set forth in the Bid Schedule. The CONTRACTOR agrees to accept as full and complete payment for all WORK to be done in this contract for: **Contract No. BE17-033, CBJ Headworks Improvements**, those Lump Sum amounts as set forth in the Bid Schedule in the Contract Documents for this Project.

The total amount of this contract shall be _____ (\$ _____),
except as adjusted in accordance with the provisions of the Bid Documents.

ARTICLE 6. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the ENGINEER as provided in the General Conditions.

Progress payments will be paid in full in accordance with Article 14 of the General Conditions until ninety (90) percent of the Contract Price has been paid. The remaining ten (10) percent of the Contract Price may be retained, in accordance with applicable Alaska State Statutes, until final inspection, completion, and acceptance of the Project by the OWNER.

ARTICLE 7. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire Agreement between OWNER and CONTRACTOR concerning the WORK consist of this Agreement (pages 00500-1 to 00500-6, inclusive) and the following sections of the Contract Documents:

- Table of Contents (pages 00005-1 to 00005-3, inclusive)
- Notice Inviting Bids (pages 00030-1 to 00030-3, inclusive).
- Instructions to Bidders (pages 00100-1 to 00100-9, inclusive).
- Bid (pages 00300-1 to 00300-3, inclusive).
- Bid Schedule (pages 00310-1, inclusive).
- Bid Bond (page 00320-1, inclusive) or Bid Security.
- Subcontractor Report (pages 00360-1 to 00360-2, inclusive).
- DBE and EEO Documents (Section 00400 – Section 00480, inclusive)
- Performance Bond (pages 00610-1 to 00610-2, inclusive).

SECTION 00500 - AGREEMENT

- Payment Bond (pages 00620-1 to 00620-2, inclusive).
- Insurance Certificate(s).
- General Conditions (pages 00700-1 to 00700-47, inclusive).
- Supplementary General Conditions (pages 00800-1 to 00800-6, inclusive).
- Alaska Labor Standards, Reporting, and Prevailing Wage Determination (page 00830-1).
- Technical Specifications as listed in the Table of Contents.
- Standard Specifications for Civil Engineering Projects and Subdivision Improvements, with 14 errata.
- Drawings consisting of 61 sheets, as listed in the Table of Contents.
- Addenda numbers _____ to _____, inclusive.
- Change Orders which may be delivered or issued after the Date of the Agreement and which are not attached hereto.

There are no Contract Documents other than those listed in this Article 7. The Contract Documents may only be amended by Change Order as provided in Paragraph 3.3 of the General Conditions.

ARTICLE 8. MISCELLANEOUS.

Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

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

OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents. This Agreement shall be governed by the laws of the State of Alaska. Jurisdiction shall be in the State of Alaska, First Judicial District.

SECTION 00500 - AGREEMENT

IN WITNESS WHEREOF, OWNER and CONTRACTOR have caused this Agreement to be executed on the date listed below by OWNER.

OWNER:

CONTRACTOR:

City and Borough of Juneau

(Company Name)

(Signature)

(Signature)

By: Duncan Rorie Watt, City & Borough Manager
(Printed Name)

By: _____
(Printed Name, Authority or Title)

Date: _____

CONTRACTOR Signature Date: _____

OWNER's address for giving notices:

CONTRACTOR's address for giving notices:

155 South Seward Street

Juneau, Alaska 99801

907-586-0873 907-586-4530
(Telephone) (Fax)

(Telephone) (Fax)

(E-mail address)

Contractor License No. _____

SECTION 00500 - AGREEMENT

**CERTIFICATE
(if Corporation)**

STATE OF)
) SS:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Board of Directors of the
_____ a corporation existing under the laws of
the State of _____, held on _____, 20____, the following resolution
was duly passed and adopted:

“RESOLVED, that _____, as _____ President
of the Corporation, be and is hereby authorized to **execute the Agreement** with the CITY AND
BOROUGH OF JUNEAU and this corporation and that the execution thereof, attested by the
Secretary of the Corporation, and with the Corporate Seal affixed, shall be the official act and deed
of this Corporation.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the
corporation this _____ day of _____, 20_____.

Secretary

(SEAL)

SECTION 00500 - AGREEMENT

CERTIFICATE
(if Partnership)

STATE OF)
) SS:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Partners of the _____ a partnership existing under the laws of the State of _____, held on _____, 20____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of the Partnership, be and is hereby authorized to **execute the Agreement** with the CITY AND BOROUGH OF JUNEAU and this partnership and that the execution thereof, attested by the _____ shall be the official act and deed of this Partnership."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of _____, 20_____.

Secretary

(SEAL)

SECTION 00500 - AGREEMENT

**CERTIFICATE
(if Joint Venture)**

STATE OF)
) SS:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Principals of the
_____ a joint venture existing under the laws of the
State of _____, held on _____, 20____, the following resolution was duly passed and
adopted:

"RESOLVED, that _____, as _____ of the
Joint Venture, be and is hereby authorized to **execute the Agreement** with the CITY AND
BOROUGH OF JUNEAU and this joint venture and that the execution thereof, attested by the
_____ shall be the official act and deed of this Joint Venture."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of
_____, 20____.

Secretary

(SEAL)

END OF SECTION

SECTION 00610 - PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: That we _____
(Name of Contractor)

_____ a _____
(Corporation, Partnership, Individual)

hereinafter called "Principal" and _____
(Surety)

of _____, State of _____ hereinafter called the "Surety," are held and
firmly bound to the CITY AND BOROUGH of JUNEAU, ALASKA hereinafter called "OWNER,"
(Owner) (City and State)

for the penal sum of _____

_____ dollars (\$ _____) in lawful money of the
United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors,
administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered
into a certain contract with the OWNER, the effective date of which is (CBJ Contracts Office to fill in effective
date) _____, a copy of which is hereto attached and made a part hereof for the
construction of:

**CBJ Headworks Improvements
CBJ Contract No. BE17-033**

NOW, THEREFORE, if the Principal shall truly and faithfully perform its duties, all the undertakings,
covenants, terms, conditions, and agreements of said contract during the original term thereof, and any
extensions thereof, which may be granted by the OWNER, with or without notice to the Surety, and if it shall
satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the
OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and
repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this
obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no
change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed
thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and
it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the
contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the Principal shall abridge
the right of any beneficiary hereunder, whose claim may be unsatisfied.

SECTION 00610 - PERFORMANCE BOND

**CBJ Headworks Improvements
CBJ Contract No. BE17-033**

IN WITNESS WHEREOF, this instrument is issued in two (2) identical counterparts, each one of which shall be deemed an original.

CONTRACTOR:

By: _____
(Signature)

(Printed Name)

(Company Name)

(Mailing Address)

(City, State, Zip Code)

SURETY:

By: _____
(Signature of Attorney-in-Fact)

Date Issued: _____

(Printed Name)

(Company Name)

(Mailing Address)

(City, State, Zip Code)

(Affix SURETY'S SEAL)

NOTE: If CONTRACTOR is Partnership, all Partners must execute bond.

END OF SECTION

SECTION 00620 - PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: That we _____
(Name of Contractor)

_____ a _____
(Corporation, Partnership, Individual)

hereinafter called "Principal" and _____
(Surety)

of _____, State of _____ hereinafter called the "Surety," are held and
firmly bound to the CITY AND BOROUGH of JUNEAU, ALASKA hereinafter called "OWNER,"
(Owner) (City and State)

for the penal sum of _____

_____ dollars (\$ _____) in lawful money of the
United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors,
administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered
into a certain contract with the OWNER, the effective date of which is (CBJ Contracts Office to fill in effective
date) _____, a copy of which is hereto attached and made a part hereof for the
construction of:

**CBJ Headworks Improvements
CBJ Contract No. BE17-033**

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms,
Subcontractors, and corporations furnishing materials for, or performing labor in the prosecution of the WORK
provided for in such contract, and any authorized extension or modification thereof, including all amounts due
for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or
used in connection with the construction of such WORK, and all insurance premiums on said work, and for all
labor performed in such WORK, whether by Subcontractor or otherwise, then this obligation shall be void;
otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no
change, extension of time, alteration or addition to the terms of the contract or to the work to be performed
thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and
it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the
contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the Principal shall abridge
the right of any beneficiary hereunder, whose claim may be unsatisfied.

SECTION 00620 - PAYMENT BOND

**CBJ Headworks Improvements
CBJ Contract No. BE17-033**

IN WITNESS WHEREOF, this instrument is issued in two (2) identical counterparts, each one of which shall be deemed an original.

CONTRACTOR:

By: _____
(Signature)

(Printed Name)

(Company Name)

(Mailing Address)

(City, State, Zip Code)

SURETY:

By: _____
(Signature of Attorney-in-Fact)

Date Issued: _____

(Printed Name)

(Company Name)

(Mailing Address)

(City, State, Zip Code)

(Affix SURETY'S SEAL)

NOTE: If CONTRACTOR is Partnership, all Partners must execute bond.

END OF SECTION

SECTION 00700 - GENERAL CONDITIONS

TABLE OF CONTENTS
(Revised 03-2003)

ARTICLE 1 DEFINITIONS 00700-5

ARTICLE 2 PRELIMINARY MATTERS

2.1 Delivery of Bonds/Insurance Certificates 00700-8
2.2 Copies of Documents 00700-9
2.3 Commencement of Contract Time; Notice to Proceed 00700-9
2.4 Starting the WORK 00700-9
2.5 Pre-construction Conference 00700-9
2.6 Finalizing CONTRACTOR Submittals..... 00700-9

ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Intent 00700-9
3.2 Order of Precedence of Contract Documents 00700-10
3.3 Amending and Supplementing Contract Documents..... 00700-10
3.4 Reuse of Documents..... 00700-11

ARTICLE 4 AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

4.1 Availability of Lands 00700-11
4.2 Physical Conditions - Subsurface and Existing Structures 00700-11
4.3 Differing Site Conditions 00700-12
4.4 Physical Conditions - Underground Utilities 00700-12
4.5 Reference Points..... 00700-13
4.6 Use of the CBJ/State Lemon Creek Gravel Pit 00700-13

ARTICLE 5 BONDS AND INSURANCE

5.1 Performance, Payment and Other Bonds 00700-14
5.2 Insurance 00700-15

ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision and Superintendence..... 00700-17
6.2 Labor, Materials, and Equipment 00700-17
6.3 Adjusting Progress Schedule..... 00700-18
6.4 Substitutes or "Or Equal" Items..... 00700-19
6.5 Concerning Subcontractors, Suppliers and Others 00700-19
6.6 Permits..... 00700-19
6.7 Patent Fees and Royalties 00700-20
6.8 Laws and Regulations..... 00700-20

SECTION 00700 - GENERAL CONDITIONS

ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES (Cont'd.)

6.9 Taxes 00700-20
6.10 Use of Premises 00700-20
6.11 Safety and Protection..... 00700-21
6.12 Shop Drawings and Samples 00700-21
6.13 Continuing the WORK..... 00700-21
6.14 Indemnification 00700-21
6.15 Contractor's Daily Reports..... 00700-22
6.16 Assignment of Contract..... 00700-22
6.17 Contractor's Responsibility for Utility Property and Services 00700-23
6.18 Operating Water System Valves 00700-23
6.19 CONTRACTOR's WORK Schedule Limitations 00700-23

ARTICLE 7 OTHER WORK

7.1 Related WORK at Site 00700-23
7.2 Coordination..... 00700-24

ARTICLE 8 OWNER'S RESPONSIBILITIES

8.1 Communications..... 00700-24
8.2 Payments 00700-24
8.3 Lands, Easements, and Surveys..... 00700-24
8.4 Change Orders..... 00700-24
8.5 Inspections and Tests..... 00700-24
8.6 Suspension of WORK 00700-24
8.7 Termination of Agreement 00700-24

ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION

9.1 OWNER 's Representative 00700-25
9.2 Visits to Site 00700-25
9.3 Project Representation..... 00700-25
9.4 Clarifications and Interpretations..... 00700-27
9.5 Authorized Variations in WORK 00700-27
9.6 Rejecting Defective WORK 00700-27
9.7 CONTRACTOR Submittals, Change Orders, and Payments 00700-27
9.8 Decisions on Disputes 00700-28
9.9 Limitation on Engineer's Responsibilities 00700-28

ARTICLE 10 CHANGES IN THE WORK

10.1 General 00700-29
10.2 Allowable Quantity Variations 00700-29

SECTION 00700 - GENERAL CONDITIONS

ARTICLE 11 CHANGE OF CONTRACT PRICE

11.1 General 00700-30
11.2 Costs Relating to Weather 00700-30
11.3 Cost of WORK (Based on Time and Materials)..... 00700-31
11.4 CONTRACTOR's Fee..... 00700-33
11.5 Excluded Costs..... 00700-34

ARTICLE 12 CHANGE OF CONTRACT TIME

12.1 General 00700-35
12.2 Extensions of Time for Delay Due to Weather..... 00700-35

**ARTICLE 13 WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS;
CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

13.1 Warranty and Guarantee..... 00700-36
13.2 Access to WORK 00700-36
13.3 Tests and Inspections..... 00700-36
13.4 OWNER May Stop the WORK..... 00700-37
13.5 Correction or Removal of Defective WORK..... 00700-37
13.6 One Year Correction Period 00700-37
13.7 Acceptance of Defective WORK..... 00700-38

ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 Schedule of Values (Lump Sum Price Breakdown) 00700-38
14.2 Unit Price Bid Schedule 00700-38
14.3 Application for Progress Payment 00700-38
14.4 CONTRACTOR's Warranty of Title 00700-39
14.5 Review of Applications for Progress Payment 00700-39
14.6 Partial Utilization 00700-40
14.7 Substantial Completion 00700-40
14.8 Final Application for Payment..... 00700-40
14.9 Final Payment and Acceptance..... 00700-40
14.10 Release of Retainage and Other Deductions..... 00700-41
14.11 CONTRACTOR's Continuing Obligation..... 00700-41
14.12 Final Payment Terminates Liability of OWNER 00700-41

ARTICLE 15 SUSPENSION OF WORK AND TERMINATION

15.1 Suspension of WORK by OWNER..... 00700-42
15.2 Termination of Agreement by OWNER (CONTRACTOR Default)..... 00700-42
15.3 Termination of Agreement by OWNER (For Convenience) 00700-42
15.4 Termination of Agreement by CONTRACTOR..... 00700-42

SECTION 00700 - GENERAL CONDITIONS

ARTICLE 16 MISCELLANEOUS

16.1 Giving Notice 00700-43
16.2 Rights In and Use of Materials Found on the WORK 00700-43
16.3 Right to Audit..... 00700-44
16.4 Archaeological or Historical Discoveries 00700-44
16.5 Construction Over or Adjacent to Navigable Waters 00700-44
16.6 Gratuity and Conflict of Interest..... 00700-44
16.7 Suits of Law Concerning the WORK..... 00700-44
16.8 Certified Payrolls..... 00700-45
16.9 Prevailing Wage Rates 00700-45
16.10 Employment Reference 00700-45
16.11 Cost Reduction Incentive 00700-46

SECTION 00700 - GENERAL CONDITIONS

ARTICLE 1 DEFINITIONS

Wherever used in these General Conditions or in the Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof. Where an entire word is capitalized in the definitions and is found not capitalized in the Contract Documents it has the ordinary dictionary definition.

Addenda - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

Agreement - The written contract between the OWNER and the CONTRACTOR covering the WORK to be performed; other documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment - The form furnished by the ENGINEER which is to be used by the CONTRACTOR to request progress or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

Asbestos - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

Bid - The offer or proposal of the Bidder submitted on the prescribed form setting forth the price or prices for the WORK.

Bonds - Bid, Performance, and Payment Bonds and other instruments which protect against loss due to inability or refusal of the CONTRACTOR to perform its contract.

CBJ Project Manager - The authorized representative of the City and Borough of Juneau Engineering Department, as OWNER, who is responsible for administration of the contract.

Change Order - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the OWNER and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - The Table of Contents, Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Technical Specifications, Drawings, Permits, and all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents.

Contract Price - The total monies payable by the OWNER to the CONTRACTOR under the terms and conditions of the Contract Documents.

Contract Time - The number of successive calendar Days stated in the Contract Documents for the completion of the WORK.

CONTRACTOR - The individual, partnership, corporation, joint-venture or other legal entity with whom the OWNER has executed the Agreement.

Day - A calendar day of 24 hours measured from midnight to the next midnight.

SECTION 00700 - GENERAL CONDITIONS

Defective WORK - WORK that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or WORK that has been damaged prior to the ENGINEER's recommendation of final payment.

Drawings - The Drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have been prepared by the ENGINEER and are referred to in the Contract Documents. Shop Drawings are not within the meaning of this paragraph.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

Engineer of Record - The individual, partnership, corporation, joint-venture or other legal entity named as such in the Contract Documents.

ENGINEER - The ENGINEER is the firm or person(s) selected by the City and Borough of Juneau (CBJ) to perform the duties of project inspection and management. CBJ will inform the CONTRACTOR of the identity of the ENGINEER at or before the Notice to Proceed.

Field Order - A written order issued by the ENGINEER which may or may not involve a change in the WORK.

General Requirements - Division 1 of the Technical Specifications.

Hazardous Waste - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 9603) as amended from time to time.

Holidays - The CBJ legal holidays occur on:

1. New Year's Day - January 1
2. Martin Luther King's Birthday - Third Monday in January
3. President's Day - Third Monday in February
4. Seward's Day - Last Monday in March
5. Memorial Day - Last Monday in May
6. Independence Day - July 4
7. Labor Day - First Monday in September
8. Alaska Day - October 18
9. Veteran's Day - November 11
10. Thanksgiving Day - Fourth Thursday and the following Friday in November
11. Christmas Day - December 25

If any holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal holidays. If the holiday should fall on a Sunday, Sunday and the following Monday are both legal holidays.

Inspector - The authorized representative of the ENGINEER assigned to make detailed inspections for conformance to the Contract Documents. Any reference to the Resident Project Representative in this document shall mean the Inspector.

SECTION 00700 - GENERAL CONDITIONS

Laws and Regulations; Laws or Regulations - Any and all applicable laws, rules, regulations, ordinances, codes, and/or orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

Mechanic's Lien - A form of security, an interest in real property, which is held to secure the payment of an obligation. When referred to in these Contract Documents, "Mechanic's Lien" or "lien" means "Stop Notice".

Milestone - A principal event specified in the Contract Documents relating to an intermediate completion date of a portion of the WORK, or a period of time within which the portion of the WORK should be performed prior to Substantial Completion of all the WORK.

Notice of Award - The written notice by the OWNER to the apparent successful bidder stating that the apparent successful bidder has complied with all conditions for award of the contract.

Notice of Completion - A form signed by the ENGINEER and the CONTRACTOR recommending to the OWNER that the WORK is Substantially Complete and fixing the date of Substantial Completion. After acceptance of the WORK by the OWNER's governing body, the form is signed by the OWNER and filed with the County Recorder. This filing starts the 30-day lien filing period on the WORK.

Notice to Proceed - The written notice issued by the OWNER to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement of the Contract Time.

Notice of Intent to Award - The written notice by the OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the requirements listed therein, within the time specified, the OWNER will enter into an Agreement.

OWNER - The City and Borough of Juneau (CBJ), acting through its legally designated officials, officers, or employees.

Partial Utilization - Use by the OWNER or a substantially completed part of the WORK for the purpose for which it is intended prior to Substantial Completion of all the WORK.

PCB's - Polychlorinated biphenyls.

PERMITTEE – See definition for CONTRACTOR.

Petroleum - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

Project - The total construction of which the WORK to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

Radioactive Material - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

SECTION 00700 - GENERAL CONDITIONS

Shop Drawings - All Drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the CONTRACTOR and submitted by the CONTRACTOR, to the ENGINEER, to illustrate some portion of WORK.

Specifications - Same definition as "Technical Specifications" hereinafter.

Stop Notice - A legal remedy for Subcontractors and suppliers who contribute to public works, but who are not paid for their WORK, which secures payment from construction funds possessed by the OWNER. For public property, the Stop Notice remedy is designed to substitute for mechanic's lien rights.

Sub-Consultant - The individual, partnership, corporation, joint-venture or other legal entity having a direct contract with ENGINEER, or with any of its Consultants to furnish services with respect to the Project.

Subcontractor - An individual, partnership, corporation, joint-venture or other legal entity having a direct contract with the CONTRACTOR, or with any of its Subcontractors, for the performance of a part of the WORK at the site.

Substantial Completion - Refers to when the WORK has progressed to the point where, in the opinion of the ENGINEER as evidenced by Notice of Completion as applicable, it is sufficiently complete, in accordance with the Contract Documents, so that the WORK can be utilized for the purposes for which it is intended; or if no such notice is issued, when final payment is due in accordance with Paragraph 14.8. The terms "substantially complete" and "substantially completed" as applied to any WORK refer to substantial completion thereof.

Supplementary General Conditions (SGC) - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman, or vendor.

Technical Specifications - Divisions 1 through 16 of the Contract Documents consisting of the General Requirements and written technical descriptions of products and execution of the WORK.

Underground Utilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: water, sewage and drainage removal, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic, or other control systems.

WORK, Work - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. WORK is the result of performing, or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

ARTICLE 2 PRELIMINARY MATTERS

2.1 DELIVERY OF BONDS/INSURANCE CERTIFICATES. When the CONTRACTOR delivers the signed Agreements to the OWNER, the CONTRACTOR shall also deliver to the OWNER such Bonds and Insurance Policies and Certificates as the CONTRACTOR may be required to furnish in accordance with the Contract Documents.

SECTION 00700 - GENERAL CONDITIONS

- 2.2 COPIES OF DOCUMENTS. The OWNER shall furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Supplementary General Conditions.
- 2.3 COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED. The Contract Time will start to run on the commencement date stated in the Notice to Proceed.
- 2.4 STARTING THE WORK
- A. The CONTRACTOR shall begin to perform the WORK within 10 days after the commencement date stated in the Notice to Proceed, but no WORK shall be done at the site prior to said commencement date.
 - B. Before undertaking each part of the WORK, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. The CONTRACTOR shall promptly report in writing to the ENGINEER any conflict, error, or discrepancy which the CONTRACTOR may discover and shall obtain a written interpretation or clarification from the ENGINEER before proceeding with any WORK affected thereby.
 - C. The CONTRACTOR shall submit to the ENGINEER for review those documents called for under Section 01300 - CONTRACTOR Submittals in the General Requirements.
- 2.5 PRE-CONSTRUCTION CONFERENCE. The CONTRACTOR is required to attend a Pre-Construction Conference. This conference will be attended by the ENGINEER and others as appropriate in order to discuss the WORK in accordance with the applicable procedures specified in the General Requirements, Section 01010 - Summary of WORK in the General Requirements.
- 2.6 FINALIZING CONTRACTOR SUBMITTALS. At least 7 days before submittal of the first Application for Payment a conference attended by the CONTRACTOR, the ENGINEER and others as appropriate will be held to finalize the initial CONTRACTOR submittals in accordance with the General Requirements. As a minimum the CONTRACTOR's representatives should include the project manager and schedule expert. The CONTRACTOR should plan on this meeting taking no less than 8 hours. If the submittals are not finalized at the end of the meeting, additional meetings will be held so that the submittals can be finalized prior to the submittal of the first application for payment. No application for payment will be processed until CONTRACTOR submittals are finalized.

ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

- 3.1 INTENT
- A. The Contract Documents comprise the entire Agreement between the OWNER and the CONTRACTOR concerning the WORK. The Contract Documents shall be construed as a whole in accordance with Alaska Law.
 - B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any work, materials, or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials, or equipment such words or phrases shall be interpreted in

SECTION 00700 - GENERAL CONDITIONS

accordance with that meaning, unless a definition has been provided in Article 1 of the General Conditions. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, or the ENGINEER or any of their consultants, agents, or employees from those set forth in the Contract Documents.

- C. If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, the CONTRACTOR shall report it to the ENGINEER in writing at once, and the CONTRACTOR shall not proceed with the WORK affected thereby (except in an emergency as authorized by the ENGINEER) until a clarification field order, or Change Order to the Contract Documents has been issued.

3.2 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

- A. In resolving conflicts resulting from, errors, or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

1. Permits from other agencies as may be required by law, excepting the definition of "PERMITEE" in these permits.
2. Field Orders
3. Change Orders
4. ENGINEER's written interpretations and clarifications.
5. Agreement
6. Addenda
7. CONTRACTOR's Bid (Bid Form)
8. Supplementary General Conditions
9. Notice Inviting Bids
10. Instructions to Bidders
11. General Conditions
12. Technical Specifications
13. Drawings

- B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail Drawings govern over general Drawings
3. Addenda/ Change Order drawings govern over Contract Drawings
4. Contract Drawings govern over standard drawings

- 3.3 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS. The Contract Documents may be amended to provide for additions, deletions, and revisions in the WORK or to modify the terms and conditions thereof by a Change Order (pursuant to Article 10 CHANGES IN THE WORK).

SECTION 00700 - GENERAL CONDITIONS

- 3.4 REUSE OF DOCUMENTS. Neither the CONTRACTOR, nor any Subcontractor or Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent of the OWNER.

ARTICLE 4 AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

- 4.1 AVAILABILITY OF LANDS. The OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement, lease or other appropriate agreement has been executed by the CONTRACTOR and the property owner, and a copy of said agreement furnished to the ENGINEER prior to said use; and, neither the OWNER nor the ENGINEER shall be liable for any claims or damages resulting from the CONTRACTOR's unauthorized trespass or use of any such properties.
- 4.2 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES
- A. Explorations and Reports. Reference is made to SGC 4.2 Physical Conditions of the Supplementary General Conditions for identification of those reports of explorations and tests of sub-surface conditions at the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, however, reports are not to be considered complete or comprehensive and nontechnical data, interpretations, and opinions contained in such reports are not to be relied on by the CONTRACTOR. The CONTRACTOR is responsible for any further explorations or tests that may be necessary and any interpretation, interpolation, or extrapolation that it makes of any information shown in such reports.
- B. Existing Structures. Reference is made to SGC 4.2 Physical Conditions of the Supplementary General Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Utilities referred to in Paragraph 4.4 herein) which are at or contiguous to the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, however, nontechnical data, interpretations, and opinions contained in such drawings are not to be relied on by the CONTRACTOR. The CONTRACTOR is also responsible for any interpretation, interpolation, or extrapolation that it makes of any information shown in such drawings.

SECTION 00700 - GENERAL CONDITIONS

4.3 DIFFERING SITE CONDITIONS

- A. The CONTRACTOR shall promptly upon discovery (but in no event later than 14 days thereafter) and before the following conditions are disturbed, notify the ENGINEER, in writing of any:
1. Material that the CONTRACTOR believes may be material that is hazardous waste, as defined in Article 1 of these General Conditions, or asbestos, PCB's, petroleum or any other substance or material posing a threat to human or to the environment.
 2. Subsurface or latent physical conditions at the site differing from those indicated.
 3. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the contract.
- B. The OWNER shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR's cost of, or the time required for, performance of any part of the WORK shall issue a Change Order under the procedures described in the contract.
- C. In the event that a dispute arises between the OWNER and the CONTRACTOR whether the conditions materially differ, or involved hazardous waste or other materials listed above, or cause a decrease or increase in the CONTRACTOR's cost of, or time required for, performance of any part of the WORK, the CONTRACTOR shall not be excused from any scheduled completion date provided for by the contract, but shall proceed with all WORK to be performed under the contract. The CONTRACTOR shall retain any and all rights provided either by contract or by Law which pertain to the resolution of disputes and protests between the contracting parties.

4.4 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

- A. Indicated. The information and data indicated in the Contract Documents with respect to existing Underground Utilities at or contiguous to the site are based on information and data furnished to the OWNER or the ENGINEER by the owners of such Underground Utilities or by others. Unless it is expressly provided in the Supplementary General Conditions and/or Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements, the OWNER and the ENGINEER shall not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such Underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of which will be considered as having been included in the Contract Price.
- B. Not Indicated. If an Underground Utility is uncovered or revealed at or contiguous to the site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of such Underground Utility and give written notice thereof to that owner and shall notify the ENGINEER in accordance with the requirements of the Supplementary General Conditions and Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements.

SECTION 00700 - GENERAL CONDITIONS

4.5 REFERENCE POINTS

- A. The ENGINEER will provide one bench mark, near or on the site of the WORK, and will provide two points near or on the site to establish a base line for use by the CONTRACTOR for alignment control. Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.
- B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks, and in case of their removal or destruction by its own employees or by its Subcontractor's employees, the CONTRACTOR shall be responsible for the accurate replacement of such reference points by personnel qualified under the Alaska Statute governing the licensing of Architects, Engineers, and Land Surveyors.

4.6 USE OF THE CBJ/STATE LEMON CREEK GRAVEL PIT

- A. On City and Borough of Juneau (CBJ) construction projects, the CBJ may make unclassified material available to CONTRACTORS, from the CBJ/State Lemon Creek gravel pit, at a rate less than charged other customers. CONTRACTORS are not required to use material from the CBJ/State pit and the CBJ makes no guarantee as to the quantity or quality of the available material. For this Project, contact Alec Venechuk, CBJ Material Source Manager, at (907) 586-0874 for the current material rates.
- B. CONTRACTORS proposing to use gravel from the CBJ/State pit are required to be in good standing for all amounts owed to the CBJ, for previous gravel operations, prior to submitting a mining plan for approval. CONTRACTORS using the pit must comply with Allowable Use Permit USE 2008-00061. Failure to meet these requirements, if so subject, shall be sufficient reason to deny use of the CBJ/State pit as a gravel source. To determine if your company is subject to these requirements, contact the CBJ Engineering Department, Gravel Pit Management, at (907) 586-0874.
- C. CONTRACTORS deciding to use material from the CBJ/State pit shall provide an Individual Mining Plan prepared by a professional engineer registered in the State of Alaska. The Individual Mining Plan must be reviewed and approved by the CBJ, prior to commencing operations within the pit. CONTRACTORS shall also secure a Performance Bond to ensure compliance with contract provisions, including any Individual Mining Plan stipulations. The bond shall remain in full force and effect until a release is obtained from the CBJ.
- D. If CONTRACTOR operations for a project do not exceed 500 tons of material, the CONTRACTOR will not be required to provide an Individual Mining Plan prepared by an engineer. However, the CONTRACTOR must submit an Individual Mining Plan that is in compliance with Allowable Use Permit USE 2008-00061 for gravel extraction within the CBJ/State pit. The CONTRACTOR must contact the CBJ Engineering Department for conditions for the extraction.
- E. CONTRACTORS using the CBJ material may do primary dry separation (screening) of materials within the pit. Crushing and washing of material will not be allowed. CONTRACTORS shall account for placement of materials removed from the pit. The CBJ may require CONTRACTORS to cross-check weight tickets, submit to an audit, or participate

SECTION 00700 - GENERAL CONDITIONS

in other measures required by the CBJ to ensure accountability. Unprocessed overburden removed from the pit will not be weighed. All other material mined will be weighed at the CBJ scale. CONTRACTORS will be responsible for loading and/or screening their own material. If asphalt pavement is removed as part of the WORK, CONTRACTORS shall dispose of the material at a to-be-specified location within the pit area, as directed by the CBJ Project Manager.

- F. The gravel pit overhead charge shall be paid to the CBJ by the CONTRACTOR within 60 days after removal of all materials from the pit and prior to requesting and/or receiving final payment. Upon completion of each excavation CONTRACTORS shall notify the CBJ, in writing, in sufficient time to perform a field-compliance examination prior to vacating the pit. Any significant deviation from the stipulations of the Individual Mining Plan identified during the field inspection shall be corrected by the CONTRACTOR prior to release of the bond. A signed release from CBJ will be required prior to releasing the CONTRACTOR's bond.
- G. If asphalt pavement is removed as part of this WORK, the CONTRACTOR shall dispose of the material at the location designated as the Asphalt Storage Facility, or as directed by the ENGINEER.
- H. The CBJ/State pit is a seasonal operation. The hours of operation are from 7:00 a.m. to 6:00 p.m., Monday through Friday, from April 1 through October 15 of the year. CONTRACTORS may obtain gravel on weekends, or during the off-season, by applying for a separate agreement with the City and Borough of Juneau Engineering Department. The CONTRACTOR will be responsible for any additional costs incurred during weekend or off-season operations at the gravel pit.
- I. All Contractors/Equipment Operators using the CBJ/State Pit shall be in compliance with Federal Mine Safety and Health Administration regulations for quarry and gravel operations.

ARTICLE 5 BONDS AND INSURANCE

5.1 PERFORMANCE, PAYMENT, AND OTHER BONDS

- A. The CONTRACTOR shall furnish, when required, Performance and Payment Bonds on forms provided by the CBJ for the penal sums of 100% of the amount of the Bid award. The surety on each bond may be any corporation or partnership authorized to do business in the State of Alaska as an insurer under AS 21.09. These bonds shall remain in effect for 12 months after the date of final payment and until all obligations and liens under this contract have been satisfied. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.
- B. If the surety on any Bond furnished by the CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is

SECTION 00700 - GENERAL CONDITIONS

located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and Surety, which must be acceptable to the OWNER.

- C. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of Alaska to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions. The City Engineer may, on behalf of the OWNER, notify the surety of any potential default or liability.

5.2 INSURANCE

- A. The CONTRACTOR shall purchase and maintain the insurance required under this paragraph. Such insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Supplementary General Conditions, or required by law, whichever are greater. All insurance shall be maintained continuously during the life of the Agreement up to the date of Final Completion and at all times thereafter when the CONTRACTOR may be correcting, removing, or replacing Defective WORK in accordance with Paragraph 13.6, but the CONTRACTOR's liabilities under this Agreement shall not be deemed limited in any way to the insurance coverage required.
- B. All insurance required by the Contract Documents to be purchased and maintained by the CONTRACTOR shall be obtained from insurance companies that are duly licensed or authorized in the State of Alaska to issue insurance policies for the limits and coverages so required. Such insurance companies shall have a current Best's Rating of at least an "A" (Excellent) general policy holder's rating and a Class VII financial size category and shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.
- C. The CONTRACTOR shall furnish the OWNER with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, reduced in coverage, or renewal refused until at least 30 days' prior written notice has been given to the OWNER by certified mail. All such insurance required herein (except for Workers' Compensation and Employer's Liability) shall name the OWNER, its Consultants and subconsultants and their officers, directors, agents, and employees as "additional insureds" under the policies. The CONTRACTOR shall purchase and maintain the following insurance:
 - 1. Workers' Compensation and Employer's Liability. This insurance shall protect the CONTRACTOR against all claims under applicable state workers' compensation laws. The CONTRACTOR shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a Workers' Compensation law. This policy shall include an "all states" endorsement. The CONTRACTOR shall require each Subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in such WORK unless such employees are covered by the protection afforded by the CONTRACTOR's Workers' Compensation Insurance. In case any class of employees is not protected,

SECTION 00700 - GENERAL CONDITIONS

under the Workers' Compensation Statute, the CONTRACTOR shall provide and shall cause each Subcontractor to provide adequate employer's liability insurance for the protection of such of its employees as are not otherwise protected.

2. Commercial General Liability. This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims arising from injuries to persons other than its employees or damage to property of the OWNER or others arising out of any act or omission of the CONTRACTOR or its agents, employees, or Subcontractors. The policy shall contain no exclusions for any operations within the scope of this contract.
3. Comprehensive Automobile Liability. This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the site of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired. Coverage for hired motor vehicles should include endorsement covering liability assumed under this Agreement.
4. Subcontractor's Commercial General Liability Insurance and Commercial Automobile Liability Insurance. The CONTRACTOR shall either require each of its Subcontractors to procure and to maintain Subcontractor's Commercial General Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in the Supplementary General Conditions or insure the activities of its Subcontractors in the CONTRACTOR's own policy, in like amount.
5. Builder's Risk. This insurance shall be of the "all risks" type, shall be written in completed value form, and shall protect the CONTRACTOR, the OWNER, and the ENGINEER, against risks of damage to buildings, structures, and materials and equipment. The amount of such insurance shall be not less than the insurable value of the WORK at completion. Builder's risk insurance shall provide for losses to be payable to the CONTRACTOR and the OWNER, as their interests may appear. The policy shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the CONTRACTOR, the OWNER, and the ENGINEER. The Builder's Risk policy shall insure against all risks of direct physical loss or damage to property from any external cause including flood and earthquake. Allowable exclusions, if any, shall be as specified in the Supplementary General Conditions.

ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES

6.1 SUPERVISION AND SUPERINTENDENCE

- A. The CONTRACTOR shall supervise, inspect, and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.
- B. The CONTRACTOR shall designate in writing and keep on the WORK site at all times during its progress a technically qualified, English-speaking superintendent, who is an

SECTION 00700 - GENERAL CONDITIONS

employee of the CONTRACTOR and who shall not be replaced without written notice to the OWNER and the ENGINEER. The superintendent will be the CONTRACTOR's representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER and the ENGINEER only.

- C. The CONTRACTOR's superintendent shall be present at the site of the WORK at all times while WORK is in progress. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the site.

6.2 LABOR, MATERIALS, AND EQUIPMENT

- A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any temporary works as may be required. The CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the WORK or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all WORK at the site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday, or any legal holiday without the OWNER's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER.
- B. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.
- C. All costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The OWNER shall have the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.
- D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK.
- E. All materials and equipment to be incorporated into the WORK shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the OWNER. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All

SECTION 00700 - GENERAL CONDITIONS

materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the ENGINEER, or any of the ENGINEER consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraphs 9.9C and 9.9D.

- F. The CONTRACTOR shall at all times employ sufficient labor and equipment for prosecuting the several classes of WORK to full completion in the manner and time set forth in and required by these specifications. All workers shall have sufficient skill and experience to perform properly the WORK assigned to them. Workers engaged in special WORK, or skilled WORK, shall have sufficient experience in such WORK and in the operation of the equipment required to perform all WORK, properly and satisfactorily.
 - G. Any person employed by the CONTRACTOR or by any Subcontractor who, in the opinion of the ENGINEER, does not perform the WORK in a proper and skillful manner, or is intemperate or disorderly shall, at the written request of the ENGINEER, be removed forthwith by the CONTRACTOR or Subcontractor employing such person, and shall not be employed again in any portion of the WORK without the approval of the ENGINEER. Should the CONTRACTOR fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the WORK, the ENGINEER may suspend the WORK by written notice until such orders are complied with.
- 6.3 ADJUSTING PROGRESS SCHEDULE. The CONTRACTOR shall submit monthly updates of the progress schedule to the ENGINEER for acceptance in accordance with the provisions in Section 01300 - CONTRACTOR Submittals in the General Requirements.
- 6.4 SUBSTITUTES OR "OR-EQUAL" ITEMS. The CONTRACTOR shall submit proposed substitutes or "or-equal" items in accordance with the provisions in Section 01300 - CONTRACTOR Submittals in the General Requirements.
- 6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS.
- A. The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its Subcontractors and their employees to the same extent as CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this Paragraph shall create any contractual relationship between any Subcontractor and the OWNER or the ENGINEER nor relieve the CONTRACTOR of any liability or obligation under the prime contract.
 - B. The CONTRACTOR shall perform not less than 40% of the WORK with its own forces (i.e., without subcontracting). The 40% requirement shall be understood to mean that the CONTRACTOR shall perform, with its own organization, WORK amounting to at least 40% of the awarded contract amount. The 40% requirement will be calculated based upon the total of the subcontract amounts submitted for contract award, and any other information requested by the OWNER from the apparent low bidder.

SECTION 00700 - GENERAL CONDITIONS

6.6 PERMITS

- A. Unless otherwise provided in the Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all construction permits and licenses from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements under this contract shall not be made the basis for claims for additional compensation. The OWNER shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids. The CONTRACTOR shall pay all charges of utility owners for connections to the WORK.
- B. These Contract Documents may require that the WORK be performed within the conditions and/or requirements of local, state and/or federal permits. These permits may be bound within the Contract Documents, included within the Contract Documents by reference, or included as part of the WORK, as designated in this Section. The CONTRACTOR is responsible for completing the WORK required for compliance with all permit requirements; this WORK is incidental to other items in the Contract Documents. Any reference to the PERMITTEE in the permits shall mean the CONTRACTOR. If any permits were acquired by the OWNER, this action was done to expedite the start of construction. If the CONTRACTOR does not complete the WORK within the specified permit window, the CONTRACTOR shall be responsible for the permit extension, and for completing any additional requirements placed upon the permit.
- C. The OWNER shall apply for, and obtain, the necessary building permit for this Project, however, the CONTRACTOR is responsible for scheduling and coordinating all necessary inspections. The CBJ Inspection number is 586-1703. All other provisions of this Section remain in effect.

6.7 PATENT FEES AND ROYALTIES. The 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, software or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the OWNER or the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by the OWNER in the Contract Documents. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER and the ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees and court costs) arising out of 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, and shall defend all such claims in connection with any alleged infringement of such rights.

6.8 LAWS AND REGULATIONS. The CONTRACTOR shall observe and comply with all federal, state, and local laws, ordinances, codes, orders, and regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK. If any discrepancy or inconsistency should be discovered in this contract in relation to any such law, ordinance, code, order, or regulation, the CONTRACTOR shall report the same in writing to the ENGINEER. The CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, and their officers, agents, and employees against all claims or liability arising from

SECTION 00700 - GENERAL CONDITIONS

violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, Subcontractors, or third parties. Any particular law or regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations.

The OWNER may, per AS 36.30, audit the CONTRACTOR's or Subcontractor(s) records that are related to the cost or pricing data for this contract, all related Change Orders, and/or contract modifications.

6.9 TAXES. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the WORK.

6.10 USE OF PREMISES. The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to (1) the Project site, (2) the land and areas identified in and permitted by the Contract Documents, and (3) the other land and areas permitted by Laws and Regulations, rights-of-way, permits, leases and easements. The CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the OWNER or the ENGINEER by any such owner or occupant because of the performance of the WORK, the CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim through litigation. The CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, and hold the OWNER and the ENGINEER harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers attorneys, and other professionals and court costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner or occupant against the OWNER, the ENGINEER, their Consultants, Sub-consultants, and the officers, directors, employees and agents of each and any of them to the extent caused by or based upon the CONTRACTOR's performance of the WORK.

6.11 SAFETY AND PROTECTION

A. The CONTRACTOR shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all employees on the WORK and other persons and organizations who may be affected thereby;
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, and utilities not designated for removal, relocation, or replacement in the course of construction.

B. The CONTRACTOR shall comply with all applicable Laws and Regulations whether referred to herein or not) of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

SECTION 00700 - GENERAL CONDITIONS

- C. The CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and program.
- D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be requested by the CONTRACTOR from the manufacturer of any hazardous product used.
- E. Material usage shall be accomplished with strict adherence to all safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.
- F. The CONTRACTOR shall be responsible for coordinating communications on any exchange of Material Safety Data Sheets or other hazardous material information that is required to be made available to, or exchanged between, or among, employers at the site in accordance with Laws or Regulations.
- G. The CONTRACTOR shall notify the ENGINEER if it considers a specified product or its intended usage to be unsafe. This notification must be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.

6.12 SHOP DRAWINGS AND SAMPLES

- A. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the ENGINEER for review, all Shop Drawings in accordance with Section 01300 - CONTRACTOR Submittals in the General Requirements.
- B. The CONTRACTOR shall also submit to the ENGINEER for review all samples in accordance with Section 01300 - CONTRACTOR Submittals in the General Requirements.
- C. Before submittal of each shop drawing or sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the WORK and the Contract Documents.

6.13 CONTINUING THE WORK. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the OWNER may otherwise agree in writing.

6.14 INDEMNIFICATION

- A. To the fullest extent permitted by Laws and Regulations, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, their Consultants, Sub-consultants and the officers, directors, employees, and agents of each and any of them, against and from all claims and liability arising under, by reason of or incidentally to the contract or

SECTION 00700 - GENERAL CONDITIONS

any performance of the WORK, but not from the sole negligence or willful misconduct of the OWNER, and the ENGINEER. Such indemnification by the CONTRACTOR shall include but not be limited to the following:

1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its employees, or agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, agents, or third parties;
 2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's or Subcontractor's own employees engaged in the WORK resulting in actions brought by or on behalf of such employees against the OWNER, and the ENGINEER;
 3. Liability or claims arising directly or indirectly from or based on the violation of any law, ordinance, regulation, order, or decree, whether by the CONTRACTOR, its employees, or agents;
 4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its employees, or agents in the performance of this contract of any copyrighted or non-copyrighted composition, secret process, patented or non-patented invention, computer software, article, or appliance, unless otherwise specifically stipulated in this contract.
 5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the OWNER or any other parties by the CONTRACTOR, its employees, or agents;
 6. Liabilities or claims arising directly or indirectly from the willful or criminal misconduct of the CONTRACTOR, its employees, or agents; and,
 7. Liabilities or claims arising directly or indirectly from any breach of the obligations assumed herein by the CONTRACTOR.
- B. The CONTRACTOR shall reimburse the ENGINEER and the OWNER for all costs and expenses, (including but not limited to fees and charges of engineers, attorneys, and other professionals and court costs including all costs of appeals) incurred by said OWNER, and the ENGINEER in enforcing the provisions of this Paragraph 6.14.
- C. The indemnification obligation under this Paragraph 6.14 shall not be limited in any way by any limitation of the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any such Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- 6.15 **CONTRACTOR'S DAILY REPORTS.** The CONTRACTOR shall complete a daily report indicating total manpower for each construction trade, major equipment on site, each Subcontractor's manpower, weather conditions, etc., involved in the performance of the WORK. The daily report shall be completed on forms provided by the ENGINEER and shall be submitted to the ENGINEER at the conclusion of each workday. The report should comment on the daily progress and status of the WORK within each major component of the WORK. These components will be decided by the ENGINEER. CONTRACTOR shall record the name, affiliation, time of arrival and departure, and reason for visit for all visitors to the location of the WORK.
- 6.16 **ASSIGNMENT OF CONTRACT.** The CONTRACTOR shall not assign, sublet, sell, transfer, or otherwise dispose of the contract or any portion thereof, or its right, title, or interest therein, or

SECTION 00700 - GENERAL CONDITIONS

obligations thereunder, without the written consent of the OWNER except as imposed by law. If the CONTRACTOR violates this provision, the contract may be terminated at the option of the OWNER. In such event, the OWNER shall be relieved of all liability and obligations to the CONTRACTOR and to its assignee or transferee, growing out of such termination.

- 6.17 **CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES.** It is understood that any turn-on or turn-off, line locates and any other work or assistance necessary by the CBJ Water Utilities Division, will be at the CONTRACTOR's expense unless otherwise stated in the bid documents. All cost must be agreed to prior to any related actions, and will be considered incidental to the project cost. Billing to the CONTRACTOR will be direct from the CBJ Water Utilities Division.
- 6.18 **OPERATING WATER SYSTEM VALVES**
- A. The CONTRACTOR shall submit a written request, to the ENGINEER, for approval to operate any valve on any in-service section of the CBJ water system. The request must be submitted at least 24-hours prior to operating any valves. The CBJ Water Utilities Division reserves the right to approve or deny the request. The request shall specifically identify each valve to be operated, the time of operation, and the operation to be performed. The CONTRACTOR shall obtain the written approval of the ENGINEER for any scheduled operation before operating any valve.
 - B. The CONTRACTOR shall be responsible for all damages, both direct and consequential, to the City or any other party, caused by unauthorized operation of any valve of the CBJ water system.
- 6.19 **CONTRACTOR'S WORK SCHEDULE LIMITATIONS.** Construction of Buildings and Projects. It is unlawful to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or similar heavy construction equipment before 7:00 a.m. or after 10:00 p.m., Monday through Friday, or before 9:00 a.m. or after 10:00 p.m., Saturday and Sunday, unless a permit shall first be obtained from the City and Borough Building Official. Such permit shall be issued by the Building Official only upon a determination that such operation during hours not otherwise permitted hereunder is necessary and will not result in unreasonable disturbance to surrounding residents.

ARTICLE 7 OTHER WORK

- 7.1 **RELATED WORK AT SITE**
- A. The OWNER may perform other work related to the Project at the site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts therefor which may contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.
 - B. The CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (or the OWNER, if the OWNER is performing the additional work with the OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required

SECTION 00700 - GENERAL CONDITIONS

to make its several parts come together properly and integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.

- C. If the proper execution or results of any part of the CONTRACTOR's work depends upon the work of any such other contractor or utility owner (or OWNER), the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work except for latent or nonapparent defects and deficiencies in the other work.

- 7.2 COORDINATION. If the OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary General Conditions, and the specific matters to be covered by such authority and responsibility will be itemized and the extent of such authority and responsibilities will be provided in the Supplementary General Conditions.

ARTICLE 8 OWNER'S RESPONSIBILITIES

8.1 COMMUNICATIONS

- A. The OWNER shall issue all its communications to the CONTRACTOR through the ENGINEER.
- B. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER.

- 8.2 PAYMENTS. The OWNER shall make payments to the CONTRACTOR as provided in Paragraphs 14.5, 14.8, 14.9 and 14.10.

- 8.3 LANDS, EASEMENTS, AND SURVEYS. The OWNER's duties in respect of providing lands and easements and providing surveys to establish reference points are set forth in Paragraphs 4.1 and 4.5.

- 8.4 CHANGE ORDERS. The OWNER shall execute Change Orders as indicated in Paragraph 10.1F.

- 8.5 INSPECTIONS AND TESTS. The OWNER's responsibility in respect of inspections, tests, and approvals is set forth in Paragraph 13.3.

- 8.6 SUSPENSION OF WORK. In connection with the OWNER's right to stop WORK or suspend WORK, see Paragraphs 13.4 and 15.1.

- 8.7 TERMINATION OF AGREEMENT. Paragraphs 15.2 and 15.3 deal with the OWNER's right to terminate services of the CONTRACTOR.

SECTION 00700 - GENERAL CONDITIONS

ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION

- 9.1 OWNER'S REPRESENTATIVE. The ENGINEER will be the OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of the ENGINEER as the OWNER's representative during construction are set forth in the Contract Documents.
- 9.2 VISITS TO SITE. The ENGINEER will make visits to the site during construction to observe the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. Exhaustive or continuous on-site inspections to check the quality or quantity of the WORK will not be required of the ENGINEER. The ENGINEER will not, during such visits, or as a result of such observations of the CONTRACTOR's WORK in progress, supervise, direct, or have control over the CONTRACTOR's WORK.
- 9.3 PROJECT REPRESENTATION. The ENGINEER may furnish an Inspector to assist in observing the performance of the WORK. The duties, responsibilities, and limitations of authority are as follows:

A. Duties, Responsibilities and Limitations of Authority of Inspector

General. The Inspector, who is the ENGINEER's Agent, will act as directed by and under the supervision of the ENGINEER and will confer with the ENGINEER regarding its actions. The Inspector's dealings in matters pertaining to the on-site WORK shall, in general, be only with the ENGINEER and the CONTRACTOR, and dealings with Subcontractors shall only be through or with the full knowledge of the CONTRACTOR. Written communication with the OWNER will be only through or as directed by the ENGINEER.

Duties and Responsibilities. The Inspector may:

1. Review the progress schedule, list of Shop Drawing submittals and schedule of values prepared by the CONTRACTOR and consult with the ENGINEER concerning their acceptability.
2. Attend pre-construction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with the ENGINEER and notify those expected to attend in advance. Attend meetings and maintain and circulate copies of minutes thereof.
3. Serve as the ENGINEER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent and assist said superintendent in understanding the intent of the Contract Documents. Assist the ENGINEER in serving as the OWNER's liaison with the CONTRACTOR when the CONTRACTOR's operations affect the OWNER's on-site operations.
4. As requested by the ENGINEER, assist in obtaining from the OWNER additional details or information, when required at the site for proper execution of the WORK.
5. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by the CONTRACTOR and notify the ENGINEER of their availability for examination.
6. Conduct on-site observations of the WORK in progress to assist the ENGINEER in determining if the WORK is proceeding in accordance with the Contract Documents.
7. Report to the ENGINEER whenever the Inspector believes that any WORK is unsatisfactory, faulty, or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspection, tests or approval required to be made or has been damaged prior to final payment; and advise the ENGINEER when the

SECTION 00700 - GENERAL CONDITIONS

Inspector believes WORK should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection, or approval.

8. Verify that the tests, equipment, and systems startups and operating and maintenance instruction are conducted as required by the Contract Documents and in presence of the required personnel, and that the CONTRACTOR maintains adequate records thereof; observe, record and report to the ENGINEER appropriate details relative to the test procedures and start-ups.
9. Accompany visiting inspectors representing public or other agencies having jurisdiction over the WORK, record the outcome of these inspections, and report to the ENGINEER.
10. Transmit to the CONTRACTOR the ENGINEER's clarifications and interpretations of the Contract Documents.
11. Consider and evaluate the CONTRACTOR's suggestions for modifications in the Contract Documents and report them with recommendations to the ENGINEER.
12. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and sample submittals, reproductions of original Contract Documents including all addenda, Change Orders, field orders, additional Drawings issued subsequent to the execution of the contract, the ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other related documents.
13. Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list all project visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of performing and observing test procedures. Send copies to the ENGINEER.
14. Record names, addresses, and telephone numbers of the CONTRACTOR, Subcontractors, and major suppliers of materials and equipment.
15. Furnish the ENGINEER with periodic reports as required of progress of the WORK and the CONTRACTOR's compliance with the accepted progress schedule and schedule of CONTRACTOR submittals.
16. Consult with the ENGINEER in advance of scheduled major tests, inspections, or start of important phases of the WORK.
17. Report immediately to the ENGINEER upon the occurrence of any accident.
18. Review applications for payment with the CONTRACTOR for compliance with the established procedure for their submittal and forward them with recommendations to the ENGINEER, noting particularly their relation to the schedule of values, WORK completed, and materials and equipment delivered at the site but not incorporated in the WORK.
19. During the course of the WORK, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by the CONTRACTOR are applicable to the items actually installed; and deliver this material to the ENGINEER for its review and forwarding to the OWNER prior to final acceptance of the WORK.
20. Before the ENGINEER prepares a Certificate of Substantial Completion/Notice of Completion, as applicable, review the CONTRACTOR's punch list items requiring completion or correction and add any items that CONTRACTOR has omitted.
21. Conduct final inspection in the company of the ENGINEER, the OWNER, and the CONTRACTOR, and prepare a final punch list of items to be completed or corrected.
22. Verify that all items on the punch list have been completed or corrected and make recommendations to the ENGINEER concerning acceptance.

SECTION 00700 - GENERAL CONDITIONS

Limitations of Authority. Except upon written instruction of the ENGINEER, the Inspector:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute material or equipment.
2. Shall not exceed limitations on the ENGINEER's authority as set forth in the Contract Documents.
3. Shall not undertake any of the responsibilities of the CONTRACTOR, Subcontractors or CONTRACTOR's superintendent, or expedite the WORK.
4. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences, or procedures of construction unless such is specifically called for in the Contract Documents.
5. Shall not advise on or issue directions as to safety precautions and programs in connection with the WORK.

9.4 CLARIFICATIONS AND INTERPRETATIONS. The ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the ENGINEER may determine necessary, which shall be consistent with, or reasonably inferred from, the overall intent of the Contract Documents.

9.5 AUTHORIZED VARIATIONS IN WORK. The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the contract completion date. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

9.6 REJECTING DEFECTIVE WORK. The ENGINEER will have authority to reject WORK which the ENGINEER believes to be defective and will also have authority to require special inspection or testing of the WORK as provided in Paragraph 13.3G, whether or not the WORK is fabricated, installed, or completed.

9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

- A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals, including Shop Drawings, samples, substitutes, or "or equal" items, etc., in order to determine if the items covered by the submittals will, after installation or incorporation in the WORK, conform to 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. The ENGINEER's review will not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto.
- B. In connection with the ENGINEER's responsibilities as to Change Orders, see Articles 10, 11, and 12.
- C. In connection with the ENGINEER's responsibilities in respect of Applications for Payment, see Article 14.

SECTION 00700 - GENERAL CONDITIONS

9.8 DECISIONS ON DISPUTES

- A. The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the WORK thereunder. Claims, disputes, and other matters relating to the acceptability of the WORK; the interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK; and those claims under Articles 11 and 12 in respect to changes in the Contract Price or Contract Time will be referred initially to the ENGINEER in writing with a request for formal decision in accordance with this paragraph, which the ENGINEER will render in writing within 30 days of receipt of the request. Written notice of each such claim, dispute, and other matter will be delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise thereto. Written supporting data will be submitted to the ENGINEER within 60 days after such occurrence unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.
- B. The rendering of a decision by the ENGINEER with respect to any such claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in Paragraph 14.12) will be a condition precedent to any exercise by the OWNER or the CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Law or Regulations in respect of any such claim, dispute, or other matter.

9.9 LIMITATION ON ENGINEER'S RESPONSIBILITIES

- A. Neither the ENGINEER's authority to act under this Article or other provisions of the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety for any of them, or any other person or organization performing any of the WORK.
- B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9C or 9.9D.
- C. The ENGINEER will not supervise, direct, control, or have authority over or be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the CONTRACTOR to comply with Laws and Regulations, applicable to the performance of the WORK. The ENGINEER will not be responsible for the CONTRACTOR's failure to perform the WORK in accordance with the Contract Documents.

SECTION 00700 - GENERAL CONDITIONS

- D. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, supplier, or any other person or organization performing any of the WORK.

ARTICLE 10 CHANGES IN THE WORK

10.1 GENERAL

- A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK; these will be authorized by a written Field Order and/or a Change Order issued by the ENGINEER.
- B. If the CONTRACTOR believes that it is entitled to an increase or decrease in the Contract Price, or an extension or shortening in the Contract Time as the result of a Field Order, a claim may be made as provided in Articles 11 and 12.
- C. If the OWNER and CONTRACTOR agree on the value of any work, or the amount of Contract Time that should be allowed as a result of a Field Order, upon receiving written notice from the ENGINEER, the CONTRACTOR shall proceed so as to minimize the impact on and delays to the work pending the issuance of a Change Order.
- D. If the OWNER and the CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Field Order, the ENGINEER can direct the CONTRACTOR to proceed on the basis of Time and Materials so as to minimize the impact on and delays to WORK, and a claim may be made therefor as provided in Articles 11 and 12.
- E. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified, supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work as provided in Paragraph 13.3G.
- F. The OWNER and the CONTRACTOR shall execute appropriate Change Orders covering:
 - 1. changes in the WORK which are ordered by the OWNER pursuant to Paragraph 10.1A;
 - 2. changes required because of acceptance of Defective WORK under Paragraph 13.7;
 - 3. changes in the Contract Price or Contract Time which are agreed to by the parties; or
 - 4. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by the ENGINEER pursuant to Paragraph 9.8.
- G. If notice of any change is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be the CONTRACTOR's responsibility, and the amount of each applicable Bond shall be adjusted accordingly.

10.2 ALLOWABLE QUANTITY VARIATIONS

- A. In the event of an increase or decrease in Bid item quantity of a unit price contract, the total amount of WORK actually done or materials or equipment furnished shall be paid for

SECTION 00700 - GENERAL CONDITIONS

according to the unit price established for such WORK under the Contract Documents, wherever such unit price has been established; provided, that an adjustment in the Contract Price may be made for changes which result in an increase or decrease in excess of 25% of the estimated quantity of any major item of the WORK. Major Item is defined as any bid item amount that is ten percent (10%) or more of the total contract amount.

- B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover such eliminated work, the price of the eliminated work shall be agreed upon in writing by the OWNER and the CONTRACTOR. If the OWNER and the CONTRACTOR fail to agree upon the price of the eliminated work, said price shall be determined in accordance with the provisions of Article 11.

ARTICLE 11 CHANGE OF CONTRACT PRICE

11.1 GENERAL

- A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.
- B. The Contract Price may only be changed by a Change Order. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 7 days) after the start of the occurrence or the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within 14 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by the ENGINEER in accordance with Paragraph 9.8A if the OWNER and the CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.1B.
- C. The value of any WORK covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:
 - 1. Where the WORK involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.
 - 2. By mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.4.
 - 3. On the basis of the cost of WORK (determined as provided in Paragraphs 11.3) plus a CONTRACTOR's fee for overhead and profit (determined as provided in Paragraph 11.4).

- 11.2 COSTS RELATING TO WEATHER. The CONTRACTOR shall have no claims against the OWNER for damages for any injury to WORK, materials, or equipment, resulting from the action of the elements. If, however, in the opinion of the ENGINEER, the CONTRACTOR has made all reasonable efforts to protect the materials, equipment and work, the CONTRACTOR may be granted a reasonable

SECTION 00700 - GENERAL CONDITIONS

extension of Contract Time to make proper repairs, renewals, and replacements of the work, materials, or equipment.

11.3 COST OF WORK (BASED ON TIME AND MATERIALS)

- A. General. The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project; shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.5 EXCLUDED COSTS.
- B. Labor. The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, worker's compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. Labor costs for equipment operators and helpers shall be paid only when such costs are not included in the invoice for equipment rental. The labor costs for forepersons shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. Non-direct labor costs including superintendence shall be considered part of the mark-up set out in paragraph 11.4.
- C. Materials. The cost of materials reported shall be at invoice or lowest current price at which materials are locally available and delivered to the job in the quantities involved, plus the cost of freight, delivery and storage, subject to the following:
1. Trade discounts available to the purchaser shall be credited to the OWNER notwithstanding the fact that such discounts may not have been taken by the CONTRACTOR.
 2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Mark-up except for actual costs incurred in the handling of such materials will not be allowed.
 3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the work site, whichever price is lower.
 4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the work site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim shall be allowed by the CONTRACTOR for costs and profit on such materials.
- D. Equipment. The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the Supplementary General Conditions. Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment shall be the rate

SECTION 00700 - GENERAL CONDITIONS

resulting in the least total cost to the OWNER for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the publication specified in the Supplementary General Conditions, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate.

1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used.
 2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number.
 3. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.
 4. Individual pieces of equipment or tools having a replacement value of \$200 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.
 5. Rental time will not be allowed while equipment is inoperative due to breakdowns.
 6. Equipment Rental Rates. Unless otherwise agreed in writing, the CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current edition of the following reference publication: "Rental Rate Blue Book" as published by Dataquest (a company of the Dunn and Bradstreet Corporation), 1290 Ridder Park Drive, San Jose, CA 95131, telephone number (800) 227-8444.
- E. Equipment on the Work Site. The rental time to be paid for equipment on the work site shall be the time the equipment is in productive operation on the extra work being performed and, in addition, shall include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the site of the extra work on other than the extra work. The following shall be used in computing the rental time of equipment on the work site.
1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be 1/2-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation.
 2. When daily rates are listed, any part of a day less than 4 hours operation shall be considered to be 1/2-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraphs (3), (4), and (5), following.
 3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.3D, herein.
 4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already

SECTION 00700 - GENERAL CONDITIONS

on the work site, or in the absence of such labor, established by collective bargaining agreements for the type of worker and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Paragraph 11.3B, herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages.

5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.4, herein.
- F. Specialty Work. Specialty work is defined as that work characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry. The following shall apply in making estimates for payment for specialty work:
1. Any bid item of WORK to be classified as Specialty Work shall be listed as such in the Supplementary General Conditions. Specialty work shall be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for specialty work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs.
 2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as specialty work and accordingly, the invoices for the work may be accepted without detailed itemization.
 3. All invoices for specialty work will be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit specified in Paragraph 11.4, herein, an allowance of 5 percent will be added to invoices for specialty work.
- G. Sureties. All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference thereto as under the original Agreement. Copies of all amendments to surety bonds or supplemental surety bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

11.4 CONTRACTOR'S FEE

- A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. The allowance for overhead and profit shall include full compensation for superintendence, bond and insurance premiums, taxes, field office expense, extended overhead, home office overhead, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraph 11.3. The allowance for overhead and profit will be made in accordance with the following schedule:

SECTION 00700 - GENERAL CONDITIONS

Actual Overhead and Profit Allowance

Labor.....	15 percent
Materials	10 percent
Equipment.....	10 percent

To the sum of the costs and mark-ups provided for in this Article, one percent shall be added as compensation for bonding.

- B. It is understood that labor, materials, and equipment may be furnished by the CONTRACTOR or by the Subcontractor on behalf of the CONTRACTOR. When all or any part of the extra work is performed by a Subcontractor, the allowance specified herein shall be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractor's total cost for the extra work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent increase above the Subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only.

11.5 EXCLUDED COSTS. The term "Cost of the Work" shall not include any of the following:

- A. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, estimators, attorneys' auditors, accountants, purchasing and contracting agents, expenditures, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the work, or not specifically covered by paragraph 11.3, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.
- B. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.
- C. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments.
- D. Cost of premiums for all bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by paragraph 11.4 above).
- E. 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.
- F. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in paragraph 11.4.

SECTION 00700 - GENERAL CONDITIONS

ARTICLE 12 CHANGE OF CONTRACT TIME

12.1 GENERAL

- A. The Contract Time may only be changed by a Change Order. Any claim for an extension of the Contract Time (or Milestones) shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 60 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by the ENGINEER in accordance with Paragraph 9.8 if the OWNER and the CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this Paragraph 12.1A. An increase in Contract Time does not mean that the Contractor is due an increase in Contract Price. Only compensable time extensions will result in an increase in Contract Price.
- B. All time limits stated in the Contract Documents are of the essence of the Agreement.
- C. Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the project due to such delay if a claim is made therefor as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, unprecedented weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.
- D. Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost on the critical path of the project due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall the OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

- 12.2 EXTENSIONS OF TIME FOR DELAY DUE TO WEATHER. Contract Time may be extended by the ENGINEER because of delays in completion of the WORK due to unusually severe weather, provided that the CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing of the cause of delay and request an extension of Contract Time. The ENGINEER will ascertain the facts and the extent of the delay and extend the time for completing the

SECTION 00700 - GENERAL CONDITIONS

work when, in the ENGINEER's judgment, the findings of fact justify such an extension. Unprecedented, abnormal, or unusually severe weather will be defined as an event, or events, with a greater than 50-year recurrence interval, as determined by the National Weather Service, or equivalent State or Federal agency

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

- 13.1 **WARRANTY AND GUARANTEE.** The CONTRACTOR warrants and guarantees to the OWNER and the ENGINEER that all work will be in accordance with the Contract Documents and will not be defective. Prompt notice of defects known to the OWNER or ENGINEER shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13.
- 13.2 **ACCESS TO WORK.** OWNER, ENGINEER, their Consultants, sub-consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the WORK at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.
- 13.3 **TESTS AND INSPECTIONS**
- A. The CONTRACTOR shall give the ENGINEER timely notice of readiness of the WORK for all required inspections, tests, or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. If Laws or Regulations of any public body having jurisdiction other than the OWNER require any WORK to specifically be inspected, tested, or approved, the CONTRACTOR shall pay all costs in connection therewith. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the OWNER's or the ENGINEER's acceptance of a Supplier of materials or equipment proposed as a substitution or (or-equal) to be incorporated in the WORK, or of materials or equipment submitted for review prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. The cost of all inspections, tests, and approvals in addition to the above which are required by the Contract Documents shall be paid by the OWNER (unless otherwise specified).
- C. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. Unless otherwise specified in the Supplementary General Conditions, the cost of such inspection and testing will be borne by the OWNER. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent reinspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

SECTION 00700 - GENERAL CONDITIONS

- D. All inspections, tests, or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to the ENGINEER and the CONTRACTOR.
 - E. If any WORK (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER timely notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.
 - F. If any WORK is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.
 - G. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, material, and equipment. If it is found that such WORK is defective, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to fees and charges of engineers, attorneys, and other professionals. However, if such WORK is not found to be defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.
- 13.4 OWNER MAY STOP THE WORK. If the WORK is defective, or the CONTRACTOR fails to perform work in such a way that the completed WORK will conform to the Contract Documents, the OWNER may order the CONTRACTOR to stop the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the OWNER to stop the WORK shall not give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.
- 13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK. If required by the ENGINEER, the CONTRACTOR shall promptly, either correct all defective work, whether or not fabricated, installed, or completed, or, if the WORK has been rejected by the ENGINEER, remove it from the site and replace it with non-defective work. The CONTRACTOR shall bear all direct, indirect and consequential costs and damages of such correction or removal, including but not limited to fees and charges of engineers, attorneys, and other professionals made necessary thereby.
- 13.6 ONE YEAR CORRECTION PERIOD
- A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, the CONTRACTOR shall promptly, without cost to the OWNER and in accordance with OWNER's written notification, (i) correct such Defective

SECTION 00700 - GENERAL CONDITIONS

WORK, or, if it has been rejected by the OWNER, remove it from the site and replace it with non-defective work, and (ii) satisfactorily correct or remove and replace any damage to other work of others resulting therefrom. If the CONTRACTOR does not promptly comply with such notification, or in an emergency where delay would cause serious risk of loss or damage, the OWNER may have the Defective WORK corrected or the rejected WORK removed and replaced, and all direct, indirect, and consequential costs and damages of such removal and replacement including but not limited to fees and charges of engineers, attorneys and other professionals will be paid by the CONTRACTOR.

- B. Where Defective WORK (and damage to other WORK resulting therefrom) has been corrected, removed or replaced under this paragraph 13.6, 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.

- 13.7 ACCEPTANCE OF DEFECTIVE WORK. If, instead of requiring correction or removal and replacement of defective work, the OWNER prefers to accept the WORK, the OWNER may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of and determination to accept such defective work. If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION

- 14.1 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN). The schedule of values or lump sum price breakdown established as provided in the General Requirements shall serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the ENGINEER.

- 14.2 UNIT PRICE BID SCHEDULE. Progress payments on account of Unit Price work will be based on the number of units completed.

14.3 APPLICATION FOR PROGRESS PAYMENT

- A. Unless otherwise prescribed by law, on the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review, an Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
- B. The Application for Payment shall identify, as a sub-total, the amount of the CONTRACTOR'S Total Earnings to Date, plus the Value of Materials Stored at the Site which have not yet been incorporated in the WORK, and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions for payment for Materials Stored at the Site, but not yet incorporated in the WORK.
- C. The Net Payment Due the CONTRACTOR shall be the above-mentioned subtotal from which shall be deducted the total amount of all previous payments made to the CONTRACTOR. Progress payments will be paid in full in accordance with Article 14 of the General

SECTION 00700 - GENERAL CONDITIONS

Conditions until 90% of the Contract Price has been paid. The remaining 10% of the Contract Price amount may be withheld until:

1. final inspection has been made;
2. completion of the Project; and
3. acceptance of the Project by the OWNER.

D. The Value of Materials Stored at the Site shall be an amount equal to the specified percent of the value of such materials as set forth in the Supplementary General Conditions. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the site or at another location agreed to in writing; provided, each such individual item has a value of more than \$5,000.00 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by an invoice (including shipping), a certification that the materials meet the applicable contract specifications, and any evidence required by the OWNER that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER. Payment for materials will not constitute final acceptance. It shall be the CONTRACTOR's responsibility to protect the material from damage, theft, loss, or peril while in storage. Unless otherwise prescribed by law, the Value of Materials Stored at the Site shall be paid at the invoice amount up to a maximum of 85% of the Contract Price for those items.

14.4 CONTRACTOR'S WARRANTY OF TITLE. The CONTRACTOR warrants and guarantees that title to all work, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the OWNER no later than the time of payment free and clear of all liens.

14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to the OWNER, or return the Application to the CONTRACTOR indicating in writing the ENGINEER's reasons for refusing to recommend payment. In the later case, the CONTRACTOR may make the necessary corrections and resubmit the Application. If the ENGINEER still disagrees with a portion of the Application, it will submit the Application recommending the undisputed portion of the Application to the OWNER for payment and provide reasons for recommending non-payment of the disputed amount. Thirty days after presentation of the Application for Payment with the ENGINEER's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.5B) become due and when due will be paid by the OWNER to the CONTRACTOR.

B. The OWNER may refuse to make payment of the full amount recommended by the ENGINEER because claims have been made against the OWNER on account of the CONTRACTOR's performance of the WORK or Liens have been filed in connection with the WORK or there are other items entitling the OWNER to a credit against the amount recommended, but the OWNER must give the CONTRACTOR written notice within 7 days (with a copy to the ENGINEER) stating the reasons for such action.

SECTION 00700 - GENERAL CONDITIONS

14.6 PARTIAL UTILIZATION

- A. The OWNER shall have the right to utilize or place into service any item of equipment or other usable portion of the WORK prior to completion of the WORK. Whenever the OWNER plans to exercise said right, the CONTRACTOR will be notified in writing by the OWNER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.
- B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of partial utilization, the OWNER will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.
- C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER and the CONTRACTOR's one year correction period shall commence only after the date of Substantial Completion for the WORK.

14.7 SUBSTANTIAL COMPLETION. When the CONTRACTOR considers the WORK ready for its intended use the CONTRACTOR shall notify the OWNER and the ENGINEER in writing that the WORK is substantially complete. The CONTRACTOR will attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Completion. Within a reasonable time thereafter, the OWNER, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER does not consider the WORK substantially complete, or the list of remaining work items to be comprehensive, the ENGINEER will notify the CONTRACTOR in writing giving the reasons therefor. If the ENGINEER considers the WORK substantially complete, the ENGINEER will prepare and deliver to the OWNER, for its execution and recording, the Notice of Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of Substantial Completion.

14.8 FINAL APPLICATION FOR PAYMENT. After the CONTRACTOR has completed all of the remaining work items referred to in Paragraph 14.7 and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, record as-built documents (as provided in the General Requirements) and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the OWNER) of all liens arising out of or filed in connection with the WORK.

14.9 FINAL PAYMENT AND ACCEPTANCE

- A. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will, within 14 days after receipt of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the Application to the OWNER for payment.

SECTION 00700 - GENERAL CONDITIONS

- B. After acceptance of the WORK by the OWNER's governing body, the OWNER will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, including the following items:
1. Liquidated damages, as applicable.
 2. Two times the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the OWNER within the time stated on the Notice of Completion, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the OWNER to cover the value of all such uncompleted or uncorrected items.

14.10 RELEASE OF RETAINAGE AND OTHER DEDUCTIONS

- A. After executing the necessary documents to initiate the lien period, and not more than 45 days thereafter (based on a 30-day lien filing period and 15-day processing time), the OWNER will release to the CONTRACTOR the retainage funds withheld pursuant to the Agreement, less any deductions to cover pending claims against the OWNER pursuant to Paragraph 14.5B.
- B. After filing of the necessary documents to initiate the lien period, the CONTRACTOR shall have 30 days to complete any outstanding items of correction work remaining to be completed or corrected as listed on a final punch list made a part of the Notice of Completion. Upon expiration of the 45 days, referred to in Paragraph 14.10A, the amounts withheld pursuant to the provisions of Paragraph 14.9B herein, for all remaining work items will be returned to the CONTRACTOR; provided, that said work has been completed or corrected to the satisfaction of the OWNER within said 30 days. Otherwise, the CONTRACTOR does hereby waive any and all claims for all monies withheld by the OWNER under the Contract to cover 2 times the value of such remaining uncompleted or uncorrected items.

14.11 CONTRACTOR'S CONTINUING OBLIGATION. The CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the ENGINEER, nor the issuance of a Notice of Completion, nor any payment by the OWNER to the CONTRACTOR under the Contract Documents, nor any use or occupancy of the WORK or any part thereof by the OWNER, nor any act of acceptance by the OWNER nor any failure to do so, nor any review of a Shop Drawing or sample submittal, will constitute an acceptance of work not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

14.12 FINAL PAYMENT TERMINATES LIABILITY OF OWNER. Final payment is defined as the last progress payment made to the CONTRACTOR for earned funds, less monies withheld as applicable, pursuant to Paragraph 14.10A. The acceptance by the CONTRACTOR of the final payment referred to in Paragraph 14.9 herein, shall be a release of the OWNER and its agents from all claims of liability to the CONTRACTOR for anything done or furnished for, or relating to, the WORK or for any act of neglect of the OWNER or of any person relating to or affecting the WORK, except demands against the OWNER for the remainder, if any, of the amounts kept or retained under the provisions of Paragraph 14.9 herein; and excepting pending, unresolved claims filed prior to the date of the Notice of Completion.

SECTION 00700 - GENERAL CONDITIONS

ARTICLE 15 SUSPENSION OF WORK AND TERMINATION

- 15.1 SUSPENSION OF WORK BY OWNER. The OWNER, acting through the ENGINEER, may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt from the ENGINEER of a notice of resumption of work. The CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.
- 15.2 TERMINATION OF AGREEMENT BY OWNER (CONTRACTOR DEFAULT)
- A. In the event of default by the CONTRACTOR, the OWNER may give 10 days written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default. It shall be considered a default by the CONTRACTOR whenever CONTRACTOR shall: (1) declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors; (2) fail to provide materials or quality of work meeting the requirements of the Contract Documents; (3) disregard or violate provisions of the Contract Documents or ENGINEER's instructions; (4) fail to prosecute the WORK according to the approved progress schedule; or, (5) fail to provide a qualified superintendent, competent workers, or materials or equipment meeting the requirements of the Contract Documents. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the OWNER may then issue the Notice of Termination.
- B. In the event the Agreement is terminated in accordance with Paragraph 15.2A, herein, the OWNER may take possession of the WORK and may complete the WORK by whatever method or means the OWNER may select. The cost of completing the WORK shall be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the OWNER. If such cost is less than the balance which would have been due, the CONTRACTOR shall not have claim to the difference.
- 15.3 TERMINATION OF AGREEMENT BY OWNER (FOR CONVENIENCE). The OWNER may terminate the Agreement at any time if it is found that reasons beyond the control of either the OWNER or CONTRACTOR make it impossible or against the OWNER's interests to complete the WORK. In such a case, the CONTRACTOR shall have no claims against the OWNER except: (1) for the value of work performed up to the date the Agreement is terminated; and, (2) for the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Agreement is terminated which would be needed in the WORK and which meet the requirements of the Contract Documents. The value of work performed and the cost of materials and equipment delivered to the site, as mentioned above, shall be determined by the ENGINEER in accordance with the procedure prescribed for the making of the final application for payment and payment under Paragraphs 14.8 and 14.9.
- 15.4 TERMINATION OF AGREEMENT BY CONTRACTOR. The CONTRACTOR may terminate the Agreement upon 10 days written notice to the OWNER, whenever: 1) the WORK has been suspended under the provisions of Paragraph 15.1, herein, for more than 90 consecutive days through no fault or

SECTION 00700 - GENERAL CONDITIONS

negligence of the CONTRACTOR, and notice to resume work or to terminate the Agreement has not been received from the OWNER within this time period; or, 2) the OWNER should fail to pay the CONTRACTOR any monies due him in accordance with the terms of the Contract Documents and within 60 days after presentation to the OWNER by the CONTRACTOR of a request therefor, unless within said 10-day period the OWNER shall have remedied the condition upon which the payment delay was based. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Paragraph 15.3, herein, and as determined in accordance with the requirements of said paragraph.

ARTICLE 16 MISCELLANEOUS

- 16.1 GIVING NOTICE. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.
- 16.2 RIGHTS IN AND USE OF MATERIALS FOUND ON THE WORK
- A. The CONTRACTOR may use on the Project, with ENGINEER's approval, such stone, gravel, sand, or other material determined suitable by the ENGINEER, as may be found in the excavation. The CONTRACTOR will be paid for the excavation of such material at the corresponding contract unit price. No additional payment will be made for utilizing the material from excavation as borrow, or select borrow.
 - B. The CONTRACTOR shall replace, at its own expense, with other acceptable material, all of that portion of the excavated material so removed and used which was needed for use on the project. No charge for the materials so used will be made against the CONTRACTOR except that the CONTRACTOR shall be responsible for payment of any royalties required.
 - C. The CONTRACTOR shall not excavate or remove any material from within the Project location which is not within the grading limits, as indicated by the slope and grade lines, without written authorization from the ENGINEER.
 - D. In the event the CONTRACTOR has processed materials from OWNER-furnished sources in excess of the quantities required for performance of this contract, including any waste material produced as a by-product, the CBJ may retain possession of such materials without obligation to reimburse the CONTRACTOR for the cost of their production. When such materials are in a stockpile, the ENGINEER may require: That it remain in stockpile; the CONTRACTOR level such stockpile(s); or that the CONTRACTOR remove such materials and restore the premises to a satisfactory condition at the CONTRACTOR's expense. This provision shall not preclude the CBJ from arranging with the CONTRACTOR to produce material over and above the contract needs, payment for which shall be by written agreement between the CBJ and the CONTRACTOR.
 - E. Unless otherwise provided, the material from any existing old structure may be used temporarily by the CONTRACTOR in the erection of the new structure. Such material shall not be cut or otherwise damaged except with the approval of the ENGINEER.

SECTION 00700 - GENERAL CONDITIONS

- 16.3 **RIGHT TO AUDIT.** If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books to the extent they are relevant. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plants, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon Subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.
- 16.4 **ARCHEOLOGICAL OR HISTORICAL DISCOVERIES.** When the CONTRACTOR's operation encounters prehistoric artifacts, burials, remains of dwelling sites, paleontological remains, such as shell heaps, land or sea mammal bones or tusks, or other items of historical significance, the CONTRACTOR shall cease operations immediately and notify the ENGINEER. No artifacts or specimens shall be further disturbed or removed from the ground and no further operations shall be performed at the site until so directed. Should the ENGINEER order suspension of the CONTRACTOR's operations in order to protect an archaeological or historical finding, or order the CONTRACTOR to perform extra work, such order(s) shall be covered by an appropriate contract change document.
- 16.5 **CONSTRUCTION OVER OR ADJACENT TO NAVIGABLE WATERS.** All work over, on, or adjacent to navigable waters shall be so conducted that free navigation of the waterways will not be interfered with and the existing navigable depths will not be impaired, except as allowed by permit issued the U.S. Coast Guard and/or the U.S. Army Corps of Engineers, as applicable.
- 16.6 **GRATUITY AND CONFLICT OF INTEREST.** The CONTRACTOR agrees to not extend any loan, gratuity or gift of money of any form whatsoever to any employee or elected official of the OWNER, nor will the CONTRACTOR rent or purchase any equipment or materials from any employee or elected official of the OWNER, or to the best of the CONTRACTOR's knowledge, from any agent of any employee or elected official of the OWNER. Before final payment, the CONTRACTOR shall execute and furnish the OWNER an affidavit certifying that the CONTRACTOR has complied with the above provisions of the contract.
- 16.7 **SUITS OF LAW CONCERNING THE WORK**
- A. Should a suit of law be entered into, either by the CONTRACTOR (or the CONTRACTOR's surety) against the OWNER, or by the OWNER against the CONTRACTOR (or the CONTRACTOR's surety), the suit of law shall be tried in the First Judicial District of Alaska.
 - B. If one of the questions at issue is the satisfactory performance of the work by the CONTRACTOR and should the appropriate court of law judge the work of the CONTRACTOR to be unsatisfactory, then the CONTRACTOR (or the CONTRACTOR's surety) shall reimburse the OWNER for all legal and all other expenses (as may be allowed and set by the court) incurred by the OWNER because of the suit of the law and, further, it is

SECTION 00700 - GENERAL CONDITIONS

agreed that the OWNER may deduct such expense from any sum or sums then, or any that become due the CONTRACTOR under the contract.

16.8 CERTIFIED PAYROLLS

- A. All CONTRACTORs or Subcontractor who perform work on a public construction contract for the OWNER shall file a certified payroll with the Alaska Department of Labor before Friday of each week that covers the preceding week (Section 14-2-4 ACLA 1949; am Section 4 ch 142 SLA 1972).
- B. In lieu of submitting the State payroll form, the CONTRACTOR's standard payroll form may be submitted, provided it contains the information required by AS 36.05.040 and a statement that the CONTRACTOR is complying with AS 36.10.010.
- C. A contractor or subcontractor, who performs work on public construction in the State, as defined by AS 36.95.010(3), shall pay not less than the current prevailing rate of wages as issued by the Alaska Department of Labor before the end of the pay period. (AS 36.05.010).

16.9 PREVAILING WAGE RATES

- A. Wage rates for Laborers and Mechanics on Public Contracts, AS 36.05.070. The CONTRACTOR, or Subcontractors, shall pay all employees unconditionally and not less than once a week. Wages may not be less than those stated in Paragraph 16.8C, regardless of the contractual relationship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors. The scale of wages to be paid shall be posted by the CONTRACTOR in a prominent, easily accessible place at the site of the WORK.
- B. Failure to Pay Agreed Wages, AS 36.05.080. If it is found that a laborer, mechanic, or field surveyor employed by the CONTRACTOR or Subcontractor has been, or is being, paid a rate or wages less than the established rate, the OWNER may, by written notice, terminate the CONTRACTOR or Subcontractors right to proceed with the work. The OWNER may prosecute the work to completion by contract or otherwise, and the CONTRACTOR and sureties will be held liable to the OWNER for excess costs for completing the WORK. (Section 2 ch 52 SLA 1959).
- C. Listing Contractor's Who Violate Contracts, AS 36.05.090. In addition, a list giving the names of persons who have disregarded the rights of their employees shall be distributed to all departments of State government and all political subdivisions. No person appearing on this list, and no firm, corporation, partnership or association in which the person has an interest, may work as a CONTRACTOR or Subcontractor on a public construction contract for the State, or a political subdivision of the state, until three years after the date of publication of the list. (Section 3 ch 52 SLA 1959; am Section 9 ch 142 SLA).

16.10 EMPLOYMENT REFERENCE. Workers employed in the execution of the contract by the CONTRACTOR or by any Subcontractor under this contract shall not be required or permitted to labor more than 8 hours a day or 40 hours per week in violation of the provisions of the Alaska Wage and Hour Act, Section 23.10.060.

SECTION 00700 - GENERAL CONDITIONS

16.11 COST REDUCTION INCENTIVE

- A. At any time within 45 days after the date of the Notice of Award, the CONTRACTOR may submit to the ENGINEER in writing, proposals for modifying the plans, specifications, or other requirements of this contract for the sole purpose of reducing the total cost of construction. The cost reduction proposal shall not impair in any manner the essential functions or characteristics of the project, including but not limited to, service life, economy of operation, ease of maintenance, desired appearance or design and safety standards.
- B. The cost reduction proposal shall contain the following information:
1. Description of both the existing contract requirements for performing the WORK and the proposed changes.
 2. An itemization of the contract requirements that must be changed if the proposal is adopted.
 3. A detailed estimate of the time required and the cost of performing the WORK under both the existing contract and the proposed change.
 4. A statement of the date by which the CONTRACTOR must receive the decision from the OWNER on the cost reduction proposal.
 5. The contract items of WORK effected by the proposed changes including any quantity variations.
 6. A description and estimate of costs the OWNER may incur in implementing the proposed changes, such as test and evaluation and operating and support costs.
 7. A prediction of any effects the proposed change would have on future operations and maintenance costs to the OWNER.
- C. The provisions of this section shall not be construed to require the OWNER to consider any cost reduction proposal which may be submitted; nor will the OWNER be liable to the CONTRACTOR for failure to accept or act upon any cost reduction proposal submitted, or for delays to the work attributable to the consideration or implementation of any such proposal.
- D. If a cost reduction proposal is similar to a change in the plans or specifications for the project under consideration by the OWNER at the time the proposal is submitted, the OWNER will not accept such proposal and reserves the right to make such changes without compensation to the CONTRACTOR under the provisions of this section.
- E. The CONTRACTOR shall continue to perform the work in accordance with the requirements of the contract until an executed Change Order incorporating the cost reduction proposal has been issued. If any executed Change Order has not been issued by the date upon which the CONTRACTOR's cost reduction proposal specifies that a decision should be made by the OWNER, in writing, the cost reduction proposal shall be considered rejected.
- F. The OWNER, shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in Contract Time and construction costs resulting from the adoption of all or any part of such proposal. Should the CONTRACTOR disagree with OWNER's decision on the cost reduction proposal, there is no further consideration. The OWNER reserves the right to make final determination.

SECTION 00700 - GENERAL CONDITIONS

- G. If the CONTRACTOR's cost reduction proposal is accepted in whole or in part, such acceptance will be made by a contract Change Order, which specifically states that the change is executed pursuant to this cost reduction proposal section. Such Change Order shall incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect and shall include any conditions upon which the OWNER's approval is based, if such approval is conditional. The Change Order shall also describe the estimated net savings in the cost of performing the work attributable to the cost reduction proposal, and shall further provide that the contract cost be adjusted by crediting the OWNER with the estimated net savings amount.
- H. Acceptance of the cost reduction proposal and performance of the work does not extend the time of completion of the contract, unless specifically provided in the Change Order authorizing the use of the submitted proposal. Should the adoption of the cost reduction proposal result in a Contract Time savings, the total Contract Time shall be reduced by an amount equal to the time savings realized.
- I. The amount specified to the CONTRACTOR in the Change Order accepted in the cost reduction proposal shall constitute full compensation for the performance of WORK. No claims for additional costs as a result of the changes specified in the cost reduction proposal shall be allowed.
- J. The OWNER reserves the right to adopt and utilize any approved cost reduction proposal for general use on any contract administered when it is determined suitable for such application. Cost reduction proposals identical, similar, or previously submitted will not be accepted for consideration if acceptance and compensation has previously been approved. The OWNER reserves the right to use all or part of any cost reduction proposal without obligation or compensation of any kind to the CONTRACTOR.
- K. The CONTRACTOR shall bear the costs, if any, to revise all bonds and insurance requirements for the project, to include the cost reduction WORK.

END OF SECTION

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

GENERAL. These Supplementary General Conditions make additions, deletions, or revisions to the General Conditions as indicated herein. All provisions which are not so added, deleted, or revised remain in full force and effect. Terms used in these Supplementary General Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

SGC 1 DEFINITIONS. *Remove* the definition for Contract Documents and *replace* with the following:

Contract Documents – The Table of Contents, Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Subcontractor Report, Bid Bond, and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination, Special Provisions, Standard Specifications, Technical Specifications, Drawings, Permits, and all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents.

SGC 2.2 COPIES OF DOCUMENTS. *Add* the following:

The OWNER shall furnish to the CONTRACTOR up to ten (10) copies of the Contract Documents which will include bound reduced Drawings and full size drawings. The CBJ Contracts Office shall contact the CONTRACTOR after issuance of Notice of Intent to Award to determine how many copies are needed. Additional quantities of the Contract Documents will be furnished at reproduction cost.

SGC 3.2 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS. *Remove* No. 12. Technical Specifications and No. 13. Drawings, and *add* the following:

12. Special Provisions Section
13. Standard Specifications for Civil Engineering Projects and Subdivision Improvements
December 2003 Edition with current Errata Sheets.
14. Drawings.

SGC 4.2 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES. *Add* the following:

- C. In the preparation of the Contract Documents, the Engineer of Record has relied upon field measurements and visual inspection of the existing structures and surface conditions.

SGC - 4.6 USE OF THE CBJ/STATE LEMON CREEK GRAVEL PIT. *Add* the following.

The CBJ/State Lemon Creek Gravel Pit is not available for this Project.

SGC 5.1 PERFORMANCE, PAYMENT, AND OTHER BONDS. The Contractor shall furnish Performance and Payment Bonds in the amount of 100% of the Bid.

SGC 5.2 INSURANCE AMOUNTS. The limits of liability for the insurance required by Paragraph 5.2 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations. All certificates of insurance supplied to the OWNER shall state that the OWNER is named as “**Additional Insured for any and all work performed for the City & Borough of Juneau.**” The Additional Insured requirement does not apply to Workers Compensation insurance. NOTE: This requirement has changed. The OWNER no longer requires certificates of insurance referencing project names and contract numbers.

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

Delete paragraph C and *Replace* with the following paragraph C:

- C. The CONTRACTOR shall furnish the OWNER with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Failure of CBJ to demand such certificate or other evidence of full compliance with these insurance requirements or failure of CBJ to identify a deficiency from evidence that is provided shall not be construed as a waiver of the obligation of the Contractor to maintain the insurance required by this contract. The coverage afforded will not be cancelled, reduced in coverage, or renewal refused until at least 30 days' prior written notice has been given to the OWNER by the CONTRACTOR. **All such insurance required herein (except for Workers' Compensation and Employer's Liability) shall name the OWNER, its Consultants and subconsultants and their officers, directors, agents, and employees as "additional insureds" under the policies.**

The CONTRACTOR shall purchase and maintain the following insurance:

- 1. Workers' Compensation and Employer's Liability. This insurance shall protect the CONTRACTOR against all claims under applicable state workers' compensation laws. The CONTRACTOR shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a Workers' Compensation law. The CONTRACTOR shall require each Subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the CONTRACTOR's Workers' Compensation Insurance. In case any class of employees is not protected, under the Workers' Compensation Statute, the CONTRACTOR shall provide and shall cause each subcontractor to provide adequate employer's liability insurance for the protection of such of its employees as are not otherwise protected.

Workers' Compensation: (under Paragraph 5.2C.1 of the General Conditions) as in accordance with AS 23.30.045:

- a. State: Statutory
- b. Applicable Federal (e.g., Longshore): Statutory

Note: If the WORK called for in the Contract Documents involves work in or on any navigable waters, the CONTRACTOR shall provide Workers' Compensation coverage which shall include coverage under the Longshore and Harbor Workers' Compensation Act, the Jones Act, and any other coverage required under Federal or State laws pertaining to workers in or on navigable waters.

- a. Employers Liability

Bodily Injury by Accident:	\$100,000.00	Each Accident
Bodily Injury by Disease:	\$100,000.00	Each Employee
Bodily Injury by Disease:	\$500,000.00	Policy Limit

- 1. CONTRACTOR agrees to waive all rights of subrogation against the OWNER for WORK performed under contract.
- 2. If CONTRACTOR directly utilizes labor outside of the State of Alaska in the prosecution of the WORK, "Other States" endorsement shall be required as a condition of the contract.

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

- 2. Commercial General Liability (CGL), including products and completed operations, property damage, bodily injury and personal and advertising injury, with limits no less than \$1,000,000 each occurrence and \$2,000,000 aggregate. (under Paragraph 5.2C.2 of the General Conditions):
- 3. Commercial Automobile Liability: (under Paragraph 5.2C.3 of the General Conditions) including Owned, Hired, and Non-Owned Vehicles:

Combined Single Limit, Bodily Injury and Property Damage \$1,000,000.00

The CONTRACTOR shall require each Subcontractor similarly to provide Commercial Automobile Liability Insurance for all of the latter's employees to be engaged in such WORK unless such employees are covered by the protection afforded by the CONTRACTOR's Commercial Automobile Liability Insurance.

Add the following paragraphs:

- C. BUILDERS RISK is not required for this project.
- D. All Subcontractors are required to secure and maintain the insurance coverages listed above, unless otherwise noted.
- E. If the CONTRACTOR maintains higher limits than the minimums shown above, the OWNER requires and shall be entitled to coverage for the higher limits maintained by the CONTRACTOR. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the OWNER.
- F. Policies shall also specify insurance provided by CONTRACTOR will be considered primary and not contributory to any other insurance available to the OWNER.
- G. Should any of the policies described above be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

SGC 6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS. Add the following:

The CONTRACTOR shall perform not less than 40% of the WORK with its own forces (i.e., without subcontracting). The 40% requirement shall be understood to mean that the CONTRACTOR shall perform, with its own organization, WORK amounting to at least 40% of the original contract amount. The 40% requirement will be calculated based upon the total of the subcontract amounts submitted for Contract Award, and any other information requested by the OWNER from the apparent low Bidder.

SGC 6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS, Add the following paragraph:

- C. CONTRACTOR must pay Subcontractors and/or Suppliers within 30 days of receiving payment from the OWNER, if that payment was made for Work performed by the Subcontractor and/or materials received. Failure to pay Subcontractors within 30 days of receiving payment from which Subcontractor and/or Supplier is to be paid may result in the OWNER initiating debarment proceedings as prescribed

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

in the City and Borough of Juneau Purchasing Code. *The 30 day City and Borough of Juneau requirement does not supersede AS 36.90.210.*

SGC 6.6 PERMITS, *Add* the following paragraph:

- D. Contractor is responsible for obtaining a Hot Works permit from the CBJ Permit Center, if performing work which requires such a permit. Work requiring a Hot Works Permit includes but is not limited to the following: cutting, welding, Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems or any other similar activity.

SGC 14.3 APPLICATION FOR PROGRESS PAYMENT. Paragraph D.

- D. The Value of Materials Stored at the site shall be an amount equal to 85%.

SGC 14.9 FINAL PAYMENT AND ACCEPTANCE. *Add* the following paragraph:

- C. Prior to the final payment the CONTRACTOR shall contact the Alaska Department of Labor and Workforce Development (ADOL) and provide the OWNER with clearance from the ADOL for the CONTRACTOR and all Subcontractors that have worked on the Project. This clearance shall indicate that all Employment Security Taxes have been paid. A sample form for this purpose is at the end of this section. The CONTRACTOR shall also submit a "NOTICE OF COMPLETION OF PUBLIC WORKS" signed by ADOL.

SGC 16.8 CERTIFIED PAYROLLS. *Change* paragraph A. to read:

- A. All CONTRACTORS or Subcontractors who perform work on a public construction contract for the OWNER shall file a certified payroll with Alaska Department of Labor. See Section 00830 - Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination.

Add the following SGC 16.12.

SGC 16.12 EQUAL EMPLOYMENT OPPORTUNITY (EEO)

The CONTRACTOR may not discriminate against any employee or applicant for employment because of race, religion, color, national origin, age, disability, sex, marital status, changes in marital status, pregnancy or parenthood. The CONTRACTOR shall post a notice setting out the provisions of this paragraph in a conspicuous place available to employees and applicants for employment.

The CONTRACTOR and each Subcontractor shall state in all solicitations and advertisements for employees to work on this Project, that it is an Equal Opportunity Employer and that all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, age, disability, sex, marital status, changes in marital status, pregnancy or parenthood.

The CONTRACTOR shall include the provisions of this EEO article in every contract relating to this Project and shall require the inclusion of these provisions in every agreement entered into for this Project, so that those provisions will be binding upon the CONTRACTOR and each Subcontractor.

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

Add the following SGC 17:

SGC 17 GENERAL INFORMATION. This Project is currently funded by the City and Borough of Juneau, Alaska and State of Alaska Department of Environmental Conservation Loan.

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

Employment Security Tax Clearance

Date: _____

To: Alaska Department of Labor
Juneau Field Tax Office
PH 907-465-2787
FAX 907-465-2374

From: _____

**Subject: CBJ Headworks Improvements
Contract No. BE17-033**

Timeframe of Contract _____

Please advise whether or not clearance is granted for the following CONTRACTOR or Subcontractor:
(List only one CONTRACTOR or Subcontractor per page.)

Name Address

Per AS 23.20.265 of the Alaska Employment Security Act, this request is for tax liability clearance and release to make final payment for WORK performed under the subject contract. Please send your response to:

Greg Smith, Contract Administrator
Engineering Department
155 S. Seward Street
Juneau, Alaska 99801
FAX 907-586-4530

- () Tax Clearance is granted.
- () Tax Clearance is NOT granted.

Remarks: _____

Signature

Date

Title

END OF SECTION

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

State of Alaska, Department of Labor, Laborers' and Mechanics' Minimum Rates of Pay, AS 36.05.010 and AS 36.05.050, Wage and Hour Administration Pamphlet No. 600, the latest edition published by the State of Alaska, Department of Labor inclusive, are made a part of this contract by reference.

The CONTRACTOR is responsible for contacting the Alaska Department of Labor to determine compliance with current regulations.

Correspondence regarding Title 36 requirements may be submitted electronically or paper copies can be submitted by mail. To submit Title 36 documents electronically, go to <https://myalaska.state.ak.us/home/app>. If filing electronically, submit certified payrolls to ADOL at the website above and email a copy of all certified payrolls to Greg Smith at the email address below. If Contractor elects to submit paper copies, they should be submitted to the physical addresses below.

Within 10 Days of "Notice of Award/Notice to Proceed" make a list of **all** Subcontractors. Include their name, address, phone, estimated subcontract amount, and estimated start and finish dates. Send this list to the Wage and Hour Section (contact information below).

Certified Payrolls must be submitted every two weeks. Before the second Friday, each CONTRACTOR and Subcontractor must file Certified Payrolls with Statements of Compliance for the previous two weeks. Indicate "**Start**" on your first payroll, and "**Final**" on your last payroll for this Project.

As part of the **final payment request package**, CONTRACTOR must submit a "NOTICE OF COMPLETION OF PUBLIC WORKS" form signed by ADOL personnel.

Contact Information:

Wage and Hour Section
State of Alaska
Department of Labor and Workforce Development
Labor Standards and Safety Division and
Wage and Hour Administration
P.O. Box 11149
Juneau, AK 99811-1149
907-465-4842
<http://labor.state.ak.us/lss/home.htm>

Greg Smith, Contract Administrator
City and Borough of Juneau
155 S. Seward Street
Juneau, AK 99801
(907) 586-0873
Greg.Smith@juneau.org

END OF SECTION

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

Wage Rate Requirements Under The Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6)

Preamble

With respect to the Clean Water and Safe Drinking Water State Revolving Funds, EPA provides capitalization grants to each State which in turn provides subgrants or loans to eligible entities within the State. Typically, the subrecipients are municipal or other local governmental entities that manage the funds. For these types of recipients, the provisions set forth under Roman Numeral I, below, shall apply. Although EPA and the State remain responsible for ensuring subrecipients' compliance with the wage rate requirements set forth herein, those subrecipients shall have the primary responsibility to maintain payroll records as described in Section 3(ii)(A), below and for compliance as described in Section I-5.

Occasionally, the subrecipient may be a private for profit or not for profit entity. For these types of recipients, the provisions set forth in Roman Numeral II, below, shall apply. Although EPA and the State remain responsible for ensuring subrecipients' compliance with the wage rate requirements set forth herein, those subrecipients shall have the primary responsibility to maintain payroll records as described in Section II-3(ii)(A), below and for compliance as described in Section II-5.

I. Requirements Under The Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6) For Subrecipients That Are Governmental Entities:

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the FY 2013 Continuing Resolution with respect to State recipients and subrecipients that are governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. If a State recipient needs guidance, the recipient may contact Lorraine Fleury at fleury.lorraine@epa.gov or at 215-814-2341 of EPA, Region III Grants and Audit Management Branch for guidance. The recipient or subrecipient may also obtain additional guidance from DOL's web site at <http://www.dol.gov/whd/>

1. Applicability of the Davis- Bacon (DB) prevailing wage requirements.

Under the FY 2013 Continuing Resolution, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the recipient State before authorizing work on that site.

2. Obtaining Wage Determinations.

(a) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

- (i) While the solicitation remains open, the subrecipient shall monitor www.wdol.gov weekly to ensure that the wage determination contained in the solicitation remains current. The subrecipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the subrecipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.
- (ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2013 Continuing Resolution, the following clauses:

(1) Minimum wages.

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative,

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. Contract Provision for Contracts in Excess of \$100,000.

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. Compliance Verification

(a) The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Subrecipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence."

(c) The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

subcontractor is not complying with DB. In addition, during the examinations the subrecipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The subrecipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/contacts/whd/america2.htm>.

II. Requirements Under The Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6) For Subrecipients That Are Not Governmental Entities:

The following terms and conditions specify how recipients will assist EPA in meeting its DB responsibilities when DB applies to EPA awards of financial assistance under the FY2013 Continuing Resolution with respect to subrecipients that are not governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient for guidance. If a State recipient needs guidance, the recipient may contact Lorraine Fleury at fleury.lorraine@epa.gov or at 215-814-2341 of EPA, Region III Grants and Audit Management Branch for guidance. The recipient or subrecipient may also obtain additional guidance from DOL's web site at <http://www.dol.gov/whd/>

Under these terms and conditions, the subrecipient must submit its proposed DB wage determinations to the State recipient for approval prior to including the wage determination in any solicitation, contract task orders, work assignments, or similar instruments to existing contractors.

1._ Applicability of the Davis- Bacon (DB) prevailing wage requirements.

Under the FY 2013 Continuing Resolution, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the recipient State before authorizing work on that site.

2. Obtaining Wage Determinations.

(a) Subrecipients must obtain proposed wage determinations for specific localities at www.wdol.gov. After the Subrecipient obtains its proposed wage determination, it must submit the wage determination to **INSERT STATE CONTACT NAME, EMAIL, and TELEPHONE NUMBER** for approval prior to inserting the wage determination into a solicitation, contract or issuing task orders, work assignments or similar

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

instruments to existing contractors (ordering instruments unless subsequently directed otherwise by the State recipient Award Official.

(b) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

- (i) While the solicitation remains open, the subrecipient shall monitor www.wdol.gov on a weekly basis to ensure that the wage determination contained in the solicitation remains current. The subrecipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the subrecipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.
- (ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(c) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2013 Continuing Resolution, the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient(s) to the State award official. The State award official will transmit the report, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request, and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s) shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. Contract Provision for Contracts in Excess of \$100,000.

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient shall upon the request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (a)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

(c) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. Compliance Verification

(a). The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

SECTION 00830 - PREVAILING WAGE RATE DETERMINATION

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Subrecipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence."

(c). The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB . In addition, during the examinations the subrecipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

(d). The subrecipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/whd/america2.htm>.

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

- A. **Within 15 Days after Notice of Intent to Award**, the CONTRACTOR must compile and submit a list of all Subcontractors and material suppliers, showing all tiers. For each company listed include name, address, phone, employer tax number; DBE status if any; estimated subcontract amount; estimated start and finish dates; and copies of bid tabulations with firm name and number. Send the list to *Addresses B and C*.
- B. **Within 30 Days of Notice to Proceed**, the CONTRACTOR and each Subcontractor, who are required to file EEO-1 reports (Standard Form 100 [SF-100]), must send it to the Office of Federal Contract Compliance Programs (OFCCP) Area Office - Address C.
- C. Before each Friday, the CONTRACTOR and each Subcontract must file:
 - 1. Weekly Employment Opportunity (EEO) Reports (page 00440-12) for the previous week to *Address A*. If the information requested (race and gender) is indicated on the copy of the payroll, then this Weekly EEO Report is hereby waived.
- D. **Certified Payrolls must be submitted every two weeks.** Before the second Friday, the CONTRACTOR and each Subcontractor must file:
 - 1. Certified Payrolls with Statements of Compliance for the previous two weeks. If there was no activity for that pay period, indicate "No Activity." Indicate "Start" on your first payroll, and "Final" on your last payroll for this project. Send the original to *Address B* and a complete copy to *Address A*, or another CBJ representative, as *designated*

Correspondence regarding State of Alaska Department of Labor and Workforce Development (ADOL) Title 36 requirements may be submitted electronically or paper copies can be submitted by mail. To submit Title 36 documents electronically, go to <https://myalaska.state.ak.us/home/app>. If filing electronically, submit certified payrolls to ADOL at the website above and email a copy of all certified payrolls to Jennifer Mannix, or her designee, at the email address below. If Contractor elects to submit paper copies, they should be submitted to the physical addresses below.

- E. By the 5th of each month, each CONTRACTOR and Subcontractor must complete the Monthly Employment Utilization Report (CC257) for the previous month for its aggregate workforce in Alaska (for federal and non-federal projects). Make a list of all projects (federal and non-federal) in Alaska over \$10,000. Include the firm name, name and location of project, project #, % complete, contract amount, and established date of completion. Send both the CC257 and the list of projects to Addresses A and C.
- F. Preparing the final payment request, the CONTRACTOR must verify that the subcontractor list is up-to-date and includes all parties submitting certified payrolls (i.e., equipment rental with operator companies, trucking services providing imported materials, surveying firms, etc.). Send a copy of amended lists to Addresses A and B. Submit completed Compliance Certification and Release, Section 01700 of the CBJ Standard Specifications for Civil Engineering Project and Subdivision Improvements, December 2003 Edition, with current Errata, for the CONTRACTOR to Address A.

<i>Address A</i>	<i>Address B</i>	<i>Address C</i>
Contract Administrator	Wage and Hour Section	OFCCP
Engineering Department	AK Dept of Labor and Workforce Dev/	Area Office
City and Borough of Juneau	Labor Standards and Safety Division	605 W. 4th Ave., Room G68
155 S. Seward Street	Wage and Hour Administration	Anchorage, AK 99501
Juneau, AK 99801	P O Box 21149	(907) 271-2864
(907) 586-0873	Juneau, AK 99802-1149	
Greg.Smith@juneau.org	(907) 465-4842	
	http://labor.state.ak.us/lss/home.htm	

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

CBJ HEADWORKS IMPROVEMENTS

Contract No. BE17-033

MINIMUM RATES OF PAY
FEDERAL WAGE RATE DETERMINATION

General Decision Number: AK160001 08/19/2016 AK1

Superseded General Decision Number: AK20150001

State: Alaska

Construction Types: Building and Heavy

Counties: Alaska Statewide.

BUILDING AND HEAVY CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.15 for calendar year 2016 applies to all contracts subject to the Davis-Bacon Act for which the solicitation was issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.15 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2016. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/08/2016
1	01/22/2016
2	02/26/2016
3	03/04/2016
4	04/01/2016
5	04/15/2016
6	04/29/2016
7	06/10/2016
8	06/17/2016
9	07/01/2016
10	07/15/2016
11	07/29/2016
12	08/19/2016

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

ASBE0097-001 01/01/2016

	Rates	Fringes
Asbestos Workers/Insulator (includes application of all insulating materials protective coverings, coatings and finishings to all types of mechanical systems).....	\$ 37.38	19.55

ASBE0097-002 01/01/2016

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER (includes preparation, wetting, stripping, removal scrapping, vacuming, bagging, and disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems).....	\$ 37.38	19.55

BOIL0502-002 01/01/2013

	Rates	Fringes
BOILERMAKER.....	\$ 42.97	26.60

* BRAK0001-002 07/01/2016

	Rates	Fringes
Bricklayer, Blocklayer, Stonemason, Marble Mason, Tile Setter, Terrazzo Worker.....	\$ 40.81	19.15
Tile & Terrazzo Finisher.....	\$ 34.79	19.15

CARP1501-001 09/01/2014

	Rates	Fringes
MILLWRIGHT.....	\$ 35.74	21.29

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

CARP2520-003 09/01/2014

	Rates	Fringes
Diver		
Stand-by.....	\$ 41.65	23.34
Tender.....	\$ 40.65	23.34
Working.....	\$ 81.45	23.34
Piledriver		
Carpenter.....	\$ 37.34	23.34
Piledriver; Skiff Operator and Rigger.....	\$ 37.34	23.34
Sheet Stabber.....	\$ 36.59	22.59
Welder.....	\$ 42.90	23.34

DEPTH PAY PREMIUM FOR DIVERS BELOW WATER SURFACE:

50-100 feet	\$1.00 per foot
101 feet and deeper	\$2.00 per foot

ENCLOSURE PAY PREMIUM WITH NO VERTICAL ASCENT:

5-50 FEET	\$1.00 PER FOOT/DAY
51-100 FEET	\$2.00 PER FOOT/DAY
101 FEET AND ABOVE	\$3.00 PER FOOT/DAY

SATURATION DIVING:

The standby rate applies until saturation starts. The saturation diving rate applies when divers are under pressure continuously until work task and decompression are complete. the diver rate shall be paid for all saturation hours.

WORK IN COMBINATION OF CLASSIFICATIONS:

Employees working in any combination of classifications within the diving crew (except dive supervisor) in a shift are paid in the classification with the highest rate for that shift.

CARP4059-001 09/01/2014

	Rates	Fringes
CARPENTER		
Carpenter.....	\$ 37.34	23.34
Lather/Drywall Applicator...	\$ 36.59	22.59

ELEC1547-004 04/01/2016

	Rates	Fringes
CABLE SPLICER.....	\$ 39.82	3%+24.96
ELECTRICIAN.....	\$ 39.49	3%+24.36

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

ELEC1547-005 04/01/2016

Line Construction

	Rates	Fringes
CABLE SPLICER.....	\$ 52.27	3%+30.33
Linemen (Including Equipment Operators, Technician).....	\$ 50.52	3%+30.33
Powderman.....	\$ 48.52	3%+30.33
TREE TRIMMER.....	\$ 35.84	3%+22.56

ELEV0019-002 01/01/2016

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 52.50	29.985+a+b

FOOTNOTE: a. Employer contributes 8% of the basic hourly rate for over 5 year's service and 6% of the basic hourly rate for 6 months to 5 years' of service as vacation paid credit. b. Eight paid holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Veteran's Day; Thanksgiving Day; Friday after Thanksgiving and Christmas Day

ENGI0302-002 04/01/2016

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 40.03	22.10
GROUP 1A.....	\$ 41.79	22.10
GROUP 2.....	\$ 39.26	22.10
GROUP 3.....	\$ 38.54	22.10
GROUP 4.....	\$ 32.33	22.10
TUNNEL WORK		
GROUP 1.....	\$ 44.03	22.10
GROUP 1A.....	\$ 45.97	22.10
GROUP 2.....	\$ 43.19	22.10
GROUP 3.....	\$ 42.39	22.10
GROUP 4.....	\$ 35.56	22.10

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Asphalt Roller: Breakdown, Intermediate, and Finish; Back Filler; Barrier Machine (Zipper); Beltcrete with power pack and similar conveyors; Bending Machine; Boat Coxwains; Bulldozers; Cableways, Highlines and Cablecars; Cleaning Machine; Coating Machine; Concrete Hydro Blaster; Cranes-45 tons and under or 150 foot boom

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION**

Reporting During Contract

and under (including jib and attachments): (a) Hydralifts or Transporters, all track or truck type, (b) Derricks; Crushers; Deck Winches-Double Drum; Ditching or Trenching Machine (16 inch or over); Drilling Machines, core, cable, rotary and exploration; Finishing Machine Operator, Concrete Paving, Laser Screed, Sidewalk, Curb and Gutter Machine; Helicopters; Hover Craft, Flex Craft, Loadmaster, Air Cushion, All Terrain Vehicle, Rollagon, Bargecable, Nodwell, and Snow Cat; Hydro Ax: Feller Buncher and similar; Loaders (2 1/2 yards through 5 yards, including all attachments): Forklifts with telescopic boom and swing attachment, Overhead and front end, 2 1/2 yards through 5 yards, Loaders with forks or pipe clamps; Loaders, elevating belt type, Euclid and similar types; Mechanics, Bodyman; Micro Tunneling Machine; Mixers: Mobile type w/hoist combination; Motor Patrol Grader; Mucking Machines: Mole, Tunnel Drill, Horizontal/Directional Drill Operator, and/or Shield; Operator on Dredges; Piledriver Engineers, L. B. Foster, Puller or similar Paving Breaker; Power Plant, Turbine Operator, 200 k.w. and over (power plants or combination of power units over 300 k.w.); Scrapers-through 40 yards; Service Oiler/Service Engineer; Sidebooms-under 45 tons; Shot Blast Machine; Shovels, Backhoes, Excavators with all attachments, and Gradealls (3 yards and under), Spreaders, Blaw Knox, Cedarapids, Barber Greene, Slurry Machine; Sub-grader (Gurries, Reclaimer, and similar types); Tack tractor; Truck mounted Concrete Pumps, Conveyor, Creter; Water Kote Machine; Unlicensed off road hauler

GROUP 1A: Camera/Tool/Video Operator (Slipline), Cranes-over 45 tons or 150 foot (including jib and attachments): (a) Clamshells and Draglines (over 3 yards), (b) Tower cranes; Licensed Water/Waste Water Treatment Operator; Loaders over 5 yds.; Certified Welder, Electrical Mechanic, Camp Maintenance Engineer, Mechanic (over 10,000 hours); Motor Patrol Grader, Dozer, Grade Tractor, Roto-mill/Profiler (finish: when finishing to final grade and/or to hubs, or for asphalt); Power Plants: 1000 k.w. and over; Quad; Screed; Shovels, Backhoes, Excavators with all attachments (over 3 yards), Sidebooms over 45 tons; Slip Form Paver, C.M.I. and similar types; Scrapers over 40 yards;

GROUP 2: Boiler-fireman; Cement Hog and Concrete Pump Operator; Conveyors (except as listed in group 1); Hoist on steel erection; Towermobiles and Air Tuggers; Horizontal/Directional Drill Locator; Licensed Grade Technician; Loaders, (i.e., Elevating Grader and Material Transfer Vehicle); Locomotives: rod and geared engines; Mixers; Screening, Washing Plant; Sideboom (cradling rock drill regardless of size); Skidder; Trenching Machine under 16 inches; Waste/ Waste Water Treatment Operator.

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

GROUP 3: "A" Frame Trucks, Deck Winches: single power drum; Bombardier (tack or tow rig); Boring Machine; Brooms-power; Bump Cutter; Compressor; Farm tractor; Forklift, industrial type; Gin Truck or Winch Truck with poles when used for hoisting; Grade Checker and Stake Hopper; Hoist, Air Tuggers, Elevators; Loaders: (a) Elevating-Athey, Barber Green and similar types (b) Forklifts or Lumber Carrier (on construction job site) (c) Forklifts with Tower (d) Overhead and Front-end, under 2 1/2 yds. Locomotives: Dinkey (air, steam, gas and electric) Speeders; Mechanics (light duty); Oil, Blower Distribution; Post Hole Diggers, mechanical; Pot Fireman (power agitated); Power Plant, Turbine Operator, under 200 k.w.; Pumps-water; Roller-other than Plantmix; Saws, concrete; Skid Steer with all attachments; Straightening Machine; Tow Tractor

GROUP 4: Rig Oiler/Crane Assistant Engineer; Parts and Equipment Coordinator; Swamper (on trenching machines or shovel type equipment); Spotter; Steam Cleaner; Drill Helper.

FOOTNOTE: Groups 1-4 receive 10% premium while performing tunnel or underground work. Rig Oiler/Crane Assistant Engineer shall be required on cranes over 85 tons or over 100 feet of boom.

IRON0751-003 07/01/2015

	Rates	Fringes
Ironworkers:		
BRIDGE, STRUCTURAL, ORNAMENTAL, REINFORCING MACHINERY MOVER, RIGGER, SHEETER, STAGE RIGGER, BENDER OPERATOR.....	\$ 36.25	28.05
FENCE, BARRIER INSTALLER....	\$ 32.75	28.05
GUARDRAIL INSTALLERS.....	\$ 33.75	28.05
GUARDRAIL LAYOUT MAN.....	\$ 33.49	28.05
HELICOPTER, TOWER.....	\$ 37.25	28.05

LABO0341-005 04/01/2016

	Rates	Fringes
Laborers: South of the 63rd Parallel & West of Longitude 138 Degrees		
GROUP 1.....	\$ 30.00	26.17
GROUP 2.....	\$ 31.00	26.17
GROUP 3.....	\$ 31.90	26.17

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION**

Reporting During Contract

GROUP 3A.....	\$ 35.18	26.17
GROUP 3B.....	\$ 38.72	23.46
GROUP 4.....	\$ 19.57	26.17
TUNNELS, SHAFTS, AND RAISES		
GROUP 1.....	\$ 33.00	26.17
GROUP 2.....	\$ 34.10	26.17
GROUP 3.....	\$ 35.09	26.17
GROUP 3A.....	\$ 38.70	26.17
GROUP 3B.....	\$ 42.59	23.46

LABORERS CLASSIFICATIONS

GROUP 1: Asphalt Workers (shovelman, plant crew); Brush Cutters; Camp Maintenance Laborer; Carpenter Tenders; Choke Setters, Hook Tender, Rigger, Signalman; Concrete Laborer (curb and gutter, chute handler, grouting, curing, screeding); Crusher Plant Laborer; Demolition Laborer; Ditch Diggers; Dump Man; Environmental Laborer (asbestos (limited to nonmechanical systems), hazardous and toxic waste, oil spill); Fence Installer; Fire Watch Laborer; Flagman; Form Strippers; General Laborer; Guardrail Laborer, Bridge Rail Installers; Hydro-Seeder Nozzleman; Laborers (building); Landscape or Planter; Laying of Decorative Block (retaining walls, flowered decorative block 4 feet and below); Material Handlers; Pneumatic or Power Tools; Portable or Chemical Toilet Serviceman; Pump Man or Mixer Man; Railroad Track Laborer; Sandblast, Pot Tender; Saw Tenders; Scaffold Building and Erecting; Slurry Work; Stake Hopper; Steam Point or Water Jet Operator; Steam Cleaner Operator; Tank Cleaning; Utiliwalk, Utilidor Laborer and Conduit Installer; Watchman (construction projects); Window Cleaner

GROUP 2: Burning and Cutting Torch; Cement or Lime Dumper or Handler (sack or bulk); Choker Splicer; Chucktender (wagon, airtrack and hydraulic drills); Concrete Laborers (power buggy, concrete saws, pumpcrete nozzleman, vibratorman); Culvert Pipe Laborer; Cured in place Pipelayer; Environmental Laborer (marine work, oil spill skimmer operator, small boat operator); Foam Gun or Foam Machine Operator; Green Cutter (dam work); Gunnite Operator; Hod Carriers; Jackhammer or Pavement Breakers (more than 45 pounds); Laying of Decorative Block (retaining walls, flowered decorative block above 4 feet); Mason Tender and Mud Mixer (sewer work); Pilot Car; Plasterer, Bricklayer and Cement Finisher Tenders; Power Saw Operator; Railroad Switch Layout Laborer; Sandblaster; Sewer Caulkers; Sewer Plant Maintenance Man; Thermal Plastic Applicator; Timber Faller, chain saw operator, filer; Timberman

GROUP 3: Alarm Installer; Bit Grinder; Guardrail Machine Operator; High Rigger and tree topper; High Scaler; Multiplate; Slurry Seal Squeegee Man

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

GROUP 3A: Asphalt Raker, Asphalt Belly dump lay down; Drill Doctor (in the field); Drillers (including, but not limited to, wagon drills, air track drills; hydraulic drills); Powderman; Pioneer Drilling and Drilling Off Tugger (all type drills); Pipelayers

GROUP 3B: Grade checker (setting or transferring of grade marks, line and grade)

GROUP 4: Final Building Cleanup

TUNNELS, SHAFTS, AND RAISES CLASSIFICATIONS

GROUP 1: Brakeman; Muckers; Nippers; Topman and Bull Gang; Tunnel Track Laborer

GROUP 2: Burning and Cutting Torch; Concrete Laborers; Jackhammers; Nozzleman, Pumpcrete or Shotcrete.

GROUP 3: Miner; Retimberman

GROUP 3A: Asphalt Raker, Asphalt Belly dump lay down; Drill Doctor (in the field); Drillers (including, but not limited to, wagon drills, air track drills; hydraulic drills); Powderman; Pioneer Drilling and Drilling Off Tugger (all type drills); Pipelayers.

GROUP 3B: Grade checker (setting or transferring of grade marks, line and grade)

Tunnel shaft and raise rates only apply to workers regularly employed inside a tunnel portal or shaft collar.

LABO0942-001 04/01/2016

	Rates	Fringes
Laborers: North of the 63rd Parallel & East of Longitude 138 Degrees		
GROUP 1.....	\$ 30.00	26.17
GROUP 2.....	\$ 31.00	26.17
GROUP 3.....	\$ 31.90	26.17
GROUP 3A.....	\$ 35.18	26.17
GROUP 3B.....	\$ 38.72	23.46
GROUP 4.....	\$ 19.57	26.17
TUNNELS, SHAFTS, AND RAISES		
GROUP 1.....	\$ 33.00	26.17
GROUP 2.....	\$ 34.10	26.17
GROUP 3.....	\$ 35.09	26.17
GROUP 3A.....	\$ 38.70	26.17
GROUP 3B.....	\$ 42.59	23.46

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

LABORERS CLASSIFICATIONS

GROUP 1: Asphalt Workers (shovelman, plant crew); Brush Cutters; Camp Maintenance Laborer; Carpenter Tenders; Choke Setters, Hook Tender, Rigger, Signalman; Concrete Laborer (curb and gutter, chute handler, grouting, curing, screeding); Crusher Plant Laborer; Demolition Laborer; Ditch Diggers; Dump Man; Environmental Laborer (asbestos (limited to nonmechanical systems), hazardous and toxic waste, oil spill); Fence Installer; Fire Watch Laborer; Flagman; Form Strippers; General Laborer; Guardrail Laborer, Bridge Rail Installers; Hydro-Seeder Nozzleman; Laborers (building); Landscape or Planter; Laying of Decorative Block (retaining walls, flowered decorative block 4 feet and below); Material Handlers; Pneumatic or Power Tools; Portable or Chemical Toilet Serviceman; Pump Man or Mixer Man; Railroad Track Laborer; Sandblast, Pot Tender; Saw Tenders; Scaffold Building and Erecting; Slurry Work; Stake Hopper; Steam Point or Water Jet Operator; Steam Cleaner Operator; Tank Cleaning; Utiliwalk, Utilidor Laborer and Conduit Installer; Watchman (construction projects); Window Cleaner

GROUP 2: Burning and Cutting Torch; Cement or Lime Dumper or Handler (sack or bulk); Choker Splicer; Chucktender (wagon, airtrack and hydraulic drills); Concrete Laborers (power buggy, concrete saws, pumpcrete nozzleman, vibratorman); Culvert Pipe Laborer; Cured in place Pipelayer; Environmental Laborer (marine work, oil spill skimmer operator, small boat operator); Foam Gun or Foam Machine Operator; Green Cutter (dam work); Gunnite Operator; Hod Carriers; Jackhammer or Pavement Breakers (more than 45 pounds); Laying of Decorative Block (retaining walls, flowered decorative block above 4 feet); Mason Tender and Mud Mixer (sewer work); Pilot Car; Plasterer, Bricklayer and Cement Finisher Tenders; Power Saw Operator; Railroad Switch Layout Laborer; Sandblaster; Sewer Caulkers; Sewer Plant Maintenance Man; Thermal Plastic Applicator; Timber Faller, chain saw operator, filer; Timberman

GROUP 3: Alarm Installer; Bit Grinder; Guardrail Machine Operator; High Rigger and tree topper; High Scaler; Multiplate; Slurry Seal Squeegee Man

GROUP 3A: Asphalt Raker, Asphalt Belly dump lay down; Drill Doctor (in the field); Drillers (including, but not limited to, wagon drills, air track drills; hydraulic drills); Powderman; Pioneer Drilling and Drilling Off Tugger (all type drills); Pipelayers

GROUP 3B: Grade checker (setting or transferring of grade marks, line and grade)

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

GROUP 4: Final Building Cleanup

TUNNELS, SHAFTS, AND RAISES CLASSIFICATIONS

GROUP 1: Brakeman; Muckers; Nippers; Topman and Bull Gang;
Tunnel Track Laborer

GROUP 2: Burning and Cutting Torch; Concrete Laborers;
Jackhammers; Nozzleman, Pumpcrete or Shotcrete.

GROUP 3: Miner; Retimberman

GROUP 3A: Asphalt Raker, Asphalt Belly dump lay down; Drill
Doctor (in the field); Drillers (including, but not limited
to, wagon drills, air track drills; hydraulic drills);
Powderman; Pioneer Drilling and Drilling Off Tugger (all
type drills); Pipelayers.

GROUP 3B: Grade checker (setting or transferring of grade
marks, line and grade)

Tunnel shaft and raise rates only apply to workers regularly
employed inside a tunnel portal or shaft collar.

PAIN1959-001 09/01/2015

NORTH OF THE 63RD PARALLEL

	Rates	Fringes
PAINTER		
BRUSH/ROLLER PAINT OR WALL COVERER.....	\$ 32.07	20.01
TAPING, TEXTURING, STRUCTURAL PAINTING, SANDBLASTING, POT TENDER, FINISH METAL, SPRAY, BUFFER OPERATOR, RADON MITIGATION, LEAD BASED PAINT ABATEMENT, HAZARDOUS MATERIAL HANDLER.....	\$ 32.59	20.01

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

PAIN1959-002 02/01/2016

SOUTH OF THE 63RD PARALLEL

	Rates	Fringes
PAINTER		
Brush, Roller, Sign, Paper and Vinyl, Swing Stage, Hand Taper/Drywall, Structural Steel, and Commercial Spray.....	\$ 30.31	19.76
Machine Taper/Drywall.....	\$ 31.56	19.76
Spray-Sand/Blast, Epoxy and Tar Applicator.....	\$ 31.66	19.76

PAIN1959-003 01/01/2016

NORTH OF THE 63RD PARALLEL

	Rates	Fringes
GLAZIER.....	\$ 37.88	20.74

PAIN1959-004 07/01/2012

	Rates	Fringes
FLOOR LAYER: Carpet.....	\$ 30.09	13.02

PAIN1959-006 01/01/2016

SOUTH OF THE 63RD PARALLEL

	Rates	Fringes
GLAZIER.....	\$ 37.88	20.74

PLAS0867-001 02/01/2016

	Rates	Fringes
PLASTERER		
North of the 63rd parallel..	\$ 37.25	20.41
South of the 63rd parallel..	\$ 37.00	20.41

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

PLAS0867-004 02/01/2016

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
North of the 63rd parallel..\$	37.25	20.41
South of the 63rd parallel..\$	37.00	20.41

PLUM0262-002 07/01/2016

East of the 141st Meridian

	Rates	Fringes
Plumber; Steamfitter.....\$	37.52	26.47

* PLUM0367-002 07/01/2016

South of the 63rd Parallel

	Rates	Fringes
Plumber; Steamfitter.....\$	39.85	22.85

PLUM0375-002 07/01/2016

North of the 63rd Parallel

	Rates	Fringes
Plumber; Steamfitter.....\$	40.81	24.25

PLUM0669-002 01/01/2015

	Rates	Fringes
SPRINKLER FITTER.....\$	43.75	22.57

SHEE0023-003 07/01/2015

South of the 63rd Parallel

	Rates	Fringes
SHEET METAL WORKER.....\$	40.79	22.38

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

SHEE0023-004 07/01/2015

North of the 63rd Parallel

	Rates	Fringes
SHEET METAL WORKER.....	\$ 45.93	21.44

TEAM0959-003 09/01/2015

	Rates	Fringes
TRUCK DRIVER		
GROUP 1.....	\$ 39.29	21.17
GROUP 1A.....	\$ 40.56	21.17
GROUP 2.....	\$ 38.03	21.17
GROUP 3.....	\$ 37.21	21.17
GROUP 4.....	\$ 36.63	21.17
GROUP 5.....	\$ 35.87	21.17

GROUP 1: Semi with Double Box Mixer; Dump Trucks (including rockbuggy and trucks with pups) over 40 yards up to and including 60 yards; Deltas, Commanders, Rollogans and similar equipment when pulling sleds, trailers or similar equipment; Boat Coxswain; Lowboys including attached trailers and jeeps, up to and including 12 axles; Ready-mix over 12 yards up to and including 15 yards); Water Wagon (250 Bbls and above); Tireman, Heavy Duty/Fueler

GROUP 1A: Dump Trucks (including Rockbuggy and Trucks with pups) over 60 yards up to and including 100 yards; Jeeps (driver under load)

GROUP 2: Turn-O-Wagon or DW-10 not self-loading; All Deltas, Commanders, Rollogans, and similar equipment; Mechanics; Dump Trucks (including Rockbuggy and Trucks with pups) over 20 yards up to and including 40 yards; Lowboys including attached trailers and jeeps up to and including 8 axles; Super vac truck/cacasco truck/heat stress truck; Ready-mix over 7 yards up to and including 12 yards; Partsman; Stringing Truck

GROUP 3: Dump Trucks (including Rockbuggy and Trucks with pups) over 10 yards up to and including 20 yards; batch trucks 8 yards and up; Oil distributor drivers; Oil Distributor Drivers; Trucks/Jeeps (push or pull); Traffic Control Technician

GROUP 4: Buggymobile; Semi or Truck and trailer; Dumpster; Tireman (light duty); Dump Trucks (including Rockbuggy and Truck with pups) up to and including 10 yards; Track Truck Equipment; Grease Truck; Flat Beds, dual rear axle; Hyster Operators (handling bulk aggregate); Lumber Carrier; Water

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION**

Reporting During Contract

Wagon, semi; Water Truck, dual axle; Gin Pole Truck, Winch Truck, Wrecker, Truck Mounted "A" Frame manufactured rating over 5 tons; Bull Lifts and Fork Lifts with Power Boom and Swing attachments, over 5 tons; Front End Loader with Forks; Bus Operator over 30 passengers; All Terrain Vehicles; Boom Truck/Knuckle Truck over 5 tons; Foam Distributor Truck/dual axle; Hydro-seeders, dual axle; Vacuum Trucks, Truck Vacuum Sweepers; Loadmaster (air and water); Air Cushion or similar type vehicle; Fire Truck/Ambulance Driver; Combination Truck-fuel and grease; Compactor (when pulled by rubber tired equipment); Rigger (air/water/oilfield); Ready Mix, up to and including 7 yards;

GROUP 5: Gravel Spreader Box Operator on Truck; Flat Beds, single rear axle; Boom Truck/Knuckle Truck up to and including 5 tons; Pickups (Pilot Cars and all light duty vehicles); Water Wagon (Below 250 Bbls); Gin Pole Truck, Winch Truck, Wrecker, Truck Mounted "A" Frame, manufactured rating 5 tons and under; Bull Lifts and Fork Lifts (fork lifts with power broom and swing attachments up to and including 5 tons); Buffer Truck; Tack Truck; Farm type Rubber Tired Tractor (when material handling or pulling wagons on a construction project); Foam Distributor, single axle; Hydro-Seeders, single axle; Team Drivers (horses, mules and similar equipment); Fuel Handler (station/bulk attendant); Batch Truck, up to and including 7 yards; Gear/Supply Truck; Bus Operator, Up to 30 Passengers; Rigger/Swamper

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

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

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

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

(weighted union average rate).

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

3.) If the decision of the Administrator is not favorable, an

**SECTION 00840 - FEDERAL LABOR STANDARDS, REPORTING, AND
PREVAILING WAGE RATE DETERMINATION
Reporting During Contract**

interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

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

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

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END OF GENERAL DECISION

PROJECT MANUAL

CBJ HEADWORKS IMPROVEMENTS Juneau, Alaska

CBJ Contract No. BE17-033



5368 Commercial Boulevard
Juneau, AK 99801
(907) 780-3533
FAX (907) 780-3535

SECTION 011100 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 GENERAL

- A. The WORK to be performed under this contract shall consist of furnishing all plant, tools, equipment, materials, supplies, manufactured articles and furnishing all labor, transportation and services, including all fuel, power, water and essential communications and performing all WORK, or other operations required for the fulfillment of the contract in strict accordance with the Contract Documents. The WORK shall be complete, and all WORK, materials, and services, not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The WORK covered in the Contract Documents generally includes:
1. **Mendenhall Valley Wastewater Treatment Plant Headworks Improvements:** The improvements to the headworks includes removal of one existing automatic screen and grinder system and one manual bar screen, the installation of two new perforated plate screens and screening washer/compactors including new electrical connections to the screens and compactors, dismantling and removing an oil/water separation tank, relocating an existing grit classifier clarifier and conveyor, and modifications to the piping in the influent pump station, painting of pipe, installation of gas alarms, and miscellaneous related WORK. Installation of the new screens will require construction sequencing to dismantle and replace existing 16-inch and 18-inch ductile iron pipe with new 24-inch process piping to make space for the new screens.
 2. **Juneau-Douglas Wastewater Treatment Plant Headworks Improvements:** The improvements to the headworks includes the installation of two new perforated plate automatic screens and screening washer/compactors including new electrical connections to the screens and compactors, construction of new concrete influent channels and piping to connect the new influent channels to existing piping, construction of a new building around the new channels and miscellaneous related WORK. Site grading includes the installation of two new catch basins, new storm drain lines, and asphalt restoration. Demolition includes the removal of the existing automatic screen and manual screen, removal of existing concrete steps, removal of a timber framed wall and soffit, and removal of electrical feeds to the existing screens. Construction sequencing will be required to maintain the existing headworks in operation while the new screens and channels are constructed.
- B. **SITE OF WORK.** The site of the WORK is at the Mendenhall and Juneau Douglas Wastewater Treatment Plants.
1. Mendenhall Valley WWTP: 2009 Radcliffe Road, Juneau, AK, 99801.
 2. Juneau Douglas WWTP: 1540 Thane Road, Juneau, AK, 99801

1.3 WORK BY OTHERS

- A. The CONTRACTOR's attention is directed to the fact that work may be conducted at the site by other contractors during the performance of the WORK under this contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the

SECTION 011100 – SUMMARY OF WORK

WORK of such other contractors, and shall cooperate fully with such contractors to provide continued safe access to their respective portions of the site, as required to perform work under their respective contracts. At the Mendenhall Plant, the Owner will be providing, installing, and maintaining the bypass pumping operation. Also at the Mendenhall plant, WORK could be starting on a biosolids project which will include demolition of the existing ABF building, construction of a new Biosolids building, installation of dryer equipment, adding additional venting in the headworks room and WORK outside but near the headworks room. The staging area for the Biosolids project will occupy the majority of the area on the west side of the Mendenhall plant site.

- B. Interference with Work on Utilities. The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.4 CONTRACTOR USE OF PROJECT SITE

- A. The CONTRACTOR's use of the Project site shall include construction operations and storage of materials, fabrication facilities, and field offices only in those areas identified on the Drawings or approved by the ENGINEER. The CONTRACTOR shall coordinate all WORK activities with the CONTRACTOR constructing the Biosolids project and with the bypass pumping operation.

1.5 OWNER USE OF THE PROJECT SITE

- A. The OWNER may utilize all or part of the existing site during the entire period of construction for the conduct of the OWNER's normal operations. The CONTRACTOR shall cooperate and coordinate with the ENGINEER to facilitate the OWNER's operations and to minimize interference with the CONTRACTOR's operation at the same time. In any event, the OWNER shall be allowed access to the Project site during the period of construction.

1.6 PROJECT MEETINGS

- A. Pre-Construction Conference
 - 1. Prior to the commencement of WORK at the site, a Pre-Construction Conference will be held at a mutually agreed time and place which shall be attended by the CONTRACTOR's Project Manager, its superintendent, and its Subcontractors as the CONTRACTOR deems appropriate. Other attendants will be:
 - a. ENGINEER and Inspector.
 - b. Representatives of OWNER.
 - c. Governmental representatives as appropriate.
 - d. Others as requested by CONTRACTOR, OWNER, or ENGINEER.
 - 2. Unless previously submitted to the ENGINEER, the CONTRACTOR shall bring to the Pre-Construction Conference one copy each of the following:
 - a. Plan of Operation.

SECTION 011100 – SUMMARY OF WORK

- b. Project Overview Bar Chart Schedule.
 - c. Procurement schedule of major equipment and materials and items requiring long lead time.
 - d. Shop Drawing/Sample/Substitute or “Or Equal” submittal schedule.
 - e. Name and telephone number of CONTRACTOR’s Project Supervisor.
 - f. Erosion Control Plan with Storm Water Pollution Prevention Plan.
3. The purpose of the Pre-Construction Conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedure for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date. The CONTRACTOR should be prepared to discuss all of the items listed below:
- a. Status of CONTRACTOR’s insurance and bonds.
 - b. CONTRACTOR’s tentative schedules.
 - c. Transmittal, review, and distribution of CONTRACTOR’s submittals.
 - d. Processing applications for payment.
 - e. Maintaining record documents.
 - f. Critical WORK sequencing.
 - g. Field decisions and Change Orders.
 - h. Use of Project site, office and storage areas, security, housekeeping, and OWNER’s needs.
 - i. Major equipment deliveries and priorities.
 - j. CONTRACTOR’s assignments for safety and first aid.
4. The OWNER will preside at the Pre-Construction Conference and will arrange for keeping and distributing the minutes to all persons in attendance.
5. The CONTRACTOR and its Subcontractors should plan on the conference taking at least three hours. Items listed in paragraph 3 will be covered as well as a review of the Drawings and Specifications with the ENGINEER and OWNER.
- B. Progress Meetings
1. The CONTRACTOR shall schedule and hold regular on-site progress meetings at least weekly and at other times as requested by the ENGINEER, or as required by the progress of the WORK. The CONTRACTOR, ENGINEER, and all Subcontractors active on the site must attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.
 2. The ENGINEER shall conduct the meeting and will arrange for recording and distributing the minutes. The purpose of the meetings will be to review the progress of the WORK, maintain

SECTION 011100 – SUMMARY OF WORK

coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the CONTRACTOR is required to present any issues which may impact the WORK, with a view toward resolving these issues expeditiously.

1.7 DEFINITIONS APPLICABLE TO TECHNICAL SPECIFICATIONS

A. The following words have the meaning defined in the Technical Portions of the WORK:

1. Furnish - means to supply and deliver to the site, to unload and unpack ready for assembly, installation, testing, and start-up.
2. Indicated - is a word used to direct the CONTRACTOR to information contained on the drawings or in the Specifications. Terms such as “shown”, “noted”, “scheduled”, and “specified” also may be used to assist in locating information but no limitation of location is implied or intended.
3. Install - defines operations at the site including assembly, erection, placing, anchoring, applying, shaping to dimension, finishing, curing, protecting, and cleaning, ready for the OWNER’s use.
4. Installer - a person or firm engaged by the CONTRACTOR or its subcontract, or any Subcontractor, for the performance of installation, erection, or application WORK at the site. Installers must be expert in the operations they are engaged to perform.
5. Provide- is defined as furnish and install, ready for the intended use.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 011120 – MODIFICATIONS TO CBJ STANDARD SPECIFICATIONS

PART 1 -- GENERAL

1.1 DESCRIPTION

- A. SCOPE: This specification includes modifications and additions to the Standard Specifications for Civil Engineering Projects and Subdivision Improvements December 2003 Edition, with fourteen Errata Sheets, as published by the City and Borough of Juneau. These references specifications are part of these Contract Documents and shall pertain to the contract. The Standard Specifications for Civil Engineering Projects and Subdivision Improvements December 2003 Edition is available for a fee from the City and Borough of Juneau Engineering Contracts Office, (907) 586-0490, or you may view them online at: www.juneau.org/engineering.

1.2 MODIFICATIONS TO CBJ STANDARD SPECIFICATIONS

Check for leaks or significant pressure drops. Correct all leaks and significant pressure drops that require more makeup water than allowable, and retest pipe per Specification section 400505.

SECTION 02801 – ASPHALT CONCRETE PAVEMENT, PART 1 - GENERAL, Article 1.1, DESCRIPTION, revise paragraph B as follows, and add paragraph C:

- B. Asphaltic concrete mix for this Project for the paved parking lot section shall be Type II-A, Class See Table 02801-1 and Table 02801-2.
- C. Asphaltic concrete mix for sidewalks, driveways, hydrant pads and manhole aprons for this Project may be either Type II-A, Class B, or Type III, Class B. See Table 02801-1 and Table 02801-2.

SECTION 02801 – ASPHALT CONCRETE PAVEMENT, PART 1 – GENERAL, Article 1.1, DESCRIPTION, TABLE 02801-1, ASPHALTIC CONCRETE MIX REQUIREMENTS, revise the table as follows:

DESIGN PARAMETERS	CLASS A	CLASS B
Voids in total mix, percent	2.5 – 4.0	2.5 – 4.0%
Percent oil content	6.0 – 6.8	6.0 – 6.8%

SECTION 02801 -- ASPHALT CONCRETE PAVEMENT, PART 2 – PRODUCTS, Article 2.1, COMPOSITION OF ASPHALT CONCRETE MIXTURES – JOB MIX DESIGN, paragraph C, delete sub-paragraph 6 and replace with the following:

- 6. The mix design shall be 50 blow Marshall Method.

SECTION 011120 – MODIFICATIONS TO CBJ STANDARD SPECIFICATIONS

SECTION 02801 – ASPHALT CONCRETE PAVEMENT, PART 3 – EXECUTION, Article 3.2, EQUIPMENT, add the following:

- F. Heavy, full size, self-propelled laydown units that will place concentrated loading on curb and gutter sufficient to cause breakage or other damage to the concrete will not be permitted.

SECTION 02801 – ASPHALT CONCRETE PAVEMENT, PART 3 - EXECUTION, Article 3.8 SPREADING AND PLACING, revise paragraph H to read:

- H. Manhole frame and covers and water valve boxes shall be set to final grade in accordance to CBJ Standard 205 – MANHOLE HEIGHTS, prior to paving operations. If the cover lugs or frame, whichever is higher, does not meet the required depression range following the finish paving operations, the CONTRACTOR shall construct a transition slab with asphalt pavement overlay, as shown in the Drawings, at no additional cost to the OWNER.

SECTION 02801 – ASPHALT CONCRETE PAVEMENT, PART 3 – EXECUTION, Article 3.13, ACCEPTANCE SAMPLING AND TESTING, add the following paragraphs:

- K. For each lot of asphalt pavement produced, at least two (2) samples shall be taken by the CONTRACTOR for purposes of acceptance testing by the OWNER. The CONTRACTOR shall split the sample with the OWNER to retain a portion for their use. The sample shall be taken according to proper sampling methods, from the asphalt pavement on the grade.
 - 1. Based on the averaged results of the acceptance testing, a deduction from the asphalt pavement pay item may be made at the following amounts: #200 Sieve: the greater of either 1.0% the contract price for asphalt pavement placed within the sampled lot or \$500 per each 0.1% outside the job mix design tolerance, not exceeding 6% maximum, of the percent passing the #200 sieve.
 - 2. Asphalt Content: the greater of either 1.0% the contract price for asphalt pavement placed within the sampled lot or \$500 per each 0.1% outside the allowable job mix design asphalt content tolerance. The allowable asphalt content tolerance for this Contract shall be +/- 0.4% of the target job mix design asphalt content and shall not exceed the asphalt oil content limits specified in this Contract.
 - 3. The pay deductions for exceeding the job mix design tolerances does not constitute acceptance of a mix that does not meet the specifications. Further acceptance testing will be performed to determine if the asphalt pavement specifications have been met. No payment for asphalt pavement will be made for asphalt pavement exceeding job mix design tolerances, or not meeting asphalt pavement specifications, until additional testing determines whether the asphalt pavement meets all other specifications.

SECTION 011120 – MODIFICATIONS TO CBJ STANDARD SPECIFICATIONS

4. For the purposes of this Contract, one lot of asphalt pavement is defined as 500 tons, or a single day's asphalt pavement production of at least 100 tons.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

SECTION 011413 – SITE ACCESS AND STORAGE

PART 1 -- GENERAL

1.1 SCOPE

- A. Work included in this section includes provisions for access and maintenance of the project site.

1.2 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- C. Retain "Use of Site" Paragraph below if Project site is accessible to other parties or if parts of a building being renovated are occupied during construction.
- D. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.3 COORDINATION WITH OCCUPANTS

- A. Owner Occupancy: Owner will occupy the premises during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
- C. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.4 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- C. On-Site Work Hours: Limit work to 6AM to 5PM., Monday through Saturday, except as indicated below where a 10 day 24 hour per day schedule will be allowed at the Mendenhall plant to complete the piping replacement.
 - 1. Alternative Work Schedule: Upon approval of Owner.
- D. Temporary Bypass MWWTP Shutdown: Weather permitting, the CONTRACTOR shall be permitted a 10 day, 24 hour per day time period to complete the piping replacement work at the MWWTP. During the 10 day period the Owner will provide, operate, and maintain a bypass pumping system to bypass the headworks facility. Tentative dates and work plan for completing

SECTION 011413 – SITE ACCESS AND STORAGE

the piping replacement shall be provided to the Owner and Engineer at the pre-construction conference. The CONTRACTOR shall make all arrangements and preparations necessary to ensure the piping replacement can be completed within the approved 10 day shutdown. The CONTRACTOR, shall notify the Owner in writing of the final proposed dates of the shutdown at least 15 days prior to the start of the planned shutdown, and provide an updated work plan to the Engineer with a timeline showing how the work will be completed with 10 days. The CONTRACTOR must have the dates and construction plan approved by the Owner and Engineer at least 48 hours prior to the commencement of the shutdown. The bypass is allowed from April 1 – May 31, 2017. The contractor may not commence influent piping replacement work until the CBJ pump replacement project is completed.

- E. No wastewater flow interruptions will be allowed at JDTP from May 15-September 15.
- F. Demolition of existing solids capture equipment at each plant shall be performed just prior to installation of the new screening equipment so that wastewater treatment is not compromised. Any construction sequencing that would require greater than 24 hours of plant operation without solids capture must be approved by the ENGINEER and the OWNER.

1.5 STORAGE

- A. The Mendenhall Project site will have very limited space for storage of materials and equipment. During the completion of this headworks project, there will also be WORK being done on a Biosolids project. Coordination will be required between the two projects. The Biosolids project will involve the demolition of the existing ABF building and the construction of a new building at the existing ABF building location. The Biosolids project will require a staging area that will occupy the majority of the west side of the project site.
- B. Coordinate with the Owner to identify appropriate staging areas at the Juneau- Douglas Plant.
- C. Provide written request with details for storage of any equipment and materials within the project site for coordination with owner's operations.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

SECTION 012000 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SCOPE

- A. Payment for the items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of WORK being described, as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents.
- B. In addition to other incidental items of WORK listed elsewhere in the contract documents, the following items shall also be considered as incidental to other Items of WORK under this contract:
 - 1. Maintenance of all services through Project area, including water, sewer, storm, garbage pickup, mail delivery, other deliveries and emergency vehicles.
 - 2. The cost of all permits, except that the CBJ shall pay for the building permit.
 - 3. The cost of compliance with the regulations of all relevant agencies.

1.2 PRICE BASED ON COMBINED LUMP SUM

- A. **Pay Item A, MWWTP Headworks Improvements**, will be paid as a lump sum for all work specified in the contract documents for the improvements at Mendenhall Wastewater Treatment Plant.
- B. **Pay Item B, JDTP Headworks Improvements**, will be paid as a lump sum for all work specified in the contract documents for the improvements at the Juneau Douglas Treatment Plant.

1.3 SCHEDULE OF VALUES

- A. The Schedule of Values shall be developed in parallel with the CPM Schedule activities and logic. The steps shall be as follows:
 - 1. The CONTRACTOR shall submit a preliminary Schedule of Values for each pay item for the major components of the WORK at the Preconstruction Conference. The listing shall include, at a minimum, the proposed value for each Specification Section in Divisions 2 to 46 inclusive, and each alternate bid item.
 - 2. The CONTRACTOR and ENGINEER shall meet and jointly review the Schedule of Values and make any adjustments in value allocations necessary, if in the opinion of the ENGINEER, allocation adjustments are necessary to establish fair and reasonable allocation of values for the major WORK components. Front end loading is not permitted. The ENGINEER may require inclusion of other major WORK components not included in the above listing if, in the opinion of the ENGINEER, such additional components are appropriate. This review and any necessary revisions shall be completed within 15 days from the date of Notice to Proceed.
 - 3. The CONTRACTOR and ENGINEER may mutually agree to make adjustments to the original Schedule of Values because of inequities discovered in the original accepted detailed Schedule of Values.

SECTION 012000 - MEASUREMENT AND PAYMENT

1.4 PROGRESS PAYMENTS

- A. CONTRACTOR may request Progress Payments in accordance with the approved Schedule of Values at intervals no greater than monthly, in accordance with the General Conditions.
- B. Contractor shall provide an updated (to the date of the progress payment submittal) construction schedule prior to CBJ approval of the progress payment. No payment will be approved without receipt and review of the updated progress schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form provided by the Owner.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided.
 - b. Coordination information, including a list of changes including design revisions needed to other parts of the Work and to construction performed by Owner and separate contractor, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size,

SECTION 012500 - SUBSTITUTION PROCEDURES

durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 7 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

SECTION 012500 - SUBSTITUTION PROCEDURES

- B. Substitutions will not be considered when they are indicated or implied on Shop Drawings or product data submittals without separate written request, or when acceptance will require substantial revision of the Contract Documents.
- C. Only one request for substitution will be considered for each product. When a substitution request is not accepted by the Owner, then Contractor shall provide specified product.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 30 days after the Notice to Proceed. Requests received after that time will not be considered.
 - 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.

SECTION 012500 - SUBSTITUTION PROCEDURES

- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
- C. Contractor fees shall not exceed fees defined in Section 00700 General Conditions, Article 11.4 Contractor Fees.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Owner's Representative will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued, are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the extension to Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. If an extension to Contract Time is necessary, then include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Engineer.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owner's Representative.

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. If an extension to Contract Time is necessary, then include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Engineer.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Owner's Representative will issue a Change Order for signatures of Owner and Contractor.

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Owner's Representative may issue a Work Change Directive on EJCDC C-940 or a similar form. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012900 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Engineer at earliest possible date, but no later than 28 days after date established for the Notice to Proceed.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section. The following items must be included in the schedule of values:
1. Schedule of Value items:
 - a. Screens at Mendenhall
 - b. Screens at JD
 - c. Washer/Compactor at Mendenhall
 - d. Washer/Compactor at JD
 - e. Demolition Cost at Mendenhall
 - f. Demolition Cost at JD
 - g. Each valve and fitting size
 - h. Stop Logs at JD
 2. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.

SECTION 012900 – PAYMENT PROCEDURES

- e. Name of supplier.
- f. Change Orders (numbers) that affect value.
- g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
- 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. .
- 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
- 7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
- B. Superintendent Resume: Within 28 days of Notice To Proceed, submit a resume for proposed project Superintendent. Superintendent required to have a minimum of 5 years experience managing projects of equivalent or greater scope, complexity, and value.

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

- C. Key Personnel Names: Within 28 days of Notice To Proceed, submit a list of key personnel assignments, including subcontractor foremen and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including office and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone once on site work commences. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- D. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Engineer.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or other approved form.
1. Form and Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven working days for Engineer's response for each RFI.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Engineer's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
 3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 5 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
 2. RFI number including RFIs that were returned without action or withdrawn.
 3. RFI description.
 4. Date the RFI was submitted.
 5. Date Engineer's response was received.
- F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within 5 days if Contractor disagrees with response.

1.7 PROJECT MEETINGS

- A. General: Owner's representative to schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
 2. Agenda: Owner's representative to prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Owner's representative will conduct meeting and record significant discussions and agreements achieved. Representative will distribute the meeting minutes to everyone concerned, including Owner and Engineer, within three days of the meeting.
- B. Preconstruction Conference: Owner's Representative will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 45 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect progress, including the following:

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

- a. Tentative construction schedule.
 - b. Critical work sequencing and long-lead items.
 - c. Designation of key personnel and their duties.
 - d. Lines of communications.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Use of the premises and existing building.
 - l. Work restrictions.
 - m. Working hours.
 - n. Owner's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Procedures for disruptions and shutdowns.
 - q. Construction waste management and recycling.
 - r. Parking availability.
 - s. Office, work, and storage areas.
 - t. Equipment deliveries and priorities.
 - u. First aid.
 - v. Security.
 - w. Progress cleaning.
4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner's Representative, Engineer, and Owner's Commissioning Authority of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Submittals.
 - f. Possible conflicts.
 - g. Compatibility requirements.
 - h. Manufacturer's written instructions.
 - i. Warranty requirements.
 - j. Compatibility of materials.
 - k. Acceptability of substrates.
 - l. Temporary facilities and controls.
 - m. Space and access limitations.

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

- n. Regulations of authorities having jurisdiction.
 - o. Installation procedures.
 - p. Coordination with other work.
 - q. Protection of adjacent work.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Engineer, but no later than 30 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.
 - e. Requirements for delivery of material samples, attic stock, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Owner's partial occupancy requirements.
 - k. Responsibility for removing temporary facilities and controls.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Owner's representative to conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Sequence of operations.
 - 2) Status of submittals.
 - 3) Status of correction of deficient items.
 - 4) Field observations.
 - 5) Status of RFIs.
 - 6) Status of proposal requests.
 - 7) Pending changes.
 - 8) Status of Change Orders.
 - 9) Pending claims and disputes.
 - 10) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Construction schedule updating reports.
 - 3. Daily construction reports.
 - 4. Site condition reports.
 - 5. Special reports.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting schedules and reports.
 - 2. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 1. Working electronic copy of schedule file, where indicated.
 2. PDF electronic file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Site Condition Reports: Submit at time of discovery of differing conditions.
- F. Special Reports: Submit at time of unusual event.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion and Final completion of project.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Provide a separate numbered activity for each specification section and main element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 15 work days, unless specifically allowed by Engineer.
 2. Activity Grouping: Group activities by separate project areas to provide a stand alone schedule for each project area. Coordinate activities between project areas.
 3. Procurement Activities: Include procurement process activities for the following long lead items and major items requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - a. Perforated Plate Screens.

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

- b. Washer/ Compactors.
 - c. Pipe, Fittings, and Valves.
4. Startup and Testing Time: Include no fewer than 3 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than 10 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, inspections, and final completion for each project area and dates of building occupancy.
- E. Recovery Schedule: When periodic update indicates the Work is 7 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
1. Use Microsoft Project or Primavera, for Windows 7 operating system.
- 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)
- A. CPM Schedule: Prepare and submit Contractor's construction schedule no later than 28 days after date established for the Notice to Proceed.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities.
 2. Critical Path Activities: Identify critical path activities. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Manpower: Identify the number of workers that will be dedicated to completion of each activity.
- B. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 7. Accidents.
 - 8. Stoppages, delays, shortages, and losses.
 - 9. Emergency procedures.
 - 10. Orders and requests of authorities having jurisdiction.
 - 11. Services connected and disconnected.
 - 12. Equipment or system tests and startups.

- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule two days before each regularly scheduled weekly progress meeting.

- B. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

END OF SECTION

SECTION 013223 – SURVEY AND LAYOUT DATA

PART 1 - GENERAL

1.1 SCOPE

- A. Work in this section includes provision of field control points, benchmarks and field staking for construction of the project.

1.2 FIELD SURVEY

- A. CONTRACTOR will establish necessary vertical and horizontal surveying control and stationing consistent with the requirement of the Contract Documents based on the Control Point Table contained in the Contract Documents.. .
- B. CONTRACTOR will keep a daily notebook on every stake set (station, offsets, fixture, hub elevation, and cut).

1.3 PRESERVATION OF REFERENCE POINTS AND PROPERTY CORNERS:

- A. The CONTRACTOR shall carefully preserve bench marks, reference points, lot corners, section corners and other stakes, and in case of destruction he shall be charged for the resetting of such points and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance. Cost for resetting such points will be invoiced as noted above.

1.4 ENGINEER'S SURVEYING:

- A. The CONTRACTOR shall allow access to the work area for the ENGINEER to conduct any surveying he determines necessary.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 2. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 4. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

SECTION 013300 - SUBMITTAL PROCEDURES

1.4 SUBMITTAL SCHEDULE

- A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Engineer's final release or approval.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for purchasing.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Owner for Contractor's use in preparing submittals.
1. Owner will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.
 - a. Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in Autocad Civil 3D version 2014.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

SECTION 013300 - SUBMITTAL PROCEDURES

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with bookmarks enabling navigation to each item. Incomplete submittals will be rejected.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use Specification Section and Number. Resubmittals shall identify version of submittal by application of suffix "v" and the number of the resubmittal.
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
 4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name of Contractor.
 - d. Name of firm or entity that prepared submittal.
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Related physical samples submitted directly.
 - j. Indication of full or partial submittal.

SECTION 013300 - SUBMITTAL PROCEDURES

- k. Submittal and transmittal distribution record.
 - l. Other necessary identification.
 - m. Remarks.
5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
- a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- E. Options: Identify options requiring selection by Engineer.
- F. Physical Samples: Physical samples shall be provided for materials where choice of color or finish is to be determined by Owner. Electronic copies of color charts and material finishes are not an acceptable substitute.
- G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- H. Resubmittals: Make resubmittals in same form as initial electronic submittal. Resubmittals to be comprehensive and complete addressing all submittal requirements, not just those cited as requiring revision or additional information in prior review.
- 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
- I. Paper Submittals: Final approved electronic submittals shall be compiled in a comprehensive paper submittal. Paper submittals to be organized by specification section in 3-ring binders with a table of contents referenced to tabs separating each section. Place a permanent label or title block on each submittal item for identification.
- 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide Engineer's approval and comments at beginning of each submittal section. Engineer approval shall identify color and finish choices where utilized.
 - 3. Additional Paper Copies: A minimum of four printed copies are required for final paper submittal unless additional copies are required by separate section of the Contract Documents.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

SECTION 013300 - SUBMITTAL PROCEDURES

- K. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Post electronic submittals as PDF electronic files directly to designated site with automatic email notification to Engineer or Submit electronic submittals via email as PDF electronic files.
 - a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Action Submittals: Submit five paper copies of each submittal unless otherwise indicated. Engineer will return two copies.
 3. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Engineer will not return copies.
 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Standard color charts.
 - c. Statement of compliance with specified referenced standards.
 - d. Testing by recognized testing agency.
 - e. Application of testing agency labels and seals.
 - f. Notation of coordination requirements.
 - g. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.

SECTION 013300 - SUBMITTAL PROCEDURES

- b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file or,
 - b. Five paper copies of Product Data unless otherwise indicated. Engineer will return two copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file or,
 - b. Five opaque copies of each submittal. Engineer will retain two copies; remainder will be returned.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

SECTION 013300 - SUBMITTAL PROCEDURES

- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
- a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
- a. Number of Samples: Submit three sets of Samples. Engineer will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- F. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."
- G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."
- H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- I. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."
- J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.

SECTION 013300 - SUBMITTAL PROCEDURES

- K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- L. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- M. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- N. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- O. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- P. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- Q. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- R. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- S. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- T. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

SECTION 013300 - SUBMITTAL PROCEDURES

- U. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- V. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

SECTION 013300 - SUBMITTAL PROCEDURES

3.2 ENGINEER'S ACTION

- A. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Engineer without action.

END OF SECTION

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer or Owner's Representative.
- C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

SECTION 014000 - QUALITY REQUIREMENTS

- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.

SECTION 014000 - QUALITY REQUIREMENTS

9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

- B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- F. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

SECTION 014000 - QUALITY REQUIREMENTS

1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - e. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer and Commissioning Authority, through Owner's Representative, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

SECTION 014000 - QUALITY REQUIREMENTS

- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
 - 1. Distribution: Distribute schedule to Owner, Engineer, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Unless otherwise noted Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction. The Contractor shall:
 - 1. Coordinate and schedule all special inspection and testing directly with the Owner's special inspector.
 - 2. Provide 48 hours notice to special inspector and Owner's representative of desired time for required special inspections.
 - 3. Group special inspections in a manner that limits number of separate inspection visits and maximizes efficiency of special inspection visits.
 - 4. Repairing or replacing deficient work identified by special inspection or testing at no additional cost to the Owner.
 - 5. Be responsible for the cost of retesting or reinspection of deficient work.

1.9 PERMIT INSPECTIONS

- A. Permit Inspections: Unless otherwise noted the Contractor is responsible for scheduling of permit inspections required by authorities having jurisdiction. The Contractor shall:
 - 1. Provide 48 hours notice to Owner's representative of pending inspections by authorities having jurisdiction.
 - 2. Provide a written copy of each permit inspection finding or results from the authorities having jurisdiction.
 - 3. Coordinate and secure a Temporary Certificate of Occupancy from the authorities having jurisdiction prior to Owner occupancy date.
 - 4. Coordinate and secure Final Certificate of Occupancy from the authorities having jurisdiction.
 - 5. Be responsible for any special inspection fees imposed by the authorities having jurisdiction for building permit inspections scheduled outside normal business hours, without sufficient notice, or any other reason that was not the fault of the Owner.

SECTION 014000 - QUALITY REQUIREMENTS

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Engineer.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Conforms to Design": When used to convey Architect's action on Contractor's submittals, applications, and requests, "conforms to design" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- D. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- E. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- F. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- G. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- H. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- I. "Provide": Furnish and install, complete and ready for the intended use.
- J. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

SECTION 014200 - REFERENCES

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

SECTION 014200 - REFERENCES

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Engineer, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Electric Power Service: Contractor shall provide power for construction operations and temporary facilities. Contractor responsible for cost of power until final completion of Project.
- C. Water and Sewer Service: Contractor shall provide water and sewer service for construction operations and temporary facilities. Contractor responsible for cost of water and sewer service until final completion of Project.
- D. Fuel: Contractor shall provide temporary heat as required for construction operations and temporary facilities. Contractor responsible for fuel cost associated all construction operations and use of temporary facilities.

1.4 SUBMITTALS

- A. Site Plan: Provide a site plan that shows locations of temporary facilities, utility connections, staging areas, and parking areas for construction personnel. Should construction sequencing or phasing alter the locations of the above, then secondary plans showing revised locations are required. Coordinate this site plan with the Contract Drawings.
- B. Project Identification and Temporary Signs, if required by funding agency: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests, Permits, & Inspections: Obtain required permits, tests, and inspections from authorities having jurisdiction for each temporary utility prior to use.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: Use of permanent HVAC systems for temporary use is prohibited. Isolated short term use can occur if approved in writing by the Owners representative. If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures".
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal office-use loading. Conform to local building codes. Field office must be available and fully operational within 45 days of Contract Award.

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building and field offices.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. Provide hot and cold water to all sanitary facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service overhead, unless otherwise indicated.

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Maintain support facilities until Engineer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- B. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- D. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

- F. Protection of Existing Facilities: Protect existing, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Article 6.4 of General Conditions
 - 2. Section 01300 Construction Submittals in CBJ Standard Specifications for Civil Engineering Projects and Subdivision Improvements.
 - 3. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 4. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

SECTION 016000 - PRODUCT REQUIREMENTS

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor through Owner's Representative of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

SECTION 016000 - PRODUCT REQUIREMENTS

6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Engineer will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

SECTION 016000 - PRODUCT REQUIREMENTS

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Engineer's sample", provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

SECTION 016000 - PRODUCT REQUIREMENTS

- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout
 - 2. Field engineering and surveying
 - 3. Installation of the Work
 - 4. Cutting and patching
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

SECTION 017300 - EXECUTION

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer and water-service piping and other utilities as identified on the Drawings.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Where construction schedule does not allow field measurement prior to fabrication layout work according to coordination drawings allowing tolerances needed to assure proper fit of Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Section 013100 "Project Management and Coordination."

SECTION 017300 - EXECUTION

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Owner's Representative promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Owner's Representative when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer and Owner's Representative.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner's Representative. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Owner's Representative before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of four permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

SECTION 017300 - EXECUTION

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

SECTION 017300 - EXECUTION

- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

SECTION 017300 - EXECUTION

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

SECTION 017300 - EXECUTION

1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- 3.8 PROTECTION OF INSTALLED CONSTRUCTION
- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
 - B. Provide protection and maintain conditions that ensure existing to remain gym floor is without damage or deterioration at time of Substantial Completion.
 - C. Comply with manufacturer's written instructions for temperature and relative humidity.
- 3.9 STARTING AND ADJUSTING
- A. Start equipment and operating components per manufacturer's start-up procedure to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
 - B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
 - C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

SECTION 017300 - EXECUTION

- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity. Maintain on-site, and in good working order, devices to measure temperature and humidity, indoors and outdoors.

3.11 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in "Cutting and Patching ."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. The following specification includes all work involved in final closeout of this Project. Included are items such as post construction inspection, acceptance of the Work, closeout records, cleaning, and project record drawings.

1.2 RELATED WORK:

- A. Section 00700 - General Conditions and Section 00800 – Supplementary General Conditions.

1.3 SUBMITTALS:

- A. All required closeout submittals shall be reviewed by the ENGINEER prior to final payment. Items to be submitted are:
 1. Guarantees and Bonds. Provide guarantees and bonds as required herein and as provided by manufacturers of all products and equipment.
 2. Certification of Completion: Certifying completion of construction, compliance with the Contract Documents, and waiver of any claims.
 3. Contractor's Affidavit of Release of Liens.
 4. Final Waiver of Lien.
 5. Consent for Surety to Final Payment:
 6. Insurance Certificate: Certificate to indicate which insurance coverages required by Section 007000 that are to remain in effect after project is completed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CLEANING:

- A. Sweep paved surface, including all adjacent haul streets and other incidental areas, soiled during construction. All lawn or grassed areas shall be raked and cleaned to level and remove all rocks, stones or other debris from construction.

3.2 SUBSTANTIAL COMPLETION AND FINAL INSPECTION:

- A. Submit written certification that project, or designated portion of Project, is substantially complete and request, in writing, a final inspection. The ENGINEER, OWNER, and any representatives of funding agencies will make an inspection within 10 days of receipt of any request.

SECTION 017700 - CLOSEOUT PROCEDURES

- B. Should the ENGINEER determine that the Work is substantially complete, he will prepare a punch list of deficiencies that need to be corrected before final acceptance, and issue a Notice of Substantial Completion with the deficiencies noted.
- C. Should the ENGINEER determine that the Work is not substantially complete, he will immediately notify the CONTRACTOR, in writing, stating reasons. After the CONTRACTOR completes the Work, he shall submit certification and request for final inspection.

3.3 ACCEPTANCE OF THE WORK:

- A. After all deficiencies have been corrected, a Letter of Final Acceptance will be issued. If only designated portions of the project have been inspected, a Letter of Partial Acceptance will be issued for that portion corrected.
- B. Acceptance may be given prior to correction of deficiencies which do not preclude operation and use of the facility; however, final payment will be withheld until all deficiencies are corrected. Until receipt of the Letter of Final Acceptance, the CONTRACTOR shall be responsible for the Work of this Contract.

SECTION 017700 – CLOSEOUT PROCEDURES

COMPLIANCE CERTIFICATE AND RELEASE FORM

PROJECT: CBJ HEADWORKS IMPROVEMENTS
CONTRACT NO: BE17-033

The CONTRACTOR must complete and submit this to the Engineering Contract Administrator with respect to the entire contract.

Completed forms may be submitted upon completion of the Project. All requirements and submittals must be met before final payment will be made to the CONTRACTOR.

I certify that the following and any referenced attachments are true:

- All WORK has been performed, materials supplied, and requirements met in accordance with the applicable Drawings, Specifications, and Contract Documents.
- All Suppliers and Subcontractors have been paid in full with no claims for labor, materials or other services outstanding. If all Subcontractors and suppliers are not paid in full, please explain on a separate sheet.
- All employees have been paid not less than the current prevailing wage rates set by the State of Alaska (or U.S. Department of Labor, as applicable).
- All equal employment opportunity, certified payroll and other reports have been filed in accordance with the prime contract.
- The attached list of Subcontractors is complete (required from CONTRACTOR). The Contract Administrator was advised and approved of all Subcontractors before WORK was performed and has approved any substitutions of Subcontractors.
- All DBE firms listed as a precondition of the prime contract award must have performed a commercially useful function in order for the WORK to count to a DBE goal. All DBE firms performed the WORK stated and have received at least the amount claimed for credit in the Contract Documents.
- All DBE Subcontractors must attach a signed statement of the payment amount received, the nature of WORK performed, whether any balance is outstanding, and indicate that no rebates are involved.
- If the amount paid is less than the amount originally claimed for DBE credit, the CONTRACTOR has attached approval from the Contract Administrator for underutilization.

I understand it is unlawful to misrepresent information in order to receive a payment which would otherwise be withheld if these conditions were not met. I am an authorized agent of this firm and sign this freely and voluntarily. The foregoing statements are true and apply to the following project contractor.

_____ Capacity: CONTRACTOR
 Firm Name

 Signed

 Printed Name and Title

 Date

Return completed form to: Engineering Contract Administrator, City and Borough of Juneau, 155 South Seward Street, Juneau, AK 99801. Call (907) 586-0873 if we can be of further assistance or if you have any questions.

END OF SECTION

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Operation manuals for systems, subsystems, and equipment.
 - 3. Product maintenance manuals.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual for each item specified in individual Specification Sections. Submit operations and maintenance manual content formatted and organized as required by this Section.
- B. Format: Submit operations and maintenance manuals in one of the following formats:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Engineer.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.

SECTION 017823 - OPERATION AND MAINTENANCE DATA

2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Engineer, through Owner's Representative, will return two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 15 days before commencing demonstration and training. Engineer and Commissioning Authority will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Final Completion and at least 10 days before commencing demonstration and training. Engineer and Commissioning Authority will return copy with comments.
 1. Correct or revise each manual to comply with Engineer's and Commissioning Authority's comments. Submit copies of each corrected manual within 10 days of receipt of Engineer's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
 1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Engineer.
 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

SECTION 017823 - OPERATION AND MAINTENANCE DATA

- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
 - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 - 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 - 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

SECTION 017823 - OPERATION AND MAINTENANCE DATA

2.2 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

SECTION 017823 - OPERATION AND MAINTENANCE DATA

2.3 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.

SECTION 017823 - OPERATION AND MAINTENANCE DATA

2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- C. **Manufacturers' Data:** Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- D. **Drawings:** Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."
- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

SECTION 024119 - SELECTIVE DEMOLITION

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 6. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Protect items from damage during transport and storage.
 - 3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

SECTION 024119 - SELECTIVE DEMOLITION

3.2 CLEANING

- A. Remove demolition waste materials from Project site
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Sections:
 - 1. Section 02234 Aggregate Material.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Proposed Mix Designs: Submit in accordance with ACI 301 at least 30 calendar days prior to first-scheduled concrete placement. Provide 28-day strength data for structural concrete and 56-day strength data for mass concrete where mix was used for previous projects within the last year, or minimum 28-day strengths for a new mix. Include laboratory test results, mill test reports, or certificates of compliance for each material used in concrete mixes.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Shop drawings shall comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures".
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
- E. Related Materials: Product data for joint materials, waterstops, admixtures, curing materials, sealants, hardeners, bonding agents and other concrete related materials that are required or proposed.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Material certification tests and delivery certificates for Portland cement, fly ash and other cementitious admixtures.
- C. Material test reports including certification tests for water and aggregates conforming to these specifications.

SECTION 033000 - CAST-IN-PLACE CONCRETE

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
 - 3. ACI 302.1R, "Guide for Concrete Floor and Slab Construction".
 - 4. ACI 304R, "Guide for Measuring, Mixing, Transporting and Placing Concrete".
 - 5. ACI 304.2R, "Placing Concrete by Pumping Methods".
 - 6. ACI 305R, "Hot Weather Concreting".
 - 7. ACI 306.1 and 306R, "Cold Weather Concreting".
 - 8. ACI 308R, "Guide to Curing Concrete".
 - 9. ACI 309R, "Guide for Consolidation of Concrete".
 - 10. ACI 318R, "Building Code Requirements for Structural Concrete".
- E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement; furthermore, all reinforcing steel shall be clean and free of mill scale, rust, debris and any other deleterious material prior to placement.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

SECTION 033000 - CAST-IN-PLACE CONCRETE

- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 1 by 1 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Interior basin and tank form coatings to comply with NSF 61 requirements for potable water.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 2 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
 - 1. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.
 - 2. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious material, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I/II.
- B. Normal-Weight Aggregates: ASTM C 33, graded.
 - 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

SECTION 033000 - CAST-IN-PLACE CONCRETE

- C. Water: ASTM C 94/C 94M and potable.
- D. Grout: Proprietary, pre-mixed, non-ferrous, non-shrink grout conforming to Corps of Engineers specification CRD-C 621.
- E. Adhesive: Use Hilti HY 150 or Simpson AT epoxy for securing dowels and fasteners to hardened concrete. Installation shall conform to the manufacturer's recommendations and instructions.

2.4 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 WATERSTOPS

- A. Flexible PVC Waterstop: CE CRD-C 572 for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes. Waterstops shall be of an approved type, supplied by an approved manufacturer and shall be plastic made of virgin polyvinylchloride compound, shall be ribbed, uniform in dimensions, dense, homogeneous, free from porosity, and as detailed on the Drawings. No reclaimed PVC shall be used in the compound. VINYLEX CORPORATION, 2636 Byington-Solway Road, Knoxville, TN 37931, (Phone 865-690-2211), www.vinylex.com, and GREENSTREAK PLASTIC PRODUCTS, 3400 Tree Court Industrial Blvd., St. Louis, MO 63122, (phone 636-225-9400), www.greanstreak.com, are two of several suppliers who can furnish waterstops meeting these requirements. Approved or-equal materials may also be used.
- B. Preformed Plastic Adhesive Waterstop: Provide SYNKO-FLEX preformed plastic adhesive waterstop and primer as manufactured by SYNKO-FLEX Products, 1277 Boyles Street, Houston, Texas 77020 or approved equal. Preformed plastic waterstop shall meet or exceed all requirements of Federal Specifications SS-S-210, "Sealing Compound for Expansion Joints."
- C. Hydrophilic Waterstop: Provide hydrophilic rubber waterstop, such as Greenstreak, HYDROTITE, style CJ-3030-M, or approved equal. Waterstop to be a combination of chloroprene rubber & hydrophilic rubber. Waterstop to have a delay coating to inhibit initial expansion due to moisture present in fresh concrete. Performance requirements as follows:

SECTION 033000 - CAST-IN-PLACE CONCRETE

1. Chloroprene Rubber:
 - a. Tensile Strength: 1300 psi, minimum (ASTM D412).
 - b. Elongation: 400%, minimum (ASTM D412).
 - c. Hardness (Shore A): 50 ± 5 (ASTM D2240).
 - d. Tear Resistance: 100 lb/in, minimum (ASTM D624).
2. Modified Chloroprene (Hydrophilic) Rubber:
 - a. Tensile Strength: 350 psi, minimum (ASTM D412).
 - b. Elongation: 600%, minimum (ASTM D412).
 - c. Hardness (Shore A): 52 ± 5 (ASTM D2240).
 - d. Tear Resistance: 50 lb/in, minimum (ASTM D624).
3. Accessories: Provide the following accessories per the manufacturer's recommendations.
 - a. Two component epoxy gel for securing waterstop to rough, wet concrete.
 - b. Single component hydrophilic sealant to secure waterstop to rough, dry concrete.
 - c. Cyanacrylate adhesive for all splices.

2.6 JOINT SEALERS

- A. Joints shall be sealed with a mastic joint sealer material of uniform, stiff consistency that does not contain solvents.
- B. The mastic shall tenaciously adhere to primed concrete surfaces, shall remain permanently mastic and shall not contaminate potable water. Product must be NSF 61 approved.
- C. The material shall be of a type that will effectively and permanently seal joints subject to movements in concrete.
- D. The mastic joint sealer shall be an acceptable two-part, non-sag (or self-leveling), non-staining, polyurethane elastomeric sealant which cures at ambient temperature. Acceptable sealants shall conform to ASTM C-920 or Federal Specification TT-S-00227E. Non-sag sealants are to be used on vertical applications while the self-leveling or non-sag sealants may be used in horizontal applications.
- E. Acceptable polyurethane materials include SIKAFLEX/1a and SIKAFLEX/2c NS and 2c SL POLYURETHANE ELASTOMERIC SEALANT, as manufactured by SIKAFLEX CHEMICAL CORP., Santa Fe Springs, CA (213-941-0231), or approved equal.

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

SECTION 033000 - CAST-IN-PLACE CONCRETE

- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, non-dissipating.
- G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A or Class C (preferred). Curing and sealing compounds acceptable for use include, but are not limited to, Super Floor Coat by Euclid Chemical Company. Approved or-equal products may be used.

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersable, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Adhesive Anchors: Hilti HIT-RE 500-SD, HIT-HY150 MAX, or Simpson SET XP adhesive anchors. Install per manufacturer's recommendations.
- E. Expansion Anchors: Hilti Kwik Bolt TZ or Simpson Strong-Bolt expansion anchor. Install per manufacturer's recommendations.

2.9 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

SECTION 033000 - CAST-IN-PLACE CONCRETE

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

C. Proportion normal-weight concrete mixture as follows:

1. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
2. 28-day Compressive Strength: 4000 psi minimum
3. Entrained air 5-7%, at point of placement
4. Maximum-size aggregate: ¾ inch
5. Maximum water/cement ratio: 0.45
6. Minimum cement content: 611 lbs/cy (6.5 sack)

D. Slump Limits: Proportion and design mixes to result in a concrete slump at point of placement of:

1. Not less than 1" and not more than 4".
2. When a high-range water-reducing admixture or a plasticizing admixture is approved, assure the concrete has a slump of 2" to 4" before the addition of the admixture, and a maximum slump of 8" at point of placement after admixture is added.

2.10 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes or 250 revolutions of the mixing drum whichever occurs first.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Construct forms tight enough to prevent loss of concrete mortar.

SECTION 033000 - CAST-IN-PLACE CONCRETE

- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- F. Chamfer exterior corners and edges of permanently exposed concrete per the Drawings.
- G. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength and in the case of shored slabs no less than 14 days.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

SECTION 033000 - CAST-IN-PLACE CONCRETE

- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
 - 2. Form keyed joints where indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate horizontal joints in walls and columns at underside of floors, slabs, and beams, and at the top of footings or floor slabs.
 - 4. Space vertical joints in walls as indicated.
 - 5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

SECTION 033000 - CAST-IN-PLACE CONCRETE

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Cut joints no later than 18 hours after concrete has been placed.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.
- B. Preformed Plastic Adhesive Waterstops: Install in non-moving construction joints at locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.
- C. Hydrophilic Waterstops: Cut coil ends square with shears or sharp blade to fit splices together without overlaps. Splices shall be sealed using cyanacrylate adhesive and single component hydrophilic sealant. Seal all exposed cells. Follow manufacturer's approved written instructions.
- D. All Waterstops: Maintain continuity of waterstops at all intersections and transitions.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

SECTION 033000 - CAST-IN-PLACE CONCRETE

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints. Lift heights shall not exceed 24 inches nor shall the fresh concrete be allowed to free fall more than 5 feet.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1.
- F. Hot-Weather Placement: Comply with ACI 305 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
- 3.8 ORDER OF PLACING CONCRETE
- A. General: The order of placing concrete shall be acceptable to the Engineer.
 - B. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by the construction joints at the indicated locations on the Drawings.
 - C. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall have cured at least 5 days for hydraulic structures (basins and tanks) and 2 days for all other structures before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the 2 adjacent wall panels have cured at least 10 days for hydraulic structures and 4 days for all other structures.

SECTION 033000 - CAST-IN-PLACE CONCRETE

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces of perimeter foundation walls.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to view.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.
 - 1. Top of tanks and basin walls adjacent to walkways shall receive a porous trowel finish.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surface of floor slab, surface of Thickener base and roof topping slab.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
 - 1. Apply a trowel finish to surface of floor slab, surface of Thickener base and roof topping slab.

SECTION 033000 - CAST-IN-PLACE CONCRETE

2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
- D. Broom Finish: Apply a broom finish to elevated concrete slabs of tanks and basins, and exterior concrete walks, steps, ramps, and elsewhere as indicated.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

SECTION 033000 - CAST-IN-PLACE CONCRETE

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 CONCRETE FLOOR SEALING

- A. Application of curing and sealing compound: Prepare, apply, and finish compound according to manufacturer's written instructions.
 1. Remove oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Apply compound at the recommended coverage rate until the surface is saturated and then apply a second at the prescribed rate in accordance with the manufacturer's written instructions.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Patching Mortar: Use non-shrink grout conforming to these specifications.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with grout before bonding agent has dried. Fill form-tie voids with grout or cone plugs secured in place with epoxy bonding agent.
 2. Repair defects on surfaces exposed to view using grout. Area beyond repaired defect shall be rubbed with a thin fluid layer of grout using burlap to match the surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact grout in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

SECTION 033000 - CAST-IN-PLACE CONCRETE

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete.
3. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
4. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
5. Repair random cracks and single holes 1 inch or less in diameter with grout. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place grout before bonding agent has dried. Compact grout and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

- E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and grout.
- F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engineer will perform field tests and inspections and prepare test reports.
- B. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

SECTION 033000 - CAST-IN-PLACE CONCRETE

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 - b. Cast and field cure one set of two standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimen at 7 days and one set of two specimens at 28 days. The fourth cylinder shall be held in reserve in the event the 28 day tests fail to meet the specified compressive strength.
 - a. Test field-cured specimens as needed.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at 28 days.
7. When strength of field-cured cylinders is less than 85 percent of the companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency

SECTION 033000 - CAST-IN-PLACE CONCRETE

may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by the Engineer.

12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.16 PROTECTION OF SEALED FLOOR

- A. Protect sealed floor from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

SECTION 042200 – CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU's).
2. Decorative concrete masonry units.
3. Steel reinforcing bars.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
2. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
3. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

D. Samples: For each type and color of exposed masonry unit.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product indicated. For masonry units include data on material properties.

SECTION 042200 – CONCRETE UNIT MASONRY

1.5 QUALITY ASSURANCE

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Concrete Masonry Units (CMU): ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
 - 2. Density Classification: Normal weight.
- C. Decorative CMU: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
 - 2. Density Classification: Normal weight.
 - 3. Pattern and Texture:
 - a. Standard pattern, split-face finish. See Architectural drawings.
 - b. Standard scored unit in 8x8 pattern.

SECTION 042200 – CONCRETE UNIT MASONRY

2.3 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout.

2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C 144.
 - 1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- E. Aggregate for Grout: ASTM C 404.
- F. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.
- G. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
 - 1. Exterior Walls: Hot-dip galvanized, carbon steel.
 - 2. Wire Size for Side Rods: 0.148-inch diameter.
 - 3. Wire Size for Cross Rods: 0.148-inch diameter.
 - 4. Wire Size for Veneer Ties: 0.148-inch diameter.
 - 5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
 - 6. Provide in lengths of not less than 10 feet.

2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.

SECTION 042200 – CONCRETE UNIT MASONRY

3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch-diameter, hot-dip galvanized steel wire.
- C. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- D. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.7 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and Section 076200 "Sheet Metal Flashing and Trim".
- B. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.
- E. Wicking Material: Cotton or polyester rope, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity between wythes.

SECTION 042200 – CONCRETE UNIT MASONRY

2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime mortar unless otherwise indicated.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For reinforced masonry, use Type S.
 - 2. Colored Mortar: Color mortar “red” for the red split-faced CMU units.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
 - 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
 - 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

SECTION 042200 – CONCRETE UNIT MASONRY

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.2 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.

SECTION 042200 – CONCRETE UNIT MASONRY

4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
 - B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
 - C. Tool exposed joints as indicated on the Architectural drawings.
 - D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- 3.4 CAVITIES:
- A. Keep cavities clean of mortar droppings and other materials during construction.
 - B. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.
- 3.5 MASONRY JOINT REINFORCEMENT
- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 1. Space reinforcement not more than 24 inches o.c.
 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
 - B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
 - C. Provide continuity at wall intersections by using prefabricated T-shaped units.
 - D. Provide continuity at corners by using prefabricated L-shaped units.
- 3.6 CONTROL JOINTS:
- A. General: Install control joints in unit masonry where indicated; see Architectural Exterior Elevations. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
 - B. Form control joints in concrete masonry as follows:
 1. Fit control joint key into hollow contour in ends of concrete masonry units. Seal joint with backer rod and joint sealant at exposed face of joint.

SECTION 042200 – CONCRETE UNIT MASONRY

3.7 LINTELS:

- A. Install steel lintels where indicated on the Drawings.
- B. Provide masonry lintels where shown and where openings of more than 24 inches for block-size units are shown without structural steel or other supporting lintels.
 - 1. Provide prefabricated or built-in-place masonry lintels. Use specially formed bond beam units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
 - 1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 FLASHING

- A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At lintels, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 - 3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 - 4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
 - 5. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing. Install vents in vertical head joints at the top of each continuous cavity at spacing indicated.

SECTION 042200 – CONCRETE UNIT MASONRY

- a. Weeps: Install weeps in outer wythe at 16 inches on center horizontally above through-wall flashing, above shelf angles and lintels and at the bottom of the walls.
- b. Use round plastic tubing to form weep holes.
- c. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

C. Masonry Flashings:

1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, at bottom of walls and as shown on the Drawings. Turn down on outside face to form drip.
2. Turn flashing up a minimum of 8 inches and bed into mortar joint of CMU back-up wall or seal to CMU wall surface.
3. Lap end joints and seal watertight.
4. Turn flashing, fold, and seal at corners, bends and interruptions.

3.10 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 12.67 feet.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Engineer will perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. Inspections: Level 1 special inspections according to the "International Building Code."

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

SECTION 042200 – CONCRETE UNIT MASONRY

2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, points to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes and completely fill with mortar. Point-up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.13 PROTECTION

- A. Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.
- B. Recycling: Undamaged, excess masonry materials are CONTRACTOR's property and shall be removed from the project site for his use.
- C. Excess Masonry Waste: Remove excess masonry waste and legally dispose of off OWNER's property.

END OF SECTION

SECTION 051200 – STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes structural steel.

1.2 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication details and erection plan of structural steel components.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Welding certificates.
- C. Mill test reports for structural steel, including chemical and physical properties.
- D. Source quality-control reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

SECTION 051200 – STRUCTURAL STEEL FRAMING

- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angles: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
- F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F436, Type 1, hardened carbon-steel washers; all with plain finish.
- B. Headed Anchor Studs: ASTM A 108, Type A, headed-stud type, cold-finished carbon steel.
- C. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
 - 1. Finish: Plain.
- D. Threaded Rods: ASTM A 36/A 36M.
 - 1. Finish: Plain.

2.3 PRIMER

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Top Coat: Comply with Section 099000 "Painting and Coatings".
- C. Primer: SSPC-Paint 25, Type I, zinc oxide, alkyd, linseed oil primer.

SECTION 051200 – STRUCTURAL STEEL FRAMING

- D. Primer: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.4 GROUT

- A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
- B. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

SECTION 051200 – STRUCTURAL STEEL FRAMING

1. SSPC-SP 2, "Hand Tool Cleaning."
 2. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 3. Ultrasonic Inspection: ASTM E 164.
 4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

SECTION 051200 – STRUCTURAL STEEL FRAMING

1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of baseplate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engineer will inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.
1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at the Engineer's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents at no additional cost to the Owner.

END OF SECTION

SECTION 055100 – METAL STAIRS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Industrial-type stairs with steel grating treads.
 - 2. Metal Ladders.

1.2 ACTION SUBMITTALS

- A. Product Data: For metal stairs.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.3 QUALITY ASSURANCE

- A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Industrial-Type Stairs: Industrial class.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Bars for Grating Treads: ASTM A 1011 or ASTM A 1018.
- D. Wire Rod for Grating Crossbars: ASTM A 510.

2.2 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: For bolt diameters of 1/2" or less, regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A 563; and where indicated, flat washers.

SECTION 055100 – METAL STAIRS

2.3 FABRICATION, GENERAL

- A. Provide stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by shop welding and field bolting, except where indicated.
 - 2. Use connections that maintain structural value of joined pieces.
 - 3. Coordinate railing attachment with railing manufacturer.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
- C. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously unless otherwise indicated.

2.4 STEEL-FRAMED STAIRS

- A. Stair Framing:
 - 1. Fabricate stringers of steel channels.
 - 2. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
- B. Metal Bar-Grating Stairs: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."
 - 1. Fabricate treads and platforms from steel grating with 1-1/4-by-3/16-inch bearing bars at 1 3/16 inch o.c and crossbars at 4 inches o.c.
 - 2. Fabricate grating treads with slip resistant nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.

2.5 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3 unless otherwise indicated.
- B. Steel Ladders:
 - 1. Space side rails 18 apart unless otherwise indicated.
 - 2. Side rails: Continuous, as indicated on Drawings.
 - 3. Rungs: 7/8-inch diameter steel bars.
 - 4. Fit rungs in centerline of siderails; fillet-weld all-around on inner rail faces.
 - 5. Provide nonslip surfaces on top of each rung by coating with abrasive material metallurgically bonded to rung.

SECTION 055100 – METAL STAIRS

6. Support each ladder as indicated.
7. fasteners, with zinc-rich primer. Finish to match ladder per Architectural Drawings.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- B. Install metal stairs by bolting as indicated.
- C. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.

3.2 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel pipe and tube railings.
- B. See Section 055100 "Metal Stairs" for steel tube railings associated with metal stairs.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and coatings.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish required.

SECTION 055213 - PIPE AND TUBE RAILINGS

- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Steel Pipe and Tube Railings:
 - a. Pisor Industries, Inc.
 - b. Wagner, R & B, Inc.; a division of the Wagner Companies.

2.2 METALS, GENERAL

- A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 STEEL

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- D. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Provide the following:
 - 1. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.

SECTION 055213 - PIPE AND TUBE RAILINGS

- B. Post-Installed Anchors: Expansion and or epoxy grouted anchors as shown on the drawings.
- C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- D. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- G. Shop Primer for Galvanized Steel: Water based galvanized metal primer complying with MPI#134.
- H. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- I. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION

- A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. Non-welded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- E. Form changes in direction by bending.
- F. Bend members in jigs to produce uniform curvature without buckling or otherwise deforming exposed surfaces.
- G. Close exposed ends of railing members with prefabricated end fittings.

SECTION 055213 - PIPE AND TUBE RAILINGS

- H. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers to transfer loads through wall finishes.

2.6 STEEL FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize steel railings, including hardware, after fabrication.
 - 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
 - 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
- B. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Anchor posts in concrete by inserting into formed or core-drilled holes and grouting annular space.
- D. Anchor posts to metal surfaces with oval flanges.
- E. Anchor railing ends at walls with round flanges anchored to wall construction.
- F. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces.

SECTION 055213 - PIPE AND TUBE RAILINGS

3.2 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 055300 – METAL GRATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Metal bar gratings.

- B. Related Sections:

- 1. Section 051200 "Structural Steel Framing" for structural-steel framing system components.
- 2. Section 055100 "Metal Stairs" for grating treads and landings of steel-framed stairs.
- 3. Section 055213 "Pipe and Tube Railings" for metal pipe and tube handrails and railings.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

- 1. Walkways and Elevated Platforms: Uniform load of 60 lbf/sq. ft.
- 2. Floors: 100 lbf/sq.ft.
- 3. Limit deflection to L/240 or 1/4 inch, whichever is less.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Include plans, sections, details, and attachments to other work.

1.5 QUALITY ASSURANCE

- A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with gratings by field measurements before fabrication.

SECTION 055300 – METAL GRATINGS

1.7 COORDINATION

- A. Coordinate installation of anchorages for gratings, grating frames, and supports. Furnish setting drawings, templates, and directions for installing anchorages.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. Steel Bars for Bar Gratings: ASTM A 1011 or ASTM A 1018.
- B. Wire Rod for Bar Grating Crossbars: ASTM A 510.

2.2 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633. Select fasteners for type, grade, and class required.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

2.3 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy that is welded.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20.

2.4 FABRICATION

- A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
- D. Fit exposed connections accurately together to form hairline joints.

SECTION 055300 – METAL GRATINGS

- E. Welding: Comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.
- G. Provide bands at all cutouts and where bearing bars are interrupted. Weld banding to each cut bearing bar.
- H. Where grating forms the landing at the top of a stairway, provide a slip resistant nosing at the leading edge of the landing. Match the nosing provided on the stair treads in type and length.

2.5 METAL BAR GRATINGS

- A. Welded Steel Grating:
 - 1. Bearing Bar Spacing: 1-3/16 inches o.c.
 - 2. Bearing Bar Depth: 1-1/4 inches.
 - 3. Bearing Bar Thickness: 1/8 inch, minimum.
 - 4. Crossbar Spacing: 4 inches o.c.
 - 5. Traffic Surface: Plain.
 - 6. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.

2.6 GRATING FRAMES AND SUPPORTS

- A. Frames and Supports for Metal Gratings and Floor Plate: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.
 - 1. Unless otherwise indicated, fabricate from same basic metal as gratings.
 - 2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- B. Galvanize steel frames and supports.

2.7 STEEL FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

SECTION 055300 – METAL GRATINGS

- B. Finish gratings, plates, frames, and supports after assembly.
- C. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.
- D. Fit exposed connections accurately together to form hairline joints.
 - 1. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

3.2 INSTALLING METAL BAR GRATINGS

- A. General: Install pieces to comply with recommendations of referenced bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.
- C. Attach non-removable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above.

3.3 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 061000 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: ICC-ES evaluation reports for wood-preservative treated wood,[fire-retardant treated wood, engineered wood products and metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Provide dressed lumber as noted on the drawings marked with grade stamp of inspection agency.
- B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable Design Stresses: Engineered wood products shall have allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be demonstrated by comprehensive testing.

2.2 TREATED MATERIALS

- A. Preservative-Treated Materials: AWWPA U1; Use Category UC1 for exterior construction not in contact with the ground, and use Category UC4B for items in contact with the ground.
 - 1. Use treatment containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 - 2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - 3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- B. Provide preservative-treated materials for items indicated on Drawings, and the following:
 - 1. Wood sills, blocking, and similar concealed members in contact with masonry or concrete.
 - 2. Wood framing members that are less than 18 inches above the ground.

2.3 FRAMING

- A. Certified Wood: Wood framing shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and to FSC STD-40-004, "FSC Standard for Chain of Custody Certification."

SECTION 061000 – ROUGH CARPENTRY

B. Dimension Lumber:

1. Maximum Moisture Content: 19 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal.
2. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
 - a. Species: Douglas Fir or Southern Pine
 - b. Grade: No. 2 or better

C. Timbers 5-Inch Nominal Size and Thicker: Select Structural No. 1: Douglas fir-larch; WCLIB, or WWPA.

- a. Maximum Moisture Content: 19 percent

2.4 MISCELLANEOUS LUMBER

A. Miscellaneous Dimension Lumber: No. 2 grade with 19 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

2.5 MISCELLANEOUS PRODUCTS

A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

1. Power-Driven Fasteners: CABO NER-272.
2. Bolts: Steel bolts complying with ASTM A 307, Grade A with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

B. Metal Framing Anchors: Structural capacity, type, and size indicated.

1. Manufacturers: One of the following:
 - a. Simpson Strong-Tie Co., Inc.
 - b. USP Structural Connectors
2. Use anchors made from hot-dip galvanized steel complying with ASTM A 653/A 653M, G60 coating designation for interior locations where stainless steel is not indicated.

C. Sill Sealer: Glass-fiber insulation, 1 inch (25 mm) thick, compressible to 1/32 inch.

D. Flexible Flashing: Self-adhesive product consisting of a butyl rubber or rubberized-asphalt compound, bonded to a backing sheet to produce an overall thickness of not less than 0.025 inch.

SECTION 061000 – ROUGH CARPENTRY

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Do not splice structural members between supports unless otherwise indicated.
- D. Securely attach rough carpentry to substrates, complying with the following:
 - 1. CABO NER-272 for power-driven fasteners.
 - 2. Published requirements of metal framing anchor manufacturer.
 - 3. Table 2304.9.1, "Fastening Schedule," in the IBC.

END OF SECTION

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood roof trusses.
2. Wood truss bracing.

1.2 ACTION SUBMITTALS

A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.

B. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Evaluation Reports: For the following, from ICC-ES:

1. Metal-plate connectors.
2. Metal truss accessories.

1.4 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, licensed in the State of Alaska, to design metal-plate-connected wood trusses.

B. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.

2.2 DIMENSION LUMBER

A. Certified Wood: For metal-plate-connected wood trusses and permanent bracing, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Provide dry lumber with no more than 19 percent maximum moisture content at time of dressing.

C. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 METAL CONNECTOR PLATES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

1. Alpine Engineered Products, Inc.; an ITW company.
2. Cherokee Metal Products, Inc.; Masengill Machinery Company.
3. CompuTrus, Inc.
4. Eagle Metal Products.
5. Jager Building Systems, Inc.; a Tembec/SGF Rexfor company.
6. MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc.
7. Robbins Engineering, Inc.
8. Truswal Systems Corporation; an ITW company.

B. General: Fabricate connector plates to comply with TPI 1.

C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.

C. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

D. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

2.6 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
- H. Install bracing to comply with the truss manufacturer's design engineer of record.
- I. Install wood trusses within installation tolerances in TPI 1.
- J. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- K. Replace wood trusses that are damaged or do not meet requirements.

END OF SECTION

SECTION 067413 – FIBERGLASS REINFORCED GRATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glass-fiber-reinforced-plastic gratings and frames and supports for gratings.

1.2 ACTION SUBMITTALS

- A. Product Data: For glass-fiber-reinforced-plastic gratings.
- B. Shop Drawings: Include manufacturer's published load tables, plans, sections, details, and attachments to other work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Grating, LLC.
 - 2. Creative Pultrusions, Inc.
 - 3. Fibergrate Composite Structures Inc.
 - 4. McNichols Co.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1. Floors: Uniform load of 100 lbf/sq. ft. or a concentrated load of 300 lbf, whichever produces the greater stress.
 - 2. Walkways and Elevated Platforms: Uniform load of 60 lbf/sq. ft.
 - 3. Limit deflection to L/240 or 1/4 inch, whichever is less.

2.3 GLASS-FIBER-REINFORCED-PLASTIC GRATINGS

- A. Pultruded Glass-Fiber-Reinforced Gratings: Bar gratings assembled from components made by simultaneously pulling glass fibers and extruding thermosetting plastic resin through a heated die under pressure to produce a product without voids and with a high glass-fiber content.
 - 1. Configuration: 2-inch T-bars spaced no more than 4 inches with a solid plank surface, closely spaced mesh (less than 1") or continuous bars with gaps 1/4" or less.

SECTION 067413 – FIBERGLASS REINFORCED GRATINGS

2. Traffic Surface: Grit for slip-resistance

2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, where shown on the drawings. Select fasteners for type, grade, and class required.

2.5 FABRICATION

- A. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form gratings from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
- C. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.

2.6 GRATING FRAMES AND SUPPORTS

- A. Frames and Supports for Glass-Fiber-Reinforced-Plastic Gratings: Fabricate from glass-fiber-reinforced-plastic shapes of sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.
 1. Equip units indicated to be cast into concrete or built into masonry with integral anchors.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
- B. Fit exposed connections accurately together to form hairline joints.

3.2 INSTALLING GLASS-FIBER-REINFORCED-PLASTIC GRATINGS

- A. Comply with manufacturer's written instructions for installing gratings. Use manufacturer's standard stainless-steel anchor clips and hold-down devices for bolted connections.

END OF SECTION

SECTION 072100 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the CONTRACT, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Concealed building insulation.
 - 2. Vapor retarders.
 - 3. Air Infiltration Barriers
 - 4. Self Adhering Underlayment

1.3 DEFINITIONS

- A. Mineral-Fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

SECTION 072100 - BUILDING INSULATION

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the WORK include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the WORK include, but are not limited to, manufacturers specified.

2.2 SELF ADHERING UNDERLAYMENT AND FLASHING

- A. General: Cross laminated high density polyethylene sheet, with pressure sensitive rubberized asphalt adhesive, in 24 mil thickness, widths as required. W.R. Grace "Vycor Plus".

2.3 GLASS-FIBER BLANKET INSULATION

- A. Available Manufacturers:
 - 1. CertainTeed Corporation.
 - 2. Guardian Fiberglass, Inc.
 - 3. Johns Manville.
 - 4. Knauf Fiber Glass.
 - 5. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

SECTION 072100 - BUILDING INSULATION

- C. Where glass-fiber blanket insulation is indicated, provide blankets in batt or roll form of thickness sufficient to completely fill wall cavity.

2.4 AIR INFILTRATION BARRIER

- A. Breathable Underlayment: Dupont Tyvek CommercialWrap.
- B. Auxiliary Materials: Auxiliary materials shall be produced by the breathable underlayment manufacturer or approved for use with their system. Auxiliary materials include:
 - 1. Single sided and double sided tape, in widths required.
 - 2. Breathable Underlayment fasteners, for securing underlayment to substrate.. #12 case hardened steel, corrosion resistance plated, with plastic plates, 1" diameter. Length as required to penetrate substrate ¾".
 - 3. Spray Adhesive for securing overlaps.

2.5 VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, **10 mils** thick, with maximum permeance rating of **0.13 perm**.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, grade level, site compaction with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

SECTION 072100 - BUILDING INSULATION

- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Install glass-fiber insulation in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Install mineral-fiber blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
 - b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

3.5 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners **16 inches** o.c.
- C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.6 INSTALLATION OF SELF ADHERING UNDERLAYMENT

- A. General: Install as recommended by manufacturer, in 3" minimum overlaps as required to shingle water away from building interior. Utilize "ripcord" to split release backing where installation sequence requires installation of one half of the flashing prior to the other.

SECTION 072100 - BUILDING INSULATION

3.7 INSTALLATION OF AIR INFILTRATION BARRIER

- A. General: Install breathable underlayment in compliance with manufacturer written directions and installed over metal studs and furring strips as shown in construction documents. Install in continuous horizontal lengths. Horizontal and vertical overlaps 6" minimum. Apply continuous strip of double sided tape between overlaps directly over backing. Install fasteners and washers through overlap layers and thread into substrate. Seal fastener plates with single sided tape, 4"x4".

3.8 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 074213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Exposed-fastener, lap-seam metal wall panels.

- B. Related Sections:

- 1. Section 074213.53 "Metal Soffit Panels" for metal panels used in horizontal soffit applications.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
 - 6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
 - 7. Review temporary protection requirements for metal panel assembly during and after installation.
 - 8. Review of procedures for repair of metal panels damaged after installation.
 - 9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

SECTION 074213.13 - FORMED METAL WALL PANELS

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
1. Include Samples of trim and accessories involving color selection.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
 - C. Field quality-control reports.
 - D. Sample Warranties: For special warranties.
- 1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For metal panels to include in maintenance manuals.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
 - B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
 - C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

SECTION 074213.13 - FORMED METAL WALL PANELS

- D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:

- a. Structural failures including rupturing, cracking, or puncturing.
- b. Deterioration of metals and other materials beyond normal weathering.

- 2. Warranty Period: Two years from date of Substantial Completion.

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

- 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

- 1. Wind Loads: 120 mph exposure C.
- 2. Other Design Loads: As indicated on Drawings.

SECTION 074213.13 - FORMED METAL WALL PANELS

3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:
 1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 1. Test-Pressure Difference: 2.86 lbf/sq. ft. (137 Pa).
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. General: Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.
- B. Vee-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, V-shaped ribs and recesses that are approximately same size, evenly spaced across panel width, and with rib/recess sides angled at approximately 45 degrees.
 1. Basis of Design: AEP Span; Mini-V-Beam. Source steel as required to comply with provisions of American Iron and Steel Act.
 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: 24 gauge.
 - b. Exterior Finish: Three-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.
 3. Rib Spacing: 4 9/16" o.c.
 4. Panel Coverage: 32 inches (813 mm).
 5. Panel Height: 1.375 inches (35 mm).

SECTION 074213.13 - FORMED METAL WALL PANELS

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

SECTION 074213.13 - FORMED METAL WALL PANELS

- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 3. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 - 1. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

SECTION 074213.13 - FORMED METAL WALL PANELS

2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving metal panels.
 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 3. Install screw fasteners in predrilled holes.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as metal panel work proceeds.
 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 1. Steel Panel Fasteners: Stainless steel fasteners approved by metal panel manufacturer and including EPDM washers where exposed to the exterior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

SECTION 074213.13 - FORMED METAL WALL PANELS

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:

1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On

SECTION 074213.13 - FORMED METAL WALL PANELS

completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 074213.53 - METAL SOFFIT PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes metal soffit panels.
- B. Related Sections:
 - 1. Section 074213.13 "Formed Metal Wall Panels" for lap-seam metal wall panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

SECTION 074213.53 - METAL SOFFIT PANELS

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.

SECTION 074213.53 - METAL SOFFIT PANELS

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings.
 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:
1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
1. Test-Pressure Difference: 2.86 lbf/sq. ft. (137 Pa).
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METAL SOFFIT PANELS

- A. General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

SECTION 074213.53 - METAL SOFFIT PANELS

- B. Flush-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels.
1. Basis of Design: AEP Span; Prestige (R-1). Source steel as required to comply with provisions of American Iron and Steel Act.
 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: 24 gauge.
 - b. Exterior Finish: Three-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.
 3. Panel Coverage: 12 inches (305 mm).
 4. Panel Height: 1.5 inches (38 mm).

2.3 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

SECTION 074213.53 - METAL SOFFIT PANELS

- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 - 1. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine framing to verify that support members and anchorage have been installed within alignment tolerances required by metal panel manufacturer. Provide additional framing as required to suit conditions.
 - 2. Examine framing or blocking and verify that installation is within flatness tolerances required by metal panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.

SECTION 074213.53 - METAL SOFFIT PANELS

5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling, and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.3 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non Penetrating thermoplastic polyolefin (TPO) roofing system.
2. Roof insulation.

B. Related Requirements:

1. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings and copings.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.
- B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
- C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other WORK.
 1. Base flashings and membrane terminations.
 2. Tapered insulation, including slopes.
 3. Insulation fastening patterns.
- C. Samples for Verification: For the following products:
 1. 12-by-12-inch (300-by-300-mm) square of sheet roofing, of color specified, including T-shaped side and end lap seam.
 2. 12-by-12-inch (300-by-300-mm) square of roof insulation.
 3. 12-inch (300-mm) length of metal termination bars.
 4. 12 x 6 length of TPO clad metal flashing
 5. Six insulation fasteners of each type, length, and finish.
 6. Six roof cover fasteners of each type, length, and finish.
 7. Special fastener/washer combination for non-penetrating mechanically fastened roofing system
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 1. Submit evidence of meeting performance requirements.
- F. Qualification Data: For Installer and manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- H. Research/Evaluation Reports: For components of membrane roofing system.
- I. Maintenance Data: For roofing system to include in maintenance manuals.
- J. Warranties: Special warranties specified in this Section.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- K. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.
- B. Contractor As-Builts: Redlined record drawings showing changes of condition or scope recorded during construction.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty. Installer must submit evidence that they have installed at least 10 roof membranes identical to that specified in the previous 10 years.
- B. Manufacturer Qualifications: A qualified manufacturer that produces membrane roofing system identical to that used for this Project.
- C. Source Limitations: Obtain components for membrane roofing system from and approved by roofing membrane manufacturer.
- D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class B; ASTM E 108, for application and roof slopes indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes no dollar limit to roofing substrate, membrane, base flashings, roofing membrane seams, patches and welds, accessories provided by roof membrane manufacturer, roof insulation, TPO clad flashing, TPO clad washers and fasteners, cover boards, walkway products and other components of membrane roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.
3. Include coverage for damage to membrane roofing system for wind and wind pressures up to the design values indicated.

- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form in section 3.10, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 1. Products: Subject to compliance with requirements, provide one of the products specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7 to loads as required to meet the design wind loads for this location as determined by City and Borough of Juneau per the International Building Code.

2.3 TPO ROOFING

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: Uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced, and as follows:
 - 1. Manufacturers:
 - a. Carlisle SynTec Incorporated.
 - b. Johns Manville International, Inc.
 - c. Sarnafil Inc.
 - 2. Thickness: 60mil, nominal.
 - 3. Exposed Face Color: Gray.
 - 4. Physical Properties:
 - a. Breaking Strength: 225 lbf (1 kN); ASTM D 751, grab method.
 - b. Elongation at Break: 15 percent; ASTM D 751.
 - c. Tearing Strength: 55 lbf (245 N) minimum; ASTM D 751, Procedure B.
 - d. Brittleness Point: Minus 22 deg F (30 deg C).
 - e. Ozone Resistance: No cracks after sample, wrapped around a 3-inch- (75-mm-) diameter mandrel, is exposed for 166 hours to a temperature of 104 deg F (40 deg C) and an ozone level of 100 pphm (100 mPa); ASTM D 1149.
 - f. Resistance to Heat Aging: 90 percent minimum retention of breaking strength, elongation at break, and tearing strength after 166 hours at 240 deg F (116 deg C); ASTM D 573.
 - g. Water Absorption: Less than 4 percent mass change after 166 hours' immersion at 158 deg F (70 deg C); ASTM D 471.
 - h. Linear Dimension Change: Plus or minus 2 percent; ASTM D 1204.

2.4 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing and substrate.
 - 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as sheet membrane.
- C. Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for base flashings.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- D. Clad Flashing: TPO clad metal flashing, 24 gage, approved by membrane manufacturer for use with the specified membrane and included in the roof warranty coverage.
- E. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470,
- G. Non Penetrating Mechanically Fastened Roofing System: Provide proprietary clad metal plate/fastener system for use with electromagnetic induction welding technology, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer..
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.5 VAPOR RETARDER

- A. Polyethylene Vapor Retarder: ASTM D 4397, 10 mils (0.15 mm) thick, minimum, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
 - 1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
 - 2. Adhesive: Manufacturer's standard lap adhesive, FMG approved for vapor-retarder application.

2.6 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
 - 1. Available Manufacturers:
 - a. AlliedSignal Inc.; Commercial Roofing Systems.
 - b. Apache Products Company.
 - c. Atlas Roofing Corporation.
 - d. Carlisle SynTec Incorporated.
 - e. Celotex Corporation.
 - f. Firestone Building Products Company.
 - g. GenFlex Roofing Systems.
 - h. Hunter Panels, LLC.
 - i. Johns Manville International, Inc.
 - j. Koppers Industries.
 - k. RMAX.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- C. Tapered Insulation: Provide factory-tapered Expanded Polystyrene insulation boards fabricated to provide a finished slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to $\pm 1/8$ " per foot slopes indicated or as required to achieve positive drainage.

2.7 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Alternate Bid Non Penetrating Mechanically Fastened Roofing System: Provide proprietary clad metal plate/fastener system for use with electromagnetic induction welding technology.
- C. Cover Board: 5/8" "DensDeck" or similar reinforced cover board.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof accessories are securely fastened in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Install insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation or self foaming insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together and fasten to roof deck.
 - 1. Non Penetrating Mechanically Fastened Roof Assembly: Install proprietary fasteners and weld plates through insulation and cover board as required by manufacturer to achieve the design wind uplift resistance.
 - 2. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 3. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.5 MECHANICALLY FASTENED ROOFING INSTALLATION

- A. Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
 - 1. Install sheet according to ASTM D 5082.
- B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing as directed by membrane manufacturer
- E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane if required by membrane manufacturer.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas, or perform seam weld twice daily on scrap membrane material. Mark the date and time of test, and record the location on roof where work is taking place. Save test samples for Owners use.
 - 3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
- G. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.
- I. Non Penetrating Mechanically Fastened Roof Assembly, weld membrane to weld plates using proprietary, non penetrating electromagnetic induction tool welding technique.
- J. Stage and phase work so that insulation, cover board, fastener, and membrane installation can be accomplished in a single day.

3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify OWNER 48 hours in advance of date and time of inspection.

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- B. Non Penetrating Mechanically Fastened Roof Assembly: Arrange for system manufacturer technical personnel to inspect weld plate installation prior to initiating weld plate welding, and inspect first day's plate welding.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at CONTRACTOR's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during construction period. When construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to ARCHITECT and OWNER.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

- 3.9 Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.10 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: City and Borough of Juneau
 - 2. Address: 155 S Seward St, Juneau Alaska, 99801
 - 3. Building Name/Type: Juneau Douglas Wastewater Treatment Plant Control Building
 - 4. Area of Work: per Contract BE17-033
 - 5. Acceptance Date: <Insert date.>
 - 6. Warranty Period: <Insert time.>
 - 7. Expiration Date: <Insert date.>
- B. AND WHEREAS Roofing Installer has contracted to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period it will, at its own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- a. lightning;
 - b. peak gust wind speed exceeding 110 mph (m/sec);
 - c. fire;
 - d. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by owner or by another responsible party so designated.
 3. During Warranty Period, if owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 4. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
 5. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration. Roofing Installer shall immediately inspect work and to examine evidence of such leaks, defects, or deterioration.
 6. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off owner from other remedies and resources lawfully available to owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether contract was a contract directly with owner or a subcontract with owners general contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this **<Insert day>** day of **<Insert month>**, **<Insert year>**.

1. Authorized Signature: **<Insert signature.>**
2. Name: **<Insert name.>**
3. Title: **<Insert title.>**

END OF SECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the CONTRACT, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:
 - 1. Formed flashing and trim.
- B. Related Sections include the following:
 - 1. Division 7 Section "PVC Roofing" for installing sheet metal flashing and trim integral with roofing membrane.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 and as required to resist the project design wind criteria.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Wind requirements: show fasteners as required to resist wind loads imposed by wind speeds indicated in the drawings for roofing in the configurations shown.
- D. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.

1.5 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the WORK include, but are not limited to, products specified.
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 SHEET METALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
 2. Exposed Finishes: Apply the following coil coating:
 - a. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1) Fluoropolymer 3-Coat System: Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color coat and clear finish coat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2604, except as modified below:
 - a) Humidity Resistance: 1000 hours.
 - b) Salt-Spray Resistance: 1000 hours.
 - 2) Color: Select from Manufacturer's stock colors.

2.3 UNDERLAYMENT MATERIALS

- A. Polyethylene Sheet: 6-mil- thick polyethylene sheet complying with ASTM D 4397.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 - 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or polycarbonate polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
- D. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Counterflashing and copings: Fabricate from the following material:
 - 1. Prepainted, Metallic-Coated Steel: 24 gage thick.
- B. Flashing Receivers: Fabricate from the following material:
 - 1. Prepainted, Metallic-Coated Steel: 24 gage inch thick.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished WORK: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a two layer course of polyethylene underlayment.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
- H. Seal joints with elastomeric sealant as required for watertight construction.
 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch centers.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.
 - 1. Secure in a waterproof manner by means of anchor and washer at 36-inch centers.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
 - 1. Seal with butyl sealant and clamp flashing to pipes penetrating roof.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.4 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

SECTION 079200 - JOINT SEALANTS

- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Omniseal 50.
 - b. Dow Corning Corporation; 795.
 - c. GE Advanced Materials - Silicones; SilPruf NB SCS9000.
 - d. May National Associates, Inc.; Bondaflex Sil 295.
 - e. Pecora Corporation; 895.
 - f. Polymeric Systems, Inc.; PSI-641.
 - g. Sika Corporation, Construction Products Division; SikaSil-C995.
 - h. Tremco Incorporated; Spectrem 3.
- B. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 790.
 - b. May National Associates, Inc.; Bondaflex Sil 728 NS.
 - c. Pecora Corporation; 311 NS.
 - d. Tremco Incorporated; Spectrem 800.
- C. Single-Component, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade P, Class 100/50, for Use T.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 890-SL.
 - b. May National Associates, Inc.; Bondaflex Sil 728 SL.
 - c. Pecora Corporation; 310 SL.
 - d. Tremco Incorporated; Spectrem 900 SL.
- D. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Omniplus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. GE Advanced Materials - Silicones; Sanitary SCS1700.

SECTION 079200 - JOINT SEALANTS

- d. May National Associates, Inc.; Bondaflex Sil 100 WF.
- e. Tremco Incorporated; Tremsil 200 Sanitary.

2.3 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

SECTION 079200 - JOINT SEALANTS

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Concrete.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

- a. Metal.

- b. Glass.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

SECTION 079200 - JOINT SEALANTS

- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.
 - 2. Silicone Joint Sealant: Single component, nonsag, traffic grade or neutral curing Single component, pourable, traffic grade, neutral curing.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:

SECTION 079200 - JOINT SEALANTS

- a. Perimeter joints of exterior openings where indicated.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - c. Other joints as indicated.
2. Joint Sealant: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Other joints as indicated.
 2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

SECTION 081113 - DOORS AND FRAMES

PART 1-GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes Fiberglass doors and frames work.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for doors.

1.3 COORDINATION

- A. Coordinate anchorage installation for fiberglass frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and material thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Special-Lite Inc.

SECTION 081113 - DOORS AND FRAMES

- B. Source Limitations: Obtain fiberglass doors and frames from single manufacturer.

2.2 EXTERIOR FIBERGLASS DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Doors: Special-Lite AF-217 .
 - 1. Doors:
 - a. Type: pebbled surface, no openings.
 - b. Thickness: 1-3/4 inches (44.5 mm).
 - c. Face: FRP face, .120 thick, finish color throughout, chemically bonded to solid high density urethane shapes chemically welded at factory.
 - d. Edge Construction: Stiles and rails to be secured at corners with pultruded corner clip.
 - e. Rails: Pultruded FRP insulated stile material.
 - f. Core: Urethane Foam.
 - g. Core: Manufacturer standard.
 - 2. Frames:
 - a. Materials: 3/16 inch thick solid pultruded FRP profiles having no corrosive components for reinforcement.
 - b. Construction: Knock down for field assembly, 2 inch wide face, 5-3/4 inch depth.
 - c. Reinforcement: 1/4 inch pultruded FRP chemically welded at all hinge, strike and closer locations.
 - d. Pre-machine doors in accordance with templates from specified hardware manufacturers.
 - 3. Exposed Finish: factory prime and painted, color of frames to match door.

2.3 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry-Wall Type: Designed to engage masonry wall, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

SECTION 081113 - DOORS AND FRAMES

2.4 FABRICATION

- A. Fabricate fiberglass work to be rigid and free of defects, warp, or buckle. Accurately form to required sizes and profiles, with factory standard radius. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).
 - 2. Edge Closures: provide flush closures at exterior doors of same material as face stiles.
- C. Fiberglass Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Grout Guards: attach guards to frame at back of hardware mortises in frames to be grouted.
 - 2. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3. Head Anchors: Two anchors per head for frames more than 42 inches (1067 mm) wide and mounted in metal-stud partitions.
 - 4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- D. Hardware Preparation: Factory prepare fiberglass work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

SECTION 081113 - DOORS AND FRAMES

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove shipping spreaders installed at factory. Restore exposed finish as required to make repaired area smooth, flush, and invisible on exposed faces.

3.3 INSTALLATION

- A. General: Install fiberglass work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

- B. Fiberglass Frames: Install frames for doors of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

- 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

- a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations as approved by manufacturer.
- b. Install frames with removable stops located on secure side of opening.
- c. Install door silencers in frames before grouting.
- d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
- e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

- 2. Installation Tolerances: Adjust door frames for squareness, alignment, twist, and plumb to the following tolerances:

- a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
- b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
- c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
- d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

- C. Fiberglass Doors: Fit doors accurately in frames, within clearances specified below. Shim as necessary.

- 1. Non-Fire-Rated Steel Doors:

- a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
- b. At Bottom of Door: **[3/4 inch (19.1 mm)] [5/8 inch (15.8 mm)]** plus or minus 1/32 inch (0.8 mm).

SECTION 081113 - DOORS AND FRAMES

- c. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including fiberglass work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from the work immediately after installation.

END OF SECTION

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Service doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Oversize Construction Certification: For door assemblies required to be fire-rated and that exceed size limitations of labeled assemblies.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

SECTION 083323 - OVERHEAD COILING DOORS

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
 - 1. Obtain operators and controls from overhead coiling door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 - 1. Design Wind Load: As indicated on Drawings.
 - 2. Testing: According to ASTM E 330.
 - 3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
 - 4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

2.3 DOOR ASSEMBLY

- A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
- B. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. (0.406 L/s per sq. m) at 15 and 25 mph (24.1 and 40.2 km/h) when tested according to ASTM E 283.
- D. Door Curtain Material: Galvanized steel.
- E. Door Curtain Slats: Flat profile slats of 2-5/8-inch (67-mm) center-to-center height.
- F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; fabricated from hot-dip galvanized steel.
- G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- H. Hood: Match curtain material and finish.

SECTION 083323 - OVERHEAD COILING DOORS

1. Shape: Square.
2. Mounting: Face of wall.

I. Locking Devices: Equip door with slide bolt for padlock.

J. Manual Door Operator: Push-up operation.

K. Door Finish:

1. Hot Dip Galvanized. Finish.

2.4 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 (Z275) zinc coating; nominal sheet thickness (coated) of 0.028 inch (0.71 mm); and as required.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Galvanized Steel: Nominal 0.028-inch- (0.71-mm-) thick, hot-dip galvanized steel sheet with G90 (Z275) zinc coating, complying with ASTM A 653/A 653M.

2.7 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

SECTION 083323 - OVERHEAD COILING DOORS

2.8 CURTAIN ACCESSORIES

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
 - 1. At door head, use 1/8-inch- (3-mm-) thick, replaceable, continuous-sheet baffle secured to inside of hood or field- installed on the header.
 - 2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- (3-mm-) thick seals of flexible vinyl, rubber, or neoprene.
- B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.9 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.
- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
 - 1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic closing device operates.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Push-up Door Operation: Lift handles and pull rope for raising and lowering doors, with counterbalance mechanism designed so that required lift or pull for door operation does not exceed 25 lbf (111 N).

SECTION 083323 - OVERHEAD COILING DOORS

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

3.3 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
 - 1. Adjust exterior doors and components to be weather-resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

END OF SECTION

SECTION 085313 - VINYL WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes vinyl-framed windows, in fixed configuration.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for vinyl windows.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of vinyl window, for tests performed by a qualified testing agency.
- B. Sample Warranties: For manufacturer's warranties.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating vinyl windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.

SECTION 085313 - VINYL WINDOWS

- b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
2. Warranty Period:
- a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Jeld-Wen, Inc.
 2. Kolbe & Kolbe Millwork Co., Inc.
 3. Milgard Manufacturing, Inc.
- B. Source Limitations: Obtain vinyl windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
1. Minimum Performance Class operable windows: C.
 2. Minimum Performance Grade operable windows: 60.
 3. Minimum Performance Class fixed windows: C.
 4. Minimum Performance Grade fixed windows: 80.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

2.3 VINYL WINDOWS

- A. Operating Types: Provide the following operating types in locations indicated on Drawings:

SECTION 085313 - VINYL WINDOWS

1. Fixed.
- B. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with AAMA/WDMA/CSA 101/I.S.2/A440.
 1. Finish: Integral color, white.
- C. Insulating-Glass Units: ASTM E 2190.
 1. Glass: ASTM C 1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 2. Lites: Two.
 3. Filling: Fill space between glass lites with argon.
 4. Low-E Coating: Sputtered on third surface.
- D. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- E. Hardware, General: Provide heavy duty stainless steel by Truth Hardware or approved equal complying with AAMA 907, designed to smoothly operate, tightly close, and securely lock windows.
- F. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- G. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 FABRICATION

- A. Fabricate vinyl windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Glaze vinyl windows in the factory.
- C. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

SECTION 085313 - VINYL WINDOWS

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 - 1. Keep protective films and coverings in place until final cleaning.
- B. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
- C. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

SECTION 87100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
 - 1. Door hardware for fiberglass doors.
- B. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
 - 1. Builders Hardware Manufacturing Association (BHMA)
 - 2. NFPA 101 Life Safety Code
 - 3. NFPA 80 -Fire Doors and Windows
 - 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
 - 5. UL10C – Positive Pressure Fire Test of Door Assemblies
 - 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
 - 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
 - 8. ICC – International Building Code

1.2 SUBMITTALS:

- A. Product Data: Manufacturer's specifications and technical data including the following:
 - 1. Detailed specification of construction and fabrication.
 - 2. Manufacturer's installation instructions.
 - 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 - 4. Submit catalog cuts with hardware schedule.
- B. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
 - 1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.

1.3 QUALITY ASSURANCE

- A. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Comply with manufacturer's recommendations.

SECTION 87100 - DOOR HARDWARE

1.5 PROJECT CONDITIONS:

- A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.6 WARRANTY:

- A. Manufacturer's Warranty:
 - 1. Closers: Lifetime
 - 2. Locksets & Cylinders: Seven years
 - 3. All other Hardware: Two years.

1.7 OWNER'S INSTRUCTION:

- A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.8 MAINTENANCE:

- A. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
- B. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
- C. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.

PART 2 - PRODUCTS

2.1 Door Hardware

- A. Hinges:
 - 1. Template screw hole locations
 - 2. Minimum of 2 permanently lubricated non-detachable bearings
 - 3. Equip with easily seated, non-rising pins
 - 4. Sufficient size to allow 180-degree swing of door
 - 5. Furnish hinges with five knuckles and flush [concealed] bearings
 - 6. Provide hinge type as listed in schedule.
 - 7. Furnish 3 hinges per leaf.

SECTION 87100 - DOOR HARDWARE

8. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish.

B. Cylindrical Type Locks and Latchsets:

1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Fit modified ANSI A115.2 door preparation.
4. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
5. Locksets to have anti-rotational studs that are thru-bolted
6. Keyed lever shall not have exposed "keeper" hole
7. Each lever to have independent spring mechanism controlling it
8. 2-3/4 inch (70 mm) backset
9. 9/16 inch (14 mm) throw latchbolt
10. Provide sufficient curved strike lip to protect door trim
11. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
12. Keyed lever to be removable only after core is removed, by authorized control key
13. Provide locksets with Stanley Security/BEST removable and interchangeable core cylinders.
14. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
15. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
16. Core face must be the same finish as the lockset.
17. Functions and design as indicated in the hardware groups.

C. Cylinders:

1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
3. Coordinate and provide as required for related sections.

D. Door Closers shall:

1. Tested and approved by BHMA for ANSI 156.4, Grade 1
2. UL10C certified
3. Provide 9001-Quality Management and 14001-Environmental Management.
4. Closer shall have extra-duty arms and knuckles
5. Conform to ANSI 117.1
6. Maximum 2 7/16 inch case projection with non-ferrous cover
7. Separate adjusting valves for closing and latching speed, and backcheck
8. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions

SECTION 87100 - DOOR HARDWARE

9. Full rack and pinion type closer with 1½" minimum bore
 10. Mount closers on interior side of door,
 11. Closers shall be non-handed, non-sized and multi-sized.
- E. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.
1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
 2. Provide fastener suitable for wall construction.
 3. Coordinate reinforcement of walls where wall stop is specified.
 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered
- F. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.
1. Surface overhead stops shall be heavy duty bronze or stainless steel.
- G. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
 2. UL10C Positive Pressure rated seal set when required.
- H. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
 2. UL10C Positive Pressure rated seal set when required.
- 2.2 FINISH:
- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
 - B. Powder coat door closers to match other hardware, unless otherwise noted.
 - C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.
- 2.3 KEYS AND KEYING:
- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying

SECTION 87100 - DOOR HARDWARE

system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.

- B. Cylinders, removable and interchangeable core system: Best key core, 1MT12 in a G keyway in a 6 pin core with Stainless steel 626 finish.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
 - 1. 2 each Change keys each keyed core
- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
 - 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 - 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 - 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units

SECTION 87100 - DOOR HARDWARE

level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
 - 1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
 - 1. Check and adjust closers to ensure proper operation.
 - 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 - 3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

<u>Code</u>	<u>Finish List</u>	<u>Description</u>
AL		Aluminum
PC		Prime Coat
26D		Satin Chrome
626		Satin Chromium Plated
628	Satin Aluminum, Clear Anodized	
630		Satin Stainless Steel
689		Aluminum Painted
GREY		Grey
BLACK		Black
US32D		Stainless Steel, Dull

SECTION 87100 - DOOR HARDWARE

Manufacturer List

<u>Code</u>	<u>Name</u>
AB	ABH Manufacturing Inc.
BE	Best Access Systems
NA	National Guard
PR	Precision
SD	Stanley Door Closers
SH	Stanley Commercial Hardware
ST	Stanley
TR	Trimco

Hardware Sets

SET #1

3 Hinges	CB1900R 4 1/2 x 4 1/2	26D	ST
1 Door Closer	QDC115	689	SH
1 Storeroom Lockset	9K3-7D14D PATD S3	626	BE
1 Surface Overhead Stop	4420 Series	US32D	AB
3 Door Silencers	1229A	GREY	TR

END OF SECTION

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior gypsum board.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

SECTION 092900 - GYPSUM BOARD

2.2 GYPSUM BOARD

- A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.
 - 1. Core: 5/8 inch (12.7 mm), regular type.

2.3 TRIM ACCESSORIES

- A. Exterior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic.
 - 2. Shapes:
 - a. Cornerbead.
 - b. U-Bead: J-shaped; exposed short flange does not receive joint compound.

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Exterior Applications:
 - 1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
 - 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

SECTION 092900 - GYPSUM BOARD

- B. Comply with ASTM C 840.

3.2 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
 1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 2. Fasten with corrosion-resistant screws.
 3. Finish according to manufactures' written instructions.

3.3 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on exterior substrates.
 - 1. Metal.
- B. Related Requirements:
 - 1. Section 081113 "Hollow Metal Doors and Frames".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

SECTION 099113 - EXTERIOR PAINTING

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from manufacturer's full range.

2.2 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- ##### A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

3.2 PREPARATION

- ##### A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- ##### B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

SECTION 099113 - EXTERIOR PAINTING

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

SECTION 099113 - EXTERIOR PAINTING

- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Steel and Iron Substrates:
 - 1. Water-Based Light Industrial Coating over Epoxy System MPI EXT 5.1R:
 - a. Prime Coat: Primer, epoxy, anti-corrosive MPI #101.
 - b. Intermediate Coat: Epoxy, high build, low gloss MPI #108.
 - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

END OF SECTION

SECTION 099700 – SPECIAL COATINGS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The work specified under this section includes furnishing and applying all coating and/or lining for all equipment, valves, piping, piping accessories, submerged metal, exposed metal, and materials as detailed in the plans or these specifications.
- B. New process pipe and fittings in this project shall be factory primed and field top-coated prior to installation, unless otherwise approved. Coating damaged during installation shall be repaired in place.
 - 1. New process piping will be placed in service immediately with no time available for painting and curing prior to return to service.
- C. Existing process piping scheduled for recoating shall be prepared via vapor blast or pressure wash as required by the existing pipe condition and coating surface preparation requirements to attain sufficient coating adhesion. Dry sand blast will not be permitted inside the facility.

1.2 RELATED WORK

- A. Section 400505 Exposed Piping Installation
- B. Section 400506 Couplings, Adapters and Specials for Process Piping.
- C. Section 400507 Hangers and Supports for Process Piping
- D. Section 400509 Wall Pipes, Floor Pipes, and Pipe Sleeves
- E. Section 400519 Ductile Iron Process Pipe & Fittings
- F. Section 400524 Steel Process Pipe & Fittings

1.3 GENERAL

- A. Extent of special coating work is as herein specified.
- B. This work includes application of special coating systems to items and surfaces including surface preparation, priming and topcoats.
 - 1. The work includes application of special coating systems for scheduled surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.
 - 2. Coat surfaces for special coating systems whether or not colors are designated, except where specifically noted as a surface not to be painted.
 - 3. "Exposed surfaces" is defined to include areas visible when permanent or built-in fixtures are in place in areas scheduled to be coated. Extend special coatings in these areas as required to maintain coating system integrity and provide desired protection.
 - 4. Where items or surfaces are not specifically mentioned, apply special coatings to these the same as adjacent similar materials or areas.

SECTION 099700 – SPECIAL COATINGS

- C. All piping, valves and equipment used on this project shall be coated for corrosion protection unless otherwise specified or unnecessary given the type of metal or material.

1.4 QUALITY ASSURANCE

- A. Coordination: Provide finish coats which are compatible with and per the same manufacturer as prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coating systems for various substrates. Upon request, furnish information on characteristics of specified finish materials, to ensure that compatible prime coats are used. Notify owner's construction representative of any anticipated problems using coating systems as specified.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information including basic materials analysis and installation instructions for each material specified. List each material and cross-reference to the specific coating and finish system and application. Identify by manufacturer's catalog number and general classification. Submittals shall be in accordance with Section 01300 and the General Conditions.
- B. NSF Certification: Submit certifications showing ANSI/NSF 61 approval for potable water contact. Note: NSF & UL are certified labs to test potable water coatings to the ANSI/NSF 61 Standard.
- C. Samples: Upon request by OWNER or ENGINEER, submit samples for OWNER's construction representative's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

1.6 DELIVERY AND STORAGE

- A. Deliver materials in original, new and unopened packages and containers bearing manufacturer's name and label and following information:
 - 1. Name or title of material
 - 2. Manufacturer's stock number and date of manufacture
 - 3. Manufacturer's name
 - 4. Contents by volume, for major pigment and vehicle constituents
 - 5. Application instructions
 - 6. Color name and number
- B. Take precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of special coatings.

1.7 JOB CONDITIONS

- A. Do not apply coatings when the temperature of surfaces to be painted and the surrounding air temperatures are or are expected to go below temperatures recommended by manufacturer, 45°F (7°C) or less than 5°F above the dew point unless otherwise permitted by coating manufacturer's printed instructions.

SECTION 099700 – SPECIAL COATINGS

- B. Do not apply coatings in snow, rain, fog, or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by coating manufacturer's printed instructions.
- C. Coating work may be continued during inclement weather only if areas and surfaces to be painted are enclosed and heated within temperature and humidity limits specified by coating manufacturer during application and curing period.

PART 2 - PRODUCTS

2.1 MATERIALS QUALITY

- A. Provide best quality grade of various types of coatings as regularly manufactured by acceptable coating materials manufacturers. Use only materials displaying manufacturer's identification as a standard, best-Manufacturer's products which comply with coating qualitative requirements of applicable Federal Specifications. Materials that differ in quantitative requirements may be considered for use when acceptable to the ENGINEER. Furnish material data and manufacturer's certificate of performance to ENGINEER for proposed substitutions. All materials specified herein shall be manufactured by TNEMEC Company, Inc., Sherwin Williams or Engineer Approved equal are approved for use on this project.
 - 1. Tnemec: Epoxy-Polyamide Potable System, Series N140 Pota-Pox Plus, Series N140 Pota-Pox Plus. Sherwin Williams Macropoxy 646 PW
 - 2. Tnemec, or Sherwin Williams: Epoxy-Polyamide Non-Potable System, Series N69 Epoxoline II, or Sherwin Williams Dura-Plate 235
 - a. Alternative: Sherwin Williams: Corothane 1, Mio-Aluminum; Sherwin Williams Corothane 1, Aliphatic Finish Coat
 - 3. Tnemec, or Sherwin Williams: Polyamide Epoxy-Coal Tar, Tnemec Hi-Build Tneme-Tar 46H-413, or Sherwin Williams Hi-Mil Sher-Tar
- B. Equivalent materials manufactured by other industrial coatings manufacturers may be submitted for approval by the Engineer and Owner. Requests for product approval shall include a list of 5 projects where each product has been used and has provided satisfactory service for at least seven years. No request for approval shall be considered that would decrease film thickness or number of coats or that would offer a change in the generic type of coating specified. In addition, no request for approval shall be considered which does not have certified test reports showing equivalency to the performance criteria of the specified coatings. Any product submitted for approval as a coating for submerged metal must have current National Sanitation Foundation (NSF) Std. 61 approval for contact with potable water.
- C. Provide undercoat recommended by manufacturer of finish coat. Use only thinners approved by coating manufacturer, and use only within recommended limits.
- D. Colors and Finishes: Paint colors, surface treatments, and finishes, are indicated in the schedule of Section 2.04. If color or finish is not designated, owner's construction representative will select from standard colors available from manufacturer of materials systems as specified.
- E. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

SECTION 099700 – SPECIAL COATINGS

- F. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated, including those approved for potable water for systems applied to objects submerged

2.2 EQUIPMENT

- A. All equipment in Divisions 40, 43 and 46 not called out in related work (Section 1.02) shall be coated per equipment manufacturer's recommendation for the environment in which the equipment is to be placed, and coated at the factory.

2.3 COATING SYSTEMS

- A. Coating systems used on the project shall be as identified below, or approved equals.
 1. All Systems: Each coating system shall be applied in accordance with the schedule in Section 2.04. Surface preparation, application, and curing shall be in accordance with manufacturer’s recommendations and application shall be completed by a trained applicator with equipment approved by manufacturer of coating system.
 2. Systems A & B: See Section 2.04.
 3. System C: Buried metal, valves, pipe and pipe accessories.
 4. Where surface is not provided with other protection, apply two coats of Tnemec coal-tar epoxy 46H-413, or equal. Where additional protection is provided, such as a polyethylene wrap or other system approved by the ENGINEER, apply one coat of Tnemec system, 46H-413 or equal.

2.4 COATING SYSTEM SCHEDULE

<u>ITEM</u>	<u>PREP</u>	<u>COATING</u>	<u>COATS/THICKNESS</u>
*System A:			
Submerged Equipment, piping, valves, misc. metals	SSPC-10-89	<u>Primer:</u> Tnemec Series N140 Pota-Pox Plus; Sherwin Williams Macropoxy 646 PW <u>Top Coat:</u> Tnemec Series N140 Pota-Pox Plus; Sherwin Williams Macropoxy 646 PW	(1)/Primer: 5-6 mils DFT (1)/Top Coat : 5-7 mils Total Film Thickness: 10.0-13.0 mils DFT
		<u>Top Coat:</u> Tnemec Series N140 Pota-Pox Plus; Sherwin Williams Tank Clad HS	(1)/Top Coat :10 - 12 mils (Min. System Thickness 16 mils per AWWA C210

SECTION 099700 – SPECIAL COATINGS

*System B:			
<u>Interior</u> & Exposed equipment, piping, valves, misc. metals	SSPC-SP-6 (as applicable)	<u>Primer:</u> Tnemec Series N69 Epoxy Polyamide.; Sherwin Williams Dura-Plate 235 <u>Top Coat(interior):</u> Tnemec Series N69; Sherwin Williams Dura-Plate 235	(1)/Primer: 4-6 mils (1)/Top Coat (int): 4-6 mils Total Film Thickness: 8.0-12.0 mils DFT
*SystemB – Alt:			
<u>Interior</u> & Exposed equipment, piping, valves, misc. metals (High humidity applications.)	SSPC-SP-6 (as applicable)	Sherwin Williams: Corothane 1, Mio-Aluminum; Sherwin Williams Corothane 1, Aliphatic Finish Coat	Primer: 2 - 3 mils Top Coat: 2 – 3 mils Total Film: 4 – 6 mils DFT
*System C:			
Buried Metal valves, pipe, etc.	As required by manufacturer	Tnemec CoalTar-Epoxy 46H-413. SW-Hi-Mil Sher-Tar B69	(1 or 2) 16-20 mils

- A. *Cast iron surface preparation as per a SSPC designation is not applicable. Cast iron shall be prepared in accordance with guidelines specified herein. Other metals shall be prepared in accordance with the noted SSPC designation.

2.5 COLOR CODING

- A. Refer to the piping schedule in the drawings and the below table for the color requirements.
 - 1. Non-potable Water Line- Blue with Black Bands
 - 2. Sewage (wastewater) Line - Gray
- B. Primer should be of distinctly different color than topcoat to facilitate coverage visibility during application and quality control. The contents and direction of flow must be stenciled on the piping in Black.

PART 3 - EXECUTION

3.1 INSPECTION BY CONTRACTOR

- A. Starting of coatings work will be construed as Applicator's acceptance of surfaces within any particular area.
- B. Do not apply coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable coating film. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

SECTION 099700 – SPECIAL COATINGS

3.2 SURFACE PREPARATION

- A. General: Perform preparation and cleaning procedures in compliance with coating manufacturer's instructions for particular substrate conditions, and as herein specified.
- B. Remove hardware, hardware accessories, machined surface, plates, lighting fixtures, and similar items which are not to be coated, or provide surface-applied protection prior to surface preparation and coating operations. Remove, if necessary, for complete coating of items and adjacent surfaces. Following coating completion in each space or area, reinstall removed items, using workman skilled in trades involved.
- C. Clean surfaces to be coated before applying coatings or surface treatment; with solvents prior to mechanical cleaning. Program cleaning and application so that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.
- D. Ferrous Metal Surfaces: Clean non-galvanized, ferrous surfaces, which have not been shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent and/or mechanical cleaning, complying with Steel Structures Painting Council (SSPC) recommendations.
 - 1. Touch-up shop applied prime coats which have been damaged or bare areas. Wire-brush, solvent clean, and touch-up with same primer as shop coat.
 - 2. Commercial Blast Cleaning (SSPC-SP6): A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining as follows: Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied paint. Slight residues of rust and paint may also be left in the bottoms of pits if the original surface is pitted.
 - 3. Near White Blast Cleaning (SSPC-10): A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining as follows: Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discolorations caused by stains of mill scale, or stains of previously applied paint.
 - 4. Cast iron pipe shall be solvent cleaned of any grease, oil or other surface contaminants and then cleaned of the solvent prior to evaporation. Following solvent cleaning, cast iron shall be brush blasted to develop a minimum 1.5 mil surface profile and cleaned of any dust remaining after blasting.
- E. Non-Ferrous Metal Surfaces: Clean non-ferrous and galvanized surfaces in accordance with special coating system manufacturer's instructions for type of service, substrate, and application required.

3.3 MATERIALS PREPARATION

- A. General: Carefully mix and prepare materials in compliance with manufacturer's directions.

SECTION 099700 – SPECIAL COATINGS

- B. Do not mix coating materials produced by different manufacturers, unless otherwise permitted by manufacturer's instructions. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce a mixture of uniform density, and as required during application. Do not stir film, which may form on surfaces, into material. Remove film and, if necessary, strain material before using.

3.4 APPLICATION

- A. General: Apply special coatings by brush, roller, spray, squeegee, or other applicators in accordance with manufacturer's directions – see exceptions. Use applicators best suited for type of material being applied. Equipment shall be coated at the factory.
 - 1. Exceptions: All mechanical piping shall be spray painted, unless otherwise approved by the ENGINEER.
- B. The number of coats and paint film thickness required is same regardless of the application method. Do not apply succeeding coats until previous coat has cured as recommended by coating manufacturer. Sand between coat applications where required to produce an even smooth surface in accordance with coating manufacturer's directions.
 - 1. Apply additional coats when undercoats or other conditions show through final coat until the cured film is of uniform finish, color and appearance.
 - 2. Coat back sides of access panels, removable or hinged covers to match exposed surfaces.
- C. Prime Coats: Before application of finish coats, apply prime coat to material, which is required to be painted or finished, and which has not been prime coated by others.
 - 1. Recoat primed and sealed substrates where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
 - 2. Recoat or prepare any primed surfaces that have been exposed for beyond the manufacturer's allowable set time for primed surfaces. Prepare surface or recoat as required by manufacturer.
- D. Minimum Coating Thickness: Apply each material at not thinner than manufacturer's recommended spreading rate. Provide a total dry film thickness of entire coating system as recommended by manufacturer, unless otherwise indicated.
- E. Brush Applications: Brush-out and work brush coats onto the surfaces in an even film. Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks. Brush apply primer or first coats, unless otherwise permitted to use mechanical applicators.
- F. Mechanical Applications: Use mechanical methods for coating application when permitted by coating material manufacturer's recommendations.
 - 1. Wherever spray application is used, apply each coat to provide equivalent hiding of brush-applied coats. Do not double-back with spray equipment building-up film thickness of 2 coats in one pass.

SECTION 099700 – SPECIAL COATINGS

- G. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish, or recoat work not in compliance with specified requirements. If required paint film thickness is not achieved, additional coats shall be applied per manufacturer's directions until the required thickness is obtained.

3.5 FIELD QUALITY CONTROL

- A. The right is reserved by the OWNER to involve following material testing procedure at any time, and any number of times during period of field painting:
 - 1. The OWNER may engage service of an independent testing laboratory to sample materials being used. Samples of materials delivered to project site may be taken, identified and sealed, and certified in presence of CONTRACTOR.
 - 2. Testing laboratory may perform appropriate tests for any of the following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance coating thickness, holidays and quantitative materials analysis.
 - 3. If test results show materials being used do not comply with specified requirements, CONTRACTOR may be directed to stop work, remove non-complying materials; pay for testing; recoat surfaces coated with rejected materials; and remove rejected materials from previously painted surfaces if, upon recoating with specified materials, two coatings are non-compatible.

3.6 INSPECTION

- A. Dry film thickness shall be measured by a contractor-furnished non-destructive magnetic type thickness gage. Measurement procedures shall be as outlined in the SSPC Steel Structures Painting Manual Volume 2, Systems and Specifications. Any deficiencies in required film thickness shall be corrected by the contractor per the recommendations of the coating manufacturer. The thickness gage shall be accurately calibrated using U.S. Department of commerce, National Bureau of Standards Certified Calibrations Plates.
- B. **Low-Voltage Wet Sponge Holiday Testing is required for all immersion service steel.** All holidays will be re-dressed as directed by coating manufacturer.

3.7 CLEAN UP AND PROTECTION

- A. Clean-up: During progress of work, remove from project site discarded materials, rubbish, cans and rags resulting from work.
- B. Upon completion of work, clean all coating-spattered surfaces. Remove spattered materials by proper methods of washing and scraping, using care not to damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be coated or not, against damage. Correct damage by cleaning, repairing or replacing, and recoating, as directed by OWNER's construction representative. Leave work in undamaged condition.
- D. Touch up all coated surfaces damaged during course of work to leave work in undamaged condition at the time of acceptance of project.

SECTION 099700 – SPECIAL COATINGS

- E. Provide "Wet Paint" signs as required to protect finishes. After coating application, remove temporary protective wrapping provided by others for protection of their work during coatings operation.

END OF SECTION

SECTION 260050 – ELECTRICAL WORK, GENERAL

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor shall provide electrical work, complete and operable, in accordance with the Contract Documents.
- C. The provisions of this Section apply to all sections in Division 16, except as indicated otherwise.
- D. The work of this Section is required for operation of electrically-driven equipment provided under specifications in other Divisions. The Contractor's attention is directed to the requirement for proper coordination of the work of this Section with the work of equipment specifications, and the work of instrumentation sections.
- E. Contractor shall review all contract drawings and specifications prior to bidding to understand the project requirements. It shall be the Contractor's responsibility to phase the work as specified and to provide all equipment to maintain the facility operations.

1.2 REFERENCE STANDARDS

- A. The work of this Section and all sections in Division 16 shall comply with the following, as applicable:

NEC (NFPA 70)	National Electrical Code
NETA	International Electrical Testing Association
NEMA 250	Enclosures for Electrical Equipment (1000 Volts Maximum)
NECA 1	Standard Practice for Good Workmanship in Electrical Construction.
IBC	International Building Code; Edition currently adopted by CBJ
ASCE 7-05	American Society Of Civil Engineer Publication 7-05
- B. Electrical equipment shall be listed by and shall bear the label of Underwriters' Laboratories, Inc. (UL).
- C. Installation of electrical equipment and materials shall comply with OSHA Safety and Health Standards, state building standards, and applicable local codes and regulations.
- D. Where the requirements of the specifications conflict with UL, NEMA, NFPA, or other applicable standards, the more stringent requirements shall govern.

1.3 DEFINITIONS

- A. CBJ City and Borough of Juneau

SECTION 260050 – ELECTRICAL WORK, GENERAL

1.4 PERMITS AND INSPECTION

- A. All electrical permits shall be obtained by the Contractor. The Owner shall pay for the inspection fees.

1.5 Contractor SUBMITTALS

- A. Furnish submittals in accordance
- B. Shop Drawings: Include the following:
 - 1. Complete material lists stating manufacturer and brand name of each item or class of material.
 - 2. Shop Drawings for all grounding work not specifically indicated.
 - 3. Front, side, rear elevations, and top views with dimensional data.
 - 4. Location of conduit entrances and access plates.
 - 5. Component data.
 - 6. Connection diagrams, terminal numbers, internal wiring diagrams, conductor size, and cable numbers.
 - 7. Method of anchoring, seismic requirements, weight.
 - 8. Types of materials and finish.
 - 9. Nameplates.
 - 10. Temperature limitations, as applicable.
 - 11. Voltage requirement, phase, and current, as applicable.
 - 12. Front and rear access requirements.
 - 13. Test reports.
 - 14. Grounding requirements.
 - 15. Catalog cuts of applicable pages of bulletins or brochures for mass produced, non-custom manufactured material. Catalog data sheets shall be stamped to indicate the project name, applicable Section and paragraph, model number, and options. This information shall be marked in spaces designated for such data in the Engineer's stamp.
- C. Shop Drawings shall be custom prepared. Drawings or data indicating "optional" or "as required" equipment are not acceptable. Options not proposed shall be crossed out or deleted from Shop Drawings.
- D. Materials and Equipment Schedules: The Contractor shall deliver to the ENGINEER within 30 days of the commencement date in the Notice to Proceed, a complete list of all materials, equipment, apparatus, and fixtures proposed for use. The list shall include type, sizes, names of manufacturers, catalog numbers, and other such information required to identify the items.
- E. Record Drawings: The Contractor shall show invert and top elevations and routing of all duct banks and concealed below-grade electrical installations. Record Drawings shall be prepared, be available to the construction manager, and be submitted according to Section 01300 – Contractor Submittals.

SECTION 260050 – ELECTRICAL WORK, GENERAL

1.6 AREA DESIGNATIONS

A. General:

1. Raceway system enclosures shall comply with Section 16110 – Electrical Raceway Systems.
2. Electrical work specifically indicated in sections within any of the Specifications shall comply with those requirements.
3. Electrical work in above grade indoor facilities shall be NEMA 12.
4. All work in Treatment Process areas shall be NEMA 4X.
5. Electrical work in below ground, below grade, and other pits, vaults, areas, below working floor level in non-hazardous facilities and at outdoor locations shall be NEMA 4X.
6. Installations in hazardous locations shall conform strictly to the requirements of the Class, Group, and Division indicated.

B. Material Requirements:

1. NEMA 4X enclosures shall be stainless steel.

1.7 TESTS

- A. The Contractor shall be responsible for factory and field tests required by specifications in Division 16 and by the Construction Manager or other authorities having jurisdiction. The Contractor shall furnish necessary testing equipment and pay costs of tests, including all replacement parts and labor, due to damage resulting from damaged equipment or from testing and correction of faulty installation.
- B. Where test reports are indicated, proof of design test reports for mass-produced equipment shall be submitted with the Shop Drawings, and factory performance test reports for custom-manufactured equipment shall be submitted and be approved prior to shipment. Field test reports shall be submitted for review prior to Substantial Completion.
- C. Equipment or material which fails a test shall be removed and replaced.

1.8 DEMOLITION AND RELATED WORK

- A. The Contractor shall perform electrical demolition work as indicated on the electrical drawings and in parts of this Specification Section. The Contractor is cautioned that demolition work may also be indicated on non-electrical drawings. Coordinate electrical de-energization, disconnection, and removal with all trades and the overall sequence of construction.
- B. Electrical requirements associated with removed equipment shall be:
 1. Remove control and signal wiring as indicated.
 2. Remove all abandoned conduits associated with removed equipment.
 3. Where contractor is directed to abandon conduits in place contractors shall provide each conduit not terminating in a junction box or enclosure with end caps approved for use with the conduit type. Abandoned Junction boxes, enclosures, etc., shall be provided with covers, KO caps, or other closures as required to cover all openings.

SECTION 260050 – ELECTRICAL WORK, GENERAL

4. Encased conduits shall be cut flush to the floor and be grouted.
 5. Remove remote mounted starters, disconnect switches, circuit breakers, sensors, and transmitters.
 6. Remove remote mounted status lights and switches where indicated on the electrical drawings, and blank off openings in existing panels with field-fabricated stainless steel plates. Plates shall be attached with stainless steel finish screws.
 7. Remove control panels, equipment sheds, and concrete bases and posts for panels and sheds.
 8. Remove pump cords, level sensors, level switches, and other electrical control devices.
- C. Where new lighting and receptacles are installed, old lighting, receptacles, switches, wiring, and conduits shall be removed.
- D. Conduits to be reused or extended shall be terminated in a new junction box. The junction box shall have a NEMA rating in accordance with the area in which it is located and shall be sized as required.
- E. Materials and equipment not indicated to be removed and returned to the Owner shall, upon removal, become the Contractor's property and shall be disposed of off-site.
- F. Material and equipment indicated to be relocated or reused shall be removed and relocated, and reinstalled with care to prevent damage thereto.
- G. Materials indicated to be returned to the Owner shall be placed in boxes with the contents clearly marked and be stored at a location determined by the Construction Manager.
- H. Where MCCs or panelboards are indicated to have circuits removed and reconnected, the MCC shall have a new engraved phenolic nameplate worded as indicated, and the panelboard schedule shall be replaced with a new printed schedule. Pencil or magic marker markings directly on the MCC or panelboard breaker are not permitted.

1.9 CONSTRUCTION SEQUENCING

- A. Continuance of facility operation during demolition and the installation process is critical at all facilities. Therefore, the Contractor shall carefully examine all work to be done in, on, or adjacent to existing equipment. Work shall be scheduled, subject to the Owner's approval, to minimize required process or equipment shutdown time. The Contractor shall submit a written request including sequence and duration of activities to be performed during station shutdown.
- B. All switching, safety tagging, etc., required for process or equipment shutdown or to isolate existing equipment shall be performed by the Contractor. In no case shall the Contractor begin any work in, on, or adjacent to existing equipment without written authorization by the plant supervisor and the Construction Manager. The Contractor shall remove the lock within 4 hours upon request of Owner, in an emergency, and if the equipment is operable.
- C. The Contractor shall make all modifications or alterations to existing electrical facilities required to successfully install and integrate the new electrical equipment as indicated on the electrical drawing. Modifications to existing equipment, panels, or cabinets shall be made in a professional manner with all coatings repaired to match existing. The Contractor is responsible for ensuring all panels and equipment are UL-listed. The costs for modifications (including UL

SECTION 260050 – ELECTRICAL WORK, GENERAL

listing) to existing electrical facilities required for a complete and operating system shall be included in the Contractor's original Bid amount and no additional payment for this work will be authorized. Extreme caution shall be exercised by the Contractor in digging trenches in order not to damage existing underground utilities. Cost of repairs of damages caused during construction shall be the Contractor's responsibility without any additional compensation from the OWNER.

- D. The Contractor is advised to visit the Site before submitting a Bid to better acquaint itself with the work of this Contract. Lack of knowledge will not be accepted as a reason for granting extra compensation to perform the work.

1.10 Installation of New Equipment:

- A. The Contractor will install and terminate the new switchboards, motor starters, control panels, wireways, cables, and instruments in accordance with the agreed schedule. The Contractor shall provide a list, daily, of the points that are ready for service as they are connected, calibrated, and tested. The Contractor shall only connect to equipment that is new or is out of service.
- B. Electrical Contractor shall coordinate with General Contractor for construction schedule.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Equipment and materials shall be new, and/or shall be constructed for this project utilizing new component products and installed in new enclosures or assemblies.
 - 1. Replacement, retrofit, or add on equipment shall match the existing equipment. Equipment supplied to refurbish or add onto existing equipment shall be new or new unused stock with a manufacturer date newer than the existing equipment. All equipment and components shall be listed by UL, and shall bear the UL label where UL requirements apply.
 - 2. Equipment and materials shall be the products of experienced and reputable manufacturers in the industry. Equipment supplied to refurbish or add onto existing equipment shall be listed for retrofit or field modification use with existing equipment.
 - 3. Similar items in the work shall be products of the same manufacturer. Equipment and materials shall be of industrial grade standard of construction.
- B. Where a nema enclosure type is indicated in a non-hazardous location, the contractor shall utilize that type of enclosure, despite the fact that certain modifications, such as cutouts for control devices, may negate the nema rating.

2.2 MOUNTING HARDWARE

- A. Miscellaneous Hardware:
 - 1. Nuts, bolts, and washers shall be stainless steel.

SECTION 260050 – ELECTRICAL WORK, GENERAL

2. Threaded rods for trapeze supports shall be continuous-threaded, hot-dipped galvanized steel or stainless steel, 3/8-inch diameter minimum.
3. Strut for mounting of conduits and equipment shall be hot-dipped galvanized or stainless steel. Where contact with concrete or dissimilar metals may cause galvanic corrosion, suitable non-metallic insulators shall be utilized to prevent such corrosion. Strut shall be as manufactured by Unistrut, B-Line, or equal.
4. Anchors for attaching equipment to concrete walls, floors and ceilings shall be stainless steel expansion anchors, such as "Rawl-Bolt," "Rawl-Stud" or "Lok-Bolt" as manufactured by Rawl; similar by Star, or equal. Wood plugs shall not be permitted.

PART 3 - EXECUTION

3.1 GENERAL

- A. Incidentals: the contractor shall provide all materials and incidentals required for a complete and operable system, even if not required explicitly by the specifications or the drawings. Typical incidentals are terminal lugs not furnished with vendor-supplied equipment, compression connectors for cables, splices, junction and terminal boxes, and control wiring required by vendor-furnished equipment to connect with other equipment indicated in the contract documents.
- B. Field Control of Location and Arrangement: The Drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items. Exact locations shall be determined by the Contractor in the field, based on the physical size and arrangement of equipment, finished elevations, and other obstructions. Locations on the Drawings, however, shall be followed as closely as possible.
 1. The Contractor shall route the conduits in accordance with the indicated installation requirements. Routings shall be exposed.
 2. Conduit and equipment shall be installed in such a manner as to avoid all obstructions and to preserve headroom and keep openings and passageways clear. Where the Drawings do not indicate exact locations, the Contractor shall determine such locations and request approval from the ENGINEER prior to installation. If equipment is installed without ENGINEERS approval and must be moved, it shall be moved without additional cost to the OWNER.
- C. Workmanship: Comply with NECA 1 and these specifications. Materials and equipment shall be installed in strict accordance with printed recommendations of the manufacturer. Installation shall be accomplished by workers skilled in the work. Installation shall be coordinated in the field with other trades to avoid interferences.
- D. Protection of Equipment and Materials: The Contractor shall fully protect materials and equipment against damage from any cause. Materials and equipment, both in storage and during construction, shall be covered in such a manner that no finished surfaces will be damaged, marred, or splattered with water, foam, plaster, or paint. Moving parts shall be kept clean and dry. The Contractor shall replace or refinish damaged materials or equipment, including faceplates of panels and switchboard sections, as part of the work.
- E. Contractor is responsible for any damage to Contractor furnished control panels incurred during installation. Contractor shall protect control panels any interior components from damage, drill

SECTION 260050 – ELECTRICAL WORK, GENERAL

waste, filing, etc. Contractor shall protect electronic components from filings, drill waste, or other foreign debris during installation. Panels components found damaged shall be replaced at Contractors expense.

3.2 CORE DRILLING

- A. The Contractor shall perform core drilling required for installation of raceways through concrete walls, floors, and foundations. Locations of penetrations, as may be required, shall be based on field conditions and shall be adjusted to preclude cutting reinforcing steel which shall be located by radio-graphic methods. Verify all exact core drilling locations based on equipment actually furnished, as well as exact field placement. To the extent possible, identify the existence and locations of encased raceways and other piping in existing walls and floors with the OWNER prior to any core drilling activities. Damage to any encased conduits, wiring, and piping shall be repaired as part of the work.
- B. All penetrations required to extend a conduit or wireway through concrete walls, roofs, and floors or masonry walls shall be core drilled.
- C. All core penetrations of fire walls shall be made with adequate space for the contractors selected firestopping and seal method.

3.3 EQUIPMENT ANCHORING

- A. Floor supported, wall-, or ceiling-hung equipment and conduits shall be anchored in place by methods that will meet seismic requirements in the area where the project is located. Wall-mounted panels that weigh more than 400 pounds, or which are within 18 inches of the floor, shall be provided with fabricated steel support pedestals. If the supported equipment is a panel or cabinet enclosed within removable side plates, it shall match supported equipment in physical appearance and dimensions.
- B. Anchoring methods and leveling criteria in the printed recommendations of the equipment manufacturers are a part of the work of this Contract. Such recommendations shall be submitted as Shop Drawings under Section 01300 – Contractor Submittals.
- C. Panels, conduit, and other equipment shall be anchored and supported for Seismic requirements of CBJ.
- D. Equipment Supports: Unless otherwise indicated, equipment supports, anchors, and restrainers shall be adequately designed for static, dynamic, wind, and seismic loads as stated in ASCE 7-05 (as referenced by IBC). Submitted design calculations for equipment supports and anchorage shall bear the signature and seal of a Professional Engineer registered in the State of Alaska.
- E. Anchors: All anchor bolts shall meet the requirement of Section 05500 – Miscellaneous Metalwork, and shall be designed to resist all applicable loads including, but not limited to, the loads listed above. Anchor bolt calculations shall clearly show that the capacity of the anchor and the capacity of the concrete that the anchor is embedded in are adequate to resist all loads stated in the IBC and ASCE 7-05, including gravity loads, wind and seismic loads, and dynamic loads associated with the equipment operation. The anchorage calculations shall satisfy the ductile detailing requirements stated in ASCE 7-05, Chapter 13, Section 13.4.2. Reduction

SECTION 260050 – ELECTRICAL WORK, GENERAL

factors associated with edge distance, embed length, and bolt spacing shall all be considered and based on the actual dimensions of the concrete that resists the anchorage forces. Anchor bolt details shall include the required bolt material, diameter, embed, and edge distances.

- F. Anchor bolt calculations and details shall be submitted and shall bear the signature and seal of a Professional Engineer registered in the State of Alaska.

3.4 CLEANING

- A. Before final acceptance, the electrical work shall be thoroughly cleaned. Exposed parts shall be thoroughly clean of cement, plaster, and other materials. Oil and grease spots shall be removed with a non-flammable cleaning solvent. Such surfaces shall be carefully wiped and all cracks and corners scraped out. Touch-up paint shall be applied to scratches on panels and cabinets. Electrical cabinets or enclosures shall be vacuum-cleaned.
- B. Contractor shall group, coil, and tie wrap all spare cables at the bottom of the Local Control Panels. The wires shall be grouped according to the device, control panel, or MCC section they originate from. Cable groups shall be tagged according to their point of origin.
- C. All debris shall be removed from the void below the panels.

END OF SECTION

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- D. Conductor Insulation:
 - 1. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- B. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Copper or Aluminum.
 - 2. Termination: Compression or Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. All conductors: Copper; stranded.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. All Circuits: Type XHHW-2, single conductors in raceway.
- B. Cord Drops at vibrating equipment: Type SO, extra hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. All conductors to be installed in surface mount raceway.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Support conduits according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all circuits. Size per NFPA 70.

3.5 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.6 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.7 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test conductors feeding the following critical equipment and services for compliance with requirements:
 - a. Motors
 - b. Control Panels
 - c. Gas Detectors
 - d. Relocated circuits
 - 2. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Inspect compression-applied connectors for correct cable match and indentation.
 - c. Inspect for correct identification.
 - d. Inspect cable jacket and condition.
 - e. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - f. Continuity test on each conductor and cable.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Category 5e twisted pair cable.
 - 2. Category 6 twisted pair cable.
 - 3. Twisted pair cabling hardware.
 - 4. Low-voltage control cabling.
 - 5. Control-circuit conductors.
 - 6. Identification products.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Source quality-control reports.
- B. Field quality-control reports.

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 CATEGORY 5e TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.
- B. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 5e cables.
- C. Conductors: 100-ohm, 24 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP).
- E. Cable Rating: Plenum.
- F. Jacket: thermoplastic.

2.3 CATEGORY 6 TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
- B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
- C. Conductors: 100-ohm, 23 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP).
- E. Cable Rating: Plenum.
- F. Jacket: thermoplastic.

2.4 TWISTED PAIR CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.
- B. General Requirements for Twisted Pair Cable Hardware:
 - 1. Comply with the performance requirements of Category 5e or Category 6 to match existing systems.

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
 3. Cables shall be terminated with connecting hardware of same category or higher.
- C. Source Limitations: Obtain twisted pair cable hardware from single source from single manufacturer.
- D. Patch Cords: Factory-made, four-pair cables in lengths as required; terminated with an eight-position modular plug at each end.
1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords shall have latch guards to protect against snagging.
- E. Plugs and Plug Assemblies:
1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded twisted pair cable.
 2. Comply with IEC 60603-7-1, IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, and IEC 60603-7.5.
- F. Jacks and Jack Assemblies:
1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded twisted pair cable.
 2. Designed to snap-in to a patch panel or faceplate.
 3. Standards:
 - a. Category 5e, unshielded twisted pair cable shall comply with IEC 60603-7-2.
 - b. Category 6, unshielded twisted pair cable shall comply with IEC 60603-7-4.
 4. Marked to indicate transmission performance.

2.5 LOW-VOLTAGE CONTROL CABLE

- A. Paired Cable: NFPA 70, Type CMG.
1. Single or Multi pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
 2. PVC insulation.
 3. Unshielded.
 4. PVC jacket.
 5. Flame Resistance: Comply with UL 1685.

2.6 CONTROL-CIRCUIT CONDUCTORS

- A. Control Circuits: Stranded copper, Type XHHW-2, complying with UL 44 in raceway.

2.7 SOURCE QUALITY CONTROL

- A. Factory test twisted pair cables according to TIA-568-C.2.

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Test cables on receipt at Project site.
 - 1. Test each pair of twisted pair cable for open and short circuits.

3.2 INSTALLATION OF RACEWAYS AND BOXES

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.
- B. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows.
- D. Raceway Installation:
 - 1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.
 - 2. Secure conduits to backboard if entering the room from overhead.
 - 3. Extend conduits 4 inches above finished floor.
 - 4. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
 - 1. Comply with TIA-568-C Series of standards.
 - 2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
 - 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - 4. Cables may not be spliced.
 - 5. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
 - 7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
9. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
10. Support: Do not allow cables to lie on removable ceiling tiles.
11. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.

C. Twisted Pair Cable Installation:

1. Comply with TIA-568-C.2.
2. Install cables in conduit.
3. Install termination hardware per manufactures instructions to conform to category requirements.
4. Do not untwist UTP cables more than 1/2 inch at the point of termination to maintain cable geometry.

D. Installation of Control-Circuit Conductors and cables:

1. Install conductors and cables in raceways. Comply with requirements specified in Section 260533 "Raceways and Boxes for Electrical Systems."

E. Separation from EMI Sources:

1. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches.
2. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
3. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
4. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches.
5. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 REMOVAL OF CONDUCTORS AND CABLES

- A. Remove abandoned conductors and cables where conduits are relocated and where installed conductors are not terminated at equipment and are not identified with a tag for future use.

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

3.5 CONTROL-CIRCUIT CONDUCTORS

- A. Minimum Conductor Sizes:
 - 1. Control and signal circuit single conductors; No 16 AWG.

3.6 IDENTIFICATION

- A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
- C. Single conductor control cables: test per section Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
- D. Network Cables:
 - 1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- E. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- F. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.

END OF SECTION

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel slotted support systems.
 - 2. Conduit and cable support devices.
 - 3. Mounting, anchoring, and attachment components, including mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 4. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.
- B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.
 - 1. Hangers. Include product data for components.
 - 2. Slotted support systems.
 - 3. Equipment supports.

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the supported equipment and systems will be fully operational after the seismic event."
 2. Component Importance Factor: 1.5.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 2. Material for Channel, Fittings, and Accessories: Stainless steel, Type 304 or Stainless steel, Type 316.
 3. Channel Width: Selected for applicable load criteria and application.
 4. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit Support Devices: Stainless-steel clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; hot dipped galvanized or stainless steel.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 2. Concrete Inserts: Stainless Steel, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 4. Through Bolts: Structural type, stainless steel, hex head, and high strength. Comply with ASTM A 325.
 5. Toggle Bolts: Stainless-steel springhead type.
 6. Hanger Rods: Threaded stainless steel.

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Stainless steel or hot dipped galvanized.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with one-bolt or two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To New Concrete: Bolt to concrete inserts.
 - 2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

3. To Existing Concrete: Expansion anchor fasteners.
 4. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 5. To Light Steel: Sheet metal screws.
 6. Wood beams: stainless steel wood screws rated for twice expected load.
 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with manufacturer's seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars. Hole depth and preparation per the manufactures instructions.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.4 TOUCHUP

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Boxes, enclosures, and cabinets.

B. Related Requirements:

1. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For raceways, conduits, and fittings, classified area junction boxes, hinged-cover enclosures, and cabinets.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 1. Structural members in paths of conduit groups with common supports.
 2. Process equipment, piping, and architectural features in paths of conduit groups with common supports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. GRC: Comply with ANSI C80.1 and UL 6.
3. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

- B. Metal Fittings:
 - 1. Comply with NEMA FB 1 and UL 514B.
 - 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 3. Fittings, General: Listed and labeled for type of conduit, location, and use.
 - 4. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.

- C. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 12 or Type 4x unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be NEMA 4X and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

- C. Wireway Covers: Flanged-and-gasketed type unless otherwise indicated.

- D. Finish: Manufacturer's standard enamel or stainless steel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

- B. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.

- C. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum or galvanized, cast iron with gasketed cover.

- D. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 4X or Type 12 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

- E. Cabinets:
 - 1. NEMA 250, Type 12 or Type 4X steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard brush or enamel.

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors, Process Rooms, and Classified Locations: Apply raceway products as specified below unless otherwise indicated:
 1. All above grade conduit: GRC.
 2. Underground Conduit: See Section 260543
 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 4. Connection to Vibrating Equipment in Classified 1 Division 1 Locations: Type SOOW cord rated for extra hard duty and installed to comply NEC section 500.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X.
- B. Indoor dry locations: Apply raceway products as specified below unless otherwise indicated:
 1. Exposed, GRC.
 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC at all locations.
 3. Damp or Wet Locations: GRC.
 4. Boxes and Enclosures: NEMA 250, Type 12, except use NEMA 250, Type 4X stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Field route surface raceways.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Complete raceway installation before starting conductor installation.

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

- C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. Install conduits parallel or perpendicular to building lines.
- F. Support conduit within 12 inches of enclosures to which attached.
- G. Raceways Embedded in Slabs:
 - 1. Run conduit parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors.
- J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- K. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- M. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- O. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

- P. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- Q. Provide unions between conduit seals and all equipment to allow equipment to be removed for maintenance without disturbing the conduit seals.
- R. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
- S. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 48 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Unclassified Locations: Use LFMC.
 - 2. Classified Location: Use flexible cords.
- T. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- U. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- V. Locate boxes so that cover or plate will not span different building finishes.
- W. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- X. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- Y. Set metal floor boxes level and flush with finished floor surface.
- Z. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals for penetrations of floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

3.4 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings, including GRC.
 - 2. Rigid nonmetallic duct.
 - 3. Duct accessories.
 - 4. Precast concrete handholes.
 - 5. Polymer concrete handholes and boxes with polymer concrete cover.

1.3 DEFINITIONS

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank: Two or more ducts installed in parallel, with or without additional casing materials.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include duct-bank materials, including spacers and miscellaneous components.
 - 2. Include duct, conduits, and their accessories, including elbows, end bells, bends, and fittings.
 - 3. Include accessories for manholes, handholes, boxes.
 - 4. Include underground-line warning tape.
- B. Shop Drawings:
 - 1. Factory-Fabricated Handholes and Boxes:

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

- a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
- b. Include duct entry provisions, including locations and duct sizes.
- c. Include cover design.
- d. Include grounding details.
- e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

1.5 INFORMATIONAL SUBMITTALS

- A. Duct and Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.
 1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
 2. Drawings shall be signed and sealed by a qualified professional engineer.
- B. Product Certificates: For concrete and steel used in precast concrete handholes, as required by ASTM C 858.
- C. Source quality-control reports.
- D. Field quality-control reports.

1.6 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions, and then only after arranging to provide temporary electrical service according to requirements indicated:
 1. Notify Construction Manager no fewer than two days in advance of proposed interruption of electrical service.
 2. Do not proceed with interruption of electrical service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 GALVANIZED RIGID METAL CONDUIT

- A. GRC: Comply with ANSI C80.1 and UL 6.
- B. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

2.2 RIGID NONMETALLIC DUCT

- A. Underground Plastic Utilities Duct: Type EPC-80-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.
- B. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
- C. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
- B. Underground-Line Warning Tape: Comply with requirements for underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."

2.4 PRECAST CONCRETE HANDHOLES AND BOXES

- A. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or box.
- B. Comply with ASTM C 858 for design and manufacturing processes.
- C. Frame and Cover: Weatherproof aluminum frame with hinged aluminum access door assembly with tamper-resistant, captive, cover-securing bolts.
 - 1. Cover Hinges: Concealed, with hold-open ratchet assembly.
 - 2. Cover Handle: Recessed.
- D. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- E. Cover Legend: Molded lettering, "ELECTRIC."
- F. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
- G. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.
 - 1. Extension shall provide increased depth of 12 inches.
 - 2. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.
- H. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

- I. Knockout Panels: Precast openings in walls, arranged to match dimensions and elevations of approaching duct, plus an additional space required vertically and horizontally to accommodate alignment variations.
- 2.5 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER
- A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.
 - B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.
 - C. Color: Gray.
 - D. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
 - E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
 - F. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - G. Cover Legend: Molded lettering, "ELECTRIC."
 - H. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.
- 2.6 FIBERGLASS HANDHOLES AND BOXES WITH POLYMER CONCRETE FRAME AND COVER
- A. Description: Sheet-molded, fiberglass-reinforced, polyester resin enclosure joined to polymer concrete top ring or frame.
 - B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.
 - C. Color: Gray.
 - D. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
 - E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
 - F. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - G. Cover Legend: Molded lettering, "ELECTRIC."

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

- H. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
- I. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.

2.7 FIBERGLASS HANDHOLES AND BOXES

- A. Description: Molded of fiberglass-reinforced polyester resin, with covers made of polymer concrete, or fiberglass.
- B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.
- C. Color: Gray.
- D. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
- E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
- F. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- G. Cover Legend: Molded lettering, "ELECTRIC."
- H. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Construction Manager.

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for underground electrical and communications: Type GRC, RNC, or HDPE.
- B. Duct for Electrical Branch Circuits: GRC, RNC, HDPE, direct-buried unless otherwise indicated.
- C. Underground Ducts Crossing Paved Paths and Driveways Roadways: GRC.
- D. Stub-ups: GRC.

3.3 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and Boxes for 600 V and Less:
 - 1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete, AASHTO HB 17, H-20 structural load rating.
 - 2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles:
 - a. Precast concrete, AASHTO HB 17, H-20
 - b. Polymer concrete, SCTE 77, Tier 15
 - c. Fiberglass enclosures with polymer concrete frame and cover, SCTE 77, Tier 15
 - d. Fiberglass-reinforced polyester resin, SCTE 77, Tier 15

3.4 EARTHWORK

- A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching.
- D. Cut and patch existing pavement in the path of underground duct, duct bank, and underground structures according to "Cutting and Patching" Article in Section 017300 "Execution."

3.5 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct according to NEMA TCB 2.

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

- C. Slope: Pitch duct a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment.
- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations unless otherwise indicated.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. Building Wall Penetrations: Make a transition from underground duct to GRC at least 10 feet outside the building wall, without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for RNC-to-GRC transition. Install GRC penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- G. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- H. Pulling Cord: Install 200-lbf-test nylon cord in empty ducts.
- I. Direct-Buried Duct and Duct Bank:
 - 1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
 - 2. Width: Excavate trench 12 inches wider than duct on each side.
 - 3. Width: Excavate trench 3 inches wider than duct on each side.
 - 4. Depth: Install top of duct at least 36 inches below finished grade unless otherwise indicated.
 - 5. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 - 6. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than four spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 - 7. Install duct with a minimum of 3 inches between ducts for like services and 6 inches between power and communications duct.
 - 8. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 - 9. Install manufactured long sweep GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.
 - a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches of concrete.

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

- b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and minimum 3 inches from conduit side to edge of slab.
 - c. Stub-ups to Indoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of wall. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and no less than 3 inches from conduit side to edge of slab.
10. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.
- a. Place minimum 3 inches of sand as a bed for duct. Place sand to a minimum of 6 inches above top level of duct.
- J. Underground-Line Warning Tape: Bury conducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inches above all concrete-encased duct and duct banks and approximately 12 inches below grade. Align tape parallel to and within 3 inches of centerline of duct bank. Provide an additional warning tape for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

3.6 INSTALLATION OF CONCRETE HANDHOLES, AND BOXES

A. Precast Concrete Handhole Installation:

- 1. Comply with ASTM C 891 unless otherwise indicated.
- 2. Install units level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances.
- 3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

B. Elevations:

- 1. Manhole Roof: Install with rooftop at least 15 inches below finished grade.
- 2. Manhole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other manhole frames 1 inch above finished grade.

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

3. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.
 4. Where indicated, cast handhole cover frame integrally with handhole structure.
- C. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated.

3.7 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch above finished grade.
- D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.
- E. Field cut openings for duct according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.
- F. For enclosures installed in asphalt paving and subject to occasional, nondeliberate, heavy-vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screeded to top of box cover frame. Bottom of ring shall rest on compacted earth.
 1. Concrete: 3000 psi, 28-day strength, complying with Section 033000 "Cast-in-Place Concrete," with a troweled finish.
 2. Dimensions: 10 inches wide by 12 inches deep.

3.8 GROUNDING

- A. Route ground conductor in each conduit.

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
 2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch-long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

3.10 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

END OF SECTION

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
 - 2. Sleeve-seal systems.
 - 3. Sleeve-seal fittings.
 - 4. Grout.
 - 5. Silicone sealants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, hot dipped galvanized.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
- E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- F. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

- a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
- b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 BELOW GRADE SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 2. Pressure Plates: Plastic or Stainless steel.
 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 ABOVE GRADE SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.4 FIRE RATED SEALANT

- A. Specseal Series SSS intumescent sealant by STI Firestop or similar.

2.5 PENETRATION TRIM PLATES

- A. Flange trim plate: AWI Manufacturing type WFT or similar.

2.6 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

2.7 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079005 "Joint Sealants."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
- C. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- D. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

- E. Below Grade, Exterior-Wall Penetrations: Seal penetrations using hot dipped galvanized steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- F. Above Grade, Exterior-Wall and Floor Penetrations: Install hot dipped galvanized pipe sleeves. Size sleeves to provide annular clear space required by seal system manufacturer between raceway and sleeve for installing sleeve-seal system.

3.2 FIRE RATED PENETRATIONS

- A. Interior Seal and trim:
 - 1. Provide fire rated caulking sealant at penetration. In interior finished areas provide stainless steel flange trim plate to match conduit size and shape.

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG.
2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
4. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
5. Color for Neutral: White or gray.
6. Color for Equipment Grounds: Bare copper, Green, Green with a yellow stripe.

- B. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

- C. Warning labels and signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

- D. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

- A. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, flexible Nylon label with acrylic pressure-sensitive adhesive.

1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

2. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- B. Self-Adhesive Labels: Vinyl or Nylon thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.

2.4 BANDS AND TUBES

- A. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.

2.5 TAPES AND STENCILS

- A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
- B. Underground-Line Warning Tape:
 1. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
 2. Color and Printing:
 - a. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE".
 3. Warning Tapes
 - a. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, compounded for direct-burial service.
 - b. Width: 6 inches.
 - c. Overall Thickness: 5 mils.
 - d. Foil Core Thickness: 0.35 mil.
 - e. Tensile according to ASTM D 882: 70 lbf and 4600 psi.

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

2.6 SIGNS

- A. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Engraved legend.
 - 2. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with white letters on a dark gray background.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.

2.7 CABLE TIES

- A. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black.

2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Verify identity of each item before installing identification products.
- C. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

- D. Apply identification devices to surfaces that require finish after completing finish work.
- E. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- G. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.
- H. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- I. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
 - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- J. Underground Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench that exceeds 16 inches overall.
 - 2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- K. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.
- L. Cable Ties: General purpose, for attaching tags, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use self-adhesive or heat shrink wraparound labels and self-adhesive vinyl tape to identify the phase and circuit.

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

- D. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive or heat shrink labels with the conductor or cable designation, origin, and destination.
- E. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive or heat shrink labels with the conductor designation.
- F. Conductors to Be Extended in the Future: Attach self-adhesive or heat shrink labels to conductors and list source and mark as spare.
- G. Locations of Underground Lines: Underground-line warning tape all underground cables or conduits.
- H. Equipment Identification Labels:
 - 1. Indoor Equipment: Laminated acrylic or melamine sign.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign.
 - 3. Equipment to Be Labeled:
 - a. Enclosures and electrical cabinets.
 - b. Control Panels
 - c. Push-button stations.
 - d. Switches for other than lighting.

END OF SECTION 260553

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Nonfusible switches.
 - 2. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include wiring diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.2 NONFUSIBLE SWITCHES

- A. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- B. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
 - 4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Contact rating - 24-V ac.
 - 5. Lugs: Mechanical type, suitable for number, size, and conductor material.
 - 6. Service-Rated Switches: Labeled for use as service equipment.

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

2.3 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be a brush finish on Type 304 stainless steel (NEMA 250 Type 4-4X stainless steel).
- C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.
- D. Operating Mechanism: The operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.
- E. NEMA 250 Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor and wet location applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Construction Manager's written permission.
 - 4. Comply with NFPA 70E.

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 4X.
 - 3. Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
 - 4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 - 5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.
 - 6. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7 with cover attached by Type 316 stainless steel bolts.

3.4 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- E. Install fuses in fusible devices.
- F. Comply with NFPA 70 and NECA 1.

3.5 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

- D. Perform tests and inspections.
 - E. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.
 - f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - h. Verify correct phase barrier installation.
 - i. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
 - F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
 - G. Prepare test and inspection reports.
 - 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.
- 3.7 ADJUSTING
- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION

SECTION 267610 – GAS DETECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Gas monitoring controllers
 - 2. H₂S Detectors (Hydrogen Sulfide)
 - 3. O₂ Detectors (Oxygen)
 - 4. CH₄ Detectors (Methane)

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. System description and system drawings.
- C. Product Schedule: Indicate type, use, location, and termination locations.
- D. Detector controller alarm level settings.

PART 2 - PRODUCTS

2.1 Gas Monitoring System

- A. General: The CONTRACTOR shall supply and install a gas detection and monitoring system in the processing area of the pump station area of the Mendenhall plant. The gas monitoring system shall have the ability to detect hydrogen sulfide (0-10 ppm), oxygen (0-25%), and combustible gas (0-100% natural gas). The gas monitoring system shall be rated for a Class 1, Division 1 environment (explosion proof), constructed of 316 stainless steel.
- B. The specifications and project drawings depict equipment and materials manufactured by MSA, Model MSA Ultima X3 gas monitor. It is not intended, however, to eliminate other products of equal quality and performance. All “or Equals” or substitutions shall follow the procedures for alternative materials of the General Conditions.
- C. Sensor/Transmitters
 - 1. Catalytic Bead Type Combustible Sensors
 - a. The catalytic bead type combustible sensor must have a demonstrated resistance to degradation of silicones and reduced sulfur gases.

SECTION 267610 – GAS DETECTION

- b. The catalytic combustible sensor/transmitter shall detect for an above 100%LEL condition (over-range). This condition must be indicated on the front panel LCD.
 - c. Sensors conductors' type and size as be specified by the manufacturer.
2. Infrared Combustible Sensor/Transmitter
 - a. The infrared (IR) combustible sensor must be capable of calibration without gas. The sensor/transmitter must be capable of performing a full calibration by zero adjustment only.
 - b. The IR sensor/transmitter shall detect for an above 100%LEL condition (over-range). This condition must be indicated on the front panel LCD.
 - c. The IR sensor/transmitter shall not contain a flashback arrestor / frit. The IR sensor/transmitter must allow for a gas check without alternate calibration / gas check fittings or cap.
 - d. Sensors conductors' type and size as be specified by the manufacturer.
 3. Electrochemical (Toxic and Oxygen) Sensors/Transmitters
 - a. The electrochemical sensor/transmitters shall not require the periodic addition of reagents.
 - b. Sensors conductors' type and size as be specified by the manufacturer.
- D. Sensor/Transmitter Operating Requirements
1. Operating Voltage - The sensor/transmitter shall operate between 8-30 VDC.
 - a. Provide manufactures recommend 24vdc power supply. Power supply input voltage to be 120VAC.
 - b. 24vdc power supply shall have capacity to power the alarm strobe system or provide additional power supplies as required to power the alarm strobes.
 2. Sensor/transmitter electronics shall consist of one PCB. This PCB shall offer expandability to allow for optional LED's and relays.
 3. The single PCB shall not require tools for installation or removal.
 4. The single PCB must be self-aligning in the enclosure.
 5. Sensor/transmitter shall allow for optional reset connector for resetting latched alarms.
 6. Set-up and start-up of the sensor/transmitter will be so that the enclosure need not be opened during this process.
 7. Sensor/transmitter shall be factory calibrated, ready for use out of the box. A gas check is all that is required to ensure proper operation.
- E. Sensor/Transmitter Display
1. There will be a local display indicating the gas type being monitored and the concentration of gas present. The display will alternate between the gas type (1 second) and gas concentration (5 seconds). The display will be an integral part of the sensor/transmitter enclosure. The display will be visible from a minimum of 5 feet and will be present always, and will not require being turned on or off. This readout will be three, one half-inch (3 1/2") digit Liquid Crystal Displays (LCD).
 2. Sensor/transmitter display shall indicate all diagnostic check/fault conditions with a scrolling message detailing the condition. Error codes shall not be used.

SECTION 267610 – GAS DETECTION

3. Sensor/transmitter will display 3 levels of alarm. Alarm levels will be adjustable by means of a hand held infrared controller or a HART hand held communicator.

F. Smart Sensor Technology

1. Sensors shall be contained in sensor modules mounted external to the main enclosure. All sensor modules shall have the capability of replacement while the unit is under power (hazardous areas) without the need for tools.
2. Sensor modules shall contain all relevant sensor information within the module. This information shall include sensor manufacturer date, gas type, gas range, calibration data, and default relay parameters.
3. Sensor module shall store all calibration data so that the module may be calibrated off site and installed in the field without the necessity of recalibration. The sensor module shall not require a battery or power source to store this data.

G. LED / Relay

1. Sensor/transmitter shall have LED's, viewable from 25 feet, minimum. The LED's shall operate as follows:
 - a. Solid green LED – normal operation (measure mode)
 - b. Solid red LED – fault condition
 - c. Blinking red LED – alarm condition
2. Sensor/transmitter shall have optional relays. Relays shall be rated at 5 amps @ 30VDC, 5 amps @ 220VAC, single-pole, double-throw and consist of three for alarm levels and one for fault. All relay contact activation will be monitored. If the relay cannot activate for any reason, the trouble relay will change state. All relays shall be field selectable through a non-intrusive hand-held wireless remote control unit (Controller) or a HART hand held communicator. Selectable features include:
 - a. Alarm level
 - b. Latching / Non-latching
 - c. Upscale / Downscale
 - d. Normally-opened / Normally-closed
 - e. Energized / De-energized

H. Other Features

1. Sensor/transmitter shall allow for full range scaling of the 4-20mA-output signal.
2. Sensor/transmitter will be capable of storing and displaying average, minimum and maximum gas concentrations over selected periods of time.
3. The sensor/transmitter will give an indication of when sensor is nearing the end of its useful life by means of the front panel LCD. This indication that the sensor is nearing its useful life will be based on the sensor output. It shall not be based on the time the sensor was in service.

I. Sensing Element Warranty

1. All electrochemical and catalytic bead sensing elements (sensors) will have a minimum useful life of one year. The supplier will provide replacement sensors at no charge for any sensor that does not meet the minimum requirement.

SECTION 267610 – GAS DETECTION

2. The IR source in the infrared sensor will have a minimum useful life of ten (10) years. The supplier will provide replacement sensors at no charge for any sensor that does not meet the minimum requirement.

J. Sensor Enclosure Parameters

1. Explosion-proof Sensor/Transmitter
2. The sensor/transmitter will be in a 316 stainless steel enclosure suitable for location in Class I, Division 1 & 2, Groups A, B, C & D classified areas.
3. The enclosure shall have a minimum of four entries, allowing for flexible mounting options for sensor, power, signal, and optional relay wiring.
4. The enclosure shall offer a means to mount without using an entryway.

K. Sensor/Transmitter Single Condulet Mounting

1. Explosion-proof Sensor/Transmitter
 - a. Sensor/transmitter will be mounted in a single condulet. The back portion of the enclosure shall be separate from the electronics, allowing for mounting and wiring of the unit without the electronics present.

L. Sensor/Transmitter Remote Sensor Mounting

1. The sensor portion of the sensor/transmitter unit will be capable of being able to be remotely mounted from the electronics and display. The separate sensor enclosure will be able to be mounted up to one hundred (100) feet from the main enclosure.
2. The sensor housing for the explosion-proof Gas Monitor will be in an enclosure suitable for location in Class I, Division 1, Groups A, B, C & D, classified areas.
3. A two twisted pair cable will connect the sensor housing and the calibration electronics.
4. The readout portion of the sensor/transmitter shall have a display of the concentration of gas present. The display will be visible from a minimum of 5 feet and will be present at all times. It will not be required to be turned on or off. This readout will be three, one half inch (3 2") digit Liquid Crystal Displays (LCD).

M. Non-intrusive Calibration Capability

1. All sensor/transmitters shall be capable of being calibrated without opening any enclosures.
2. By means of a non-intrusive hand held wireless remote control unit, magnetic operator, or other nonintrusive means the sensor/transmitter the operator shall be able to direct the controller to enter the calibration mode. The display of the sensor/transmitter will instruct the user on when to apply zero and span gas. The sensor/transmitter will automatically adjust its internal settings to the proper calibration values without further intervention by the user. Upon completion of a successful calibration, the sensor transmitter will exit the calibration mode. Date stamp of last successful calibration will be retained in the sensor/transmitter internal memory, with capability to be displayed on LCD. If calibration is unsuccessful for any reason, the display must show an unsuccessful calibration attempt and revert to its previous calibration settings.
3. All tools, calibrators, remote control units, or other devices required for calibration shall be provided with the gas detection system.

SECTION 267610 – GAS DETECTION

- a. Provide 1(ea) of any required tool, calibrator, or other devices required for calibration.
- b. Any electronic type calibration tools provided will be full featured to allow the calibration and setting of all functions and features of the sensor/transmitter.

N. Calibration Kit

1. The manufacture of the gas monitor system shall provide a calibration kit. The calibration kit shall be for monitoring the following gases
 - a. Hydrogen Sulfide
 - b. Oxygen
 - c. Methane
2. The calibration kit shall include all tools and equipment required for testing and calibration of sensor/transmitters. At a minimum, a carrying/storage case, tubing, regulators, calibration gases, and calibration tools.

O. Approvals:

1. All equipment shall be Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked use and for installation in Class I, Division 1 hazardous location.

P. NOTIFICATION APPLIANCES

1. Alarm Strobes
 - a. Provide strobes as shown on the drawings.
 - b. Strobes shall be red, LED type, operable at 24VDC.
 - c. All strobes, regardless of location shall be rated for class 1 division 1.

PART 3 - EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall familiarize himself with all information concerning the equipment including the installation requirements and operation characteristics. The equipment shall be installed in accordance with the recommendations of the manufacturer.
- B. Install products level, plumb, parallel, and perpendicular with building construction.
- C. Properly support instruments, tubing, piping, wiring, and conduit to comply with requirements indicated. Brace all products to prevent lateral movement and sway or a break in attachment when subjected to seismic loads.
- D. Fastening Hardware:
 1. Stillson wrenches, pliers, and other tools that cause injury to or mar surfaces of rods, nuts, and other parts are prohibited for work of assembling and tightening nuts.

SECTION 267610 – GAS DETECTION

2. Tighten bolts and nuts firmly and uniformly. Do not overstress threads by using excessive force or oversized wrenches.
 3. Lubricate threads of bolts, nuts, and screws with graphite and oil before assembly.
- E. Install products in locations that are accessible and that permit calibration and maintenance from floor, equipment platforms, or catwalks. Where ladders are required for Owner's access, confirm unrestricted ladder placement is possible under occupied condition.
- F. All conductors, cables, or wiring shall be installed in conduits. See section 26 05 33 for conduit requirements.
- G. All installations shall comply with NFPA 70 Section 501 requirements for hazardous locations. Provide explosionproof class 1 division 1 rated junction boxes as required.

3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Each piece of wire, cable, and tubing shall have the same designation at each end for operators to determine continuity at points of connection. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Install engraved phenolic nameplate with instrument identification on face.

3.3 CHECKOUT PROCEDURES

- A. Check out installed products before continuity tests, leak tests, and calibration.
- B. Check instruments for proper location and accessibility.
- C. Check instruments for proper installation on direction of flow, elevation, orientation, insertion depth, or other applicable considerations that impact performance.

3.4 ADJUSTMENT, CALIBRATION, AND TESTING

- A. Description:
1. Calibrate each instrument installed that is not factory calibrated and provided with calibration documentation.
 2. Detection system manufactures shall program detection system to pre-alarm and alarm at OSHA/NIOSH recommend alarm levels.
 - a. Submit alarm levels for approval prior to system installation.
 3. Provide a written description of proposed field procedures and equipment for calibrating each type of instrument. Submit procedures before calibration and adjustment.
 4. For each analog instrument, perform a three-point calibration test for both linearity and accuracy.
 5. Equipment and procedures used for calibration shall comply with instrument manufacturer's written recommendations.

SECTION 267610 – GAS DETECTION

6. Provide diagnostic and test equipment for calibration and adjustment.
7. Field instruments and equipment used to test and calibrate installed instruments shall have an accuracy of at least twice the instrument accuracy being calibrated. For example, an installed instrument with an accuracy of 1 percent shall be checked by an instrument with an accuracy of 0.5 percent.
8. Calibrate each instrument according to instrument instruction manual supplied by manufacturer.
9. If, after calibration, indicated performance cannot be achieved, replace out-of-tolerance instruments.

B. Analog Signals:

1. Check analog voltage signals using a precision voltage meter at zero, 50, and 100 percent.
2. Check analog current signals using a precision current meter at zero, 50, and 100 percent.

C. Digital Signals:

1. Check digital signals using a jumper wire.
2. Check digital signals using an ohmmeter to test for contact.

D. Meters: Check sensors at zero, 50, and 100 percent of Project design values.

E. Sensors: Check sensors at zero, 50, and 100 percent of Project design values.

F. Switches: Calibrate switches to make or break contact at set points indicated.

G. Transmitters:

1. Check and calibrate transmitters at zero, 50, and 100 percent of Project design values.

H. Calibration Tools

1. Transmit tools, calibrators or other devices required for calibration to the owner.

3.5 ACCEPTANCE TESTS

A. After installation of the equipment, the CONTRACTOR shall operate each unit to demonstrate its ability to perform its specified function. A manufacturer's representative shall inspect, calibrate, and test each of the gas sensors. The manufacturer's representative shall provide instruction to the OWNER'S representative in the operation and calibration of the flow meters.

1. Manufactures Representative

- a. After installation the CONTRACTOR shall engage a qualified representative of the manufacture of the gas monitor system to provide to inspect the equipment installed, assist in start-up, and instruct plant personnel in the proper operation, maintenance testing and calibration of the equipment.
- b. CONTRACTOR shall provide all expenses, tools, equipment and assistive labor as required.

SECTION 267610 – GAS DETECTION

- c. The representative will be required for one (1) trip and one (1) day minimum or as required for testing and training if additional days are required to complete the work.
2. Calibration tools
- a. Turn over tools, calibrators or other devices required for calibration to the owner after demonstration and training.

END OF SECTION

SECTION 400502 – PIPING AND EQUIPMENT IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section includes materials and installation of markers, labels, and signs for pipes and valves, for mechanical equipment, and for miscellaneous plant services.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 099800 Special Coatings
- B. Section 400519 Ductile Iron Process Pipe and Fittings
- C. Section 400524 Steel Process Pipe and Fittings
- D. Section 400553 Process Valves
- E. Section 432000 Pumps, General

1.3 SUBMITTALS:

- A. Submit manufacturer's catalog data and descriptive literature describing materials, colors, letter size, and size of labels.
- B. Submit list of all pipe, valves, and equipment being supplied for this contract including proposed tag numbers following the system established in this Section.

PART 2 - MATERIALS

2.1 STENCILED LABELS

- A. Labels shall be 2" stenciled letters in white paint. 1" letters on pipe less than or equal to 3" in diameter. Coordinate with Engineer for locations of respective labels.
- B. Piping Label Schedule: Provide process pipe labeling with flow direction arrow as follows:
 - 1. RWW INFL (4 Locations)
 - 2. SBR INFL (2 Locations)
 - 3. SBR's 2, 4, 6, 8 INFL (2 Locations)
 - 4. SBR's 1, 3, 5, 7 INLET (1 Location)
 - 5. NPW (1 Location)
 - 6. OVER FLOW (3 Locations)

2.2 LABELS FOR VALVES:

- A. Provide each valve of size larger than 2 inches with an identification tag. Tag shall be 2-inch-square or circular aluminum or 1/16-inch-thick fiberglass: W.H. Brady B-60, Seton Name Plate Corp. Series SVT, or equal. Aluminum tags shall have black-filled letters. Tag shall show the valve tag number and/or name or designation as given on the drawings.

SECTION 400502 – PIPING AND EQUIPMENT IDENTIFICATION

2.3 LABELS FOR MECHANICAL EQUIPMENT:

- A. Provide a label for each pump, tank, feeder, or other piece of mechanical equipment. Label shall contain the equipment name and tag number. Lettering shall conform to OSHA requirements. Labels shall be 2-inches (minimum) by 4 inches (minimum) brass, aluminum, or 1/8-inch-thick fiberglass tags: Brady B-120, Fiber-Shelf, Seton Style G, or equal.

PART 3 - EXECUTION

3.1 PIPE LABELS:

- A. Provide label and flow arrow at each connection to pumps or other mechanical equipment, at wall boundaries, at tees and crosses and at 10-foot centers on straight runs of piping.

3.2 VALVE AND EQUIPMENT LABELS:

- A. Attach labels to the valve or piece of equipment with Type 316 stainless-steel chains or wires.
- B. Attach valve labels to the valve handwheels. If the valve has no handwheel, attach the label to the valve by tying the tag wire or chain around the operating shaft or nut.

3.3 TAG LIST:

- A. The drawings establish the protocol for tag numbers. The CONTRACTOR and/or Process Equipment Suppliers shall maintain an up-to-date tag list, using the established protocol, to reflect any changes made during the detail design of process equipment and/or system. The final tag list shall be included in the O&M Manual.

END OF SECTION

SECTION 400505 – EXPOSED PIPING INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to install and test all exposed piping, fittings, and specials. The Work includes the following:
1. All types and sizes of exposed piping, except where exposed piping installations are specified under other Sections.
 2. Unless otherwise shown or specified, this Section includes all piping beginning at the outside face of structures or structure foundations and extending into the structure. Piping embedded in concrete within a structure or foundation shall be considered as exposed and is included herein. Piping that is permanently or intermittently submerged, or installed in sub-aqueous environments, is considered as exposed and is included in this Section.
 3. Work on or affecting existing exposed piping.
 4. Installation of all jointing and gasket materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all Work required for a complete exposed piping installation.
 5. Supports, restraints, and other anchors.
 6. Field quality control, including testing.
 7. Cleaning and disinfecting.
 8. Incorporation of valves, meters, and special items shown or specified into the piping systems per the Contract Documents and as required
- B. Related Sections:
1. Section 099700 Special Coatings
 2. Section 400506 Couplings, Adapters and Specials for Process Piping
 3. Section 400509 Wall Pipes, Floor Pipes, and Pipe Sleeves
 4. Section 400519 Ductile Iron Process Pipe and Fittings
 5. Section 400524 Steel Process Pipe and Fittings
 6. Section 400553 Process Valves
- C. Coordination:
1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before exposed piping Work.
 2. Coordinate with appropriate piping Sections of Division 40, Mechanical.

1.2 REFERENCES

- A. Standards referenced in this Section are:
1. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings
 2. ASME Boiler and Pressure Vessel Code.
 3. ASME B31.3, Process Piping.

SECTION 400505 – EXPOSED PIPING INSTALLATION

4. American Society for Non-Destructive Testing (ASNT), ASNT-TC-1A, Recommended Practice, Personnel Qualification, and Certification in Nondestructive Testing.
5. ASTM A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
6. ASTM B32, Specification for Solder Metal.
7. ASTM D4161, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals
8. ASTM D4174, Standard Practice for Cleaning, Flushing, and Purification of Petroleum Fluid Hydraulic Systems
9. ASTM F2164, Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure
10. AWS D1.1/D1.1M, Structural Welding Code-Steel.
11. ANSI/AWWA 0111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
12. ANSI/AWWA C206, Field Welding of Steel Water Pipe.
13. ANSI/AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
14. ANSI/AWWA C606, Grooved and Shouldered Joints.
15. ANSI/AWWA C651, Disinfecting Water Mains.
16. AWWA M9, Concrete Pressure Pipe.
17. AWWA M11, Steel Pipe - A Guide for Design and Installation.
18. AWWA M23, PVC Piping - Design and Installation.
19. AWWA M41, Ductile-Iron Pipe and Fittings.
20. AWWA M45, Fiberglass Pipe Design.
21. AWWA M55, PE Pipe - Design and Installation.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements and recommendations of authorities having jurisdiction over the Work.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
 - a. Detailed drawings in plan and, as applicable, section.
 - b. Details of piping, valves, supports, accessories, specials, joints, harnessing, and main anchor supports, and connections to existing piping, structures, equipment, and appurtenances.
2. Testing Plans, Procedures, and Testing Limitations
 - a. Submit description of proposed testing methods, procedures, and apparatus, and obtain ENGINEER's approval prior to testing.

SECTION 400505 – EXPOSED PIPING INSTALLATION

3. Informational Submittals: Submit the following:
 - a. Certificates:
 - i. Submit a certificate, signed by manufacturer of each product, certifying that product complies with applicable referenced standards.
 - ii. Welder's certificate in compliance with Paragraph 3.1.E.7.c of this Section.

B. Closeout Submittals: Submit the following:

1. Record Documentation:
 - a. Maintain accurate and up-to-date record documents showing field and Shop Drawing modifications. Record documents for exposed piping Work shall show actual location of all piping and appurtenances on a copy of the Drawings, unless otherwise approved by ENGINEER.
 - b. Record documents shall show piping with elevations referenced to the project datum and dimensions from permanent structures. For straight runs of pipe provide offset dimensions as required to document pipe location.
 - c. Include section drawings with exposed piping record documents when the Contract Documents include section Drawings.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Deliver products to Site to ensure uninterrupted progress of the Work.
2. Upon delivery, inspect pipe and appurtenances for cracked, gouged, chipped, dented, and other damage and immediately remove damaged products from Site.

B. Storage:

1. Store products for convenient access for inspection and identification. Store products off the ground using pallets, platforms, or other supports. Protect packaged products from corrosion and deterioration.
2. Pipe and fittings other than thermoplastic materials may be stored outdoors without cover. Thermoplastic pipe and fittings stored outdoors shall be covered.

C. Handling:

1. Handle pipe, fittings, specials, and accessories carefully with approved handling devices. Do not drop or roll material of delivery vehicles. Do not otherwise drop, roll, or skid piping.
2. Avoid unnecessary handling of pipe.
3. Keep pipe interiors free of dirt and foreign matter.
4. Protect interior linings and exterior coatings of pipe and fittings from damage. Replace pipe and fittings with damaged lining regardless of cause of damage. Repair damaged coatings.

SECTION 400505 – EXPOSED PIPING INSTALLATION

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Piping materials are specified in the Exposed Piping Schedule at the end of this Section. Piping materials shall conform to Specification for each type of pipe and piping appurtenances in applicable sections of Division 40, Process Interconnections.
- B. Markings and Identification:
 - 1. Pipe Markings:
 - a. Clearly mark each piece of pipe or fitting with a designation conforming to that shown on the approved Shop Drawings.
 - b. Manufacturer shall cast or paint on each length of pipe and each fitting the pipe material, diameter, and pressure or thickness class.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine conditions under which the Work is to be installed and notify ENGINEER in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

B. INSTALLATION

- 1. General:
- 2. Install piping as shown, specified and as recommended by the pipe and fittings manufacturer.
- 3. If there is a conflict between manufacturer's recommendations and the Contract Documents, request in writing instructions from ENGINEER before proceeding.
- 4. Provide pipe manufacturer's installation specialist at Site as specified on this Section.

C. Temporary Blind Flanges, Plugs, Caps, and Bulkheads:

- 1. Temporarily plug installed pipe at the end of each day of work or other interruption of pipe installation to prevent entry of animals, liquids, and persons into pipe, and entrance or insertion of deleterious materials into pipe.
- 2. Install standard plugs in all bells at dead ends, tees, and crosses. Cap all spigot and plain ends.
- 3. Fully secure and block blind flanges, plugs, caps, and bulkheads installed for testing, designed to withstand specified test pressure.
- 4. Where plugging is required for phasing of Work or subsequent connection of piping, install watertight, permanent type blind flanges, plugs, caps, or bulkhead acceptable to ENGINEER.

SECTION 400505 – EXPOSED PIPING INSTALLATION

D. Piping Installation:

1. Conform to manufacturer's instructions and requirements of standards and manuals listed in this Section, as applicable:
 - a. Ductile Iron Pipe: ANSI/AWWA 0600, AWWA M41.
 - b. Steel Pipe: ASME B31.3, ANSI/AWWA C206, AWWA M11.
 - c. Thermoplastic Pipe: AWWA M23
2. Install straight runs true to line and elevation.
3. Install vertical pipe truly plumb in all directions.
4. Install piping parallel or perpendicular to walls of structures. Piping at angles and 45 degree runs across corners of structures will not be accepted unless specifically shown on the Contract Documents or approved by the ENGINEER.
5. Install small diameter piping generally as shown when specific locations and elevations are not indicated. Locate such piping as required to avoid ducts, equipment, beams, and other obstructions.
6. Install piping to leave all corridors, walkways, work areas, and similar spaces unobstructed. Unless otherwise approved by ENGINEER provide a minimum headroom clearance under piping and pipe supports of 7.5 feet. Clearances beneath piping shall be measured from the outermost edge of piping, flanges or other type of joint that extends beyond the nominal outside diameter of piping.
7. Protect and keep clean interiors, fittings, and valves of pipe that will convey potable water, chemicals, and other pipe designated by ENGINEER.
8. Cutting: Limit field cutting of pipe. If required, cut pipe from measurements verified at Site. Field cut pipe, only where required, with a machine specially designed for cutting type of pipe being installed. Make cuts carefully without damage to pipe, coating, or lining, and with a smooth end at right angles to axis of pipe. Cut ends of push-on joint type pipe shall be tapered and sharp edges filed off smooth. Do not flame-cut pipe.

E. Jointing Pipe:

1. General:
 - a. Make joints in accordance with pipe manufacturer's recommendations and Contract Documents.
 - b. Cut piping accurately and squarely and install without forcing or springing.
 - c. Ream out pipes and tubing to full inside diameter after cutting. Remove all sharp edges on end cuts.
 - d. Remove all cuttings and foreign matter from inside of pipe and tubing before installation. Thoroughly clean all pipe, fittings, valves, specials, and accessories before installing.
2. Ductile Iron Mechanical Joint Pipe:
 - a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.

SECTION 400505 – EXPOSED PIPING INSTALLATION

- b. Lubricate plain end and gasket with soapy water or pipe manufacturer's recommended pipe lubricant, per ANSI/AWWA C111, just prior to slipping gasket onto plain end of joint assembly.
- c. Place gland on plain end with lip extension toward plain end, followed by gasket with narrow edge of gasket toward the plain end.
- d. Insert pipe into socket and press gasket firmly and evenly into gasket recess. Keep joint straight during assembly.
- e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
- f. Insert bolts and hand tighten nuts.
- g. Deflect joint only after assembled when approved by ENGINEER.
- h. Make deflection after joint assembly, if approved by ENGINEER, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. Bolt torque shall be:

Pipe Diameter (inches)	Bolt Diameter (inches)	Range of Torque (ft-lbs)
3	5/8	45 to 60
4 to 24	3/4	75 to 90
30 to 36	1	100 to 120
42 to 48	1.25	120 to 150

3. Ductile Iron Push-On Joint Pipe:

- a. Prior to assembling joints, thoroughly clean with a wire brush the last eight inches of exterior surface of spigot and interior surface of bell, except where joints are lined or coated with a protective lining or coating.
- b. Wipe clean rubber gaskets and flex gaskets until resilient. Conform to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold temperatures.
- c. Insert gasket into joint recess and smooth out entire circumference of gasket to remove bulges and to prevent interference with proper entry of spigot of entering pipe.
- d. Immediately prior to joint assembly, apply a thin film of pipe manufacturer's recommended lubricant to surface of gasket that will come in contact with entering spigot end of pipe, or apply a thin film of lubricant to outside of spigot of entering pipe.
- e. For assembly, center spigot in pipe bell and push pipe forward until spigot just makes contact with the rubber gasket. After gasket is compressed and before pipe is pushed or pulled in the rest of the way, carefully check gasket for proper position around the full circumference of joint. Final assembly shall be made by forcing spigot end of entering pipe past gasket until spigot makes contact with the base of the bell. When more than a reasonable amount of force is required to assemble the joint, remove spigot end of pipe to verify proper positioning of gasket. Do not use gaskets that have been scored or otherwise damaged.
- f. Maintain an adequate supply of gaskets and joint lubricant at Site when pipe jointing is in progress.

4. Ductile Iron and Steel Flanged Joints:

SECTION 400505 – EXPOSED PIPING INSTALLATION

- a. Assemble flanged joints using ring-type gaskets, with thickness as recommended by pipe manufacturer but not less than 1/8-inch thick, for raised-face flanges. Use full-face gaskets for flat-face flanges, unless otherwise approved by ENGINEER or recommended by pipe manufacturer. Gaskets shall be suitable for the service intended in accordance with the manufacturer's ratings and instructions. Gaskets shall be properly centered.
- b. Tighten bolts in a sequence that provides equal distribution of bolt loads.
- c. Length of bolts shall be uniform. Bolts shall not project beyond the nut more than 1/4-inch or fall short of the nut when fully taken up. Machine-cut ends of bolts to be neatly rounded. Do not use washers.
- d. Prior to assembly of flanged joints, lubricate bolt threads and gasket faces.
- e. Alternately tighten bolts 180 degrees apart to compress the gasket evenly.
- f. After assembly, coat all bolts and nuts, except stainless steel bolts and nuts, with same coating specified in Section 099700, Special Coatings, for material of pipe and fittings being joined.

F. Installing Valves and Accessories:

1. Provide supports for large valves, flow meters, and other heavy items as shown or required to prevent strain on adjoining piping.

G. Unions:

1. Install dielectric unions as specified in Section 400506, Couplings, Adapters, and Specials for Process Piping, where dissimilar metals are connected, except for bronze or brass valves in ferrous piping.
2. Provide a union downstream of each valve with screwed connections.
3. Provide screwed or flanged unions at each piece of equipment, where shown, and where necessary to install or dismantle piping.

H. Transitions from One Type of Pipe to Another:

1. Provide all necessary adapters, specials, and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.

I. Closures:

1. Provide closure pieces, such as blind flanges and caps, shown or required to complete the Work.

3.2 THRUST RESTRAINT

A. General

1. Provide thrust restraint on all pressure piping systems and where otherwise shown or specified.
2. Thrust restraints shall be designed for axial thrust exerted by test pressure specified in the Exposed Piping Schedule at end of this Section.

SECTION 400505 – EXPOSED PIPING INSTALLATION

B. Restrained Pipe Joints:

1. Pipe joints shall be restrained by means suitable for the type of pipe being installed.
2. Ductile Iron, Push-on Joints and Mechanical Joints: Restrain with a proprietary restrained joint system as specified in Section 400519. Ductile iron pipe, lugs, and tie rods, or other joint restraint systems approved by ENGINEER. Restrain ductile iron pipe connected by flexible couplings or flanged coupling adapters by harnessing across the coupling or adapter using tie rods or extended bolts connecting between flanges.
3. Steel Pipe Joints: Provide butt-welded joints, lap welded joints, flanged joints, or mechanical coupling connections as shown. Provide tie rods connected to lugs welded to the steel pipe for restraint at mechanical couplings.
4. Thermoplastic, FRP and HDPE Joints: Where bell and spigot-type or other non-restrained joints are utilized, provide tie rods across the joint or other suitable joint restraint system, subject to approval of ENGINEER.

3.3 WORK AFFECTING EXISTING PIPING

A. Location of Existing Piping:

1. Locations of existing piping shown on Drawings is approximate.
2. Determine the true location of existing piping to which connections are to be made, crossed, and that could be disturbed, and determine location of other facilities that could be affected by the Work.

B. Work on Existing Pipelines:

1. Cut or tap pipes as shown or required with machines and tools specifically designed for cutting or tapping pipelines.
2. Install temporary plugs to prevent entry of mud, dirt, water, and debris into pipe.
3. Provide necessary adapters, sleeves, fittings, pipe, and appurtenances required to complete the Work.

3.4 PAINTING

- A. Field painting shall conform to Section 099700 Special Coatings.

3.5 FIELD QUALITY CONTROL

A. Testing, General:

1. Test all piping, except as exempted in the Exposed Piping Schedule.
2. Notification: Notify ENGINEER at least 48 hours prior to testing.
3. When authorities having jurisdiction are to witness tests, notify ENGINEER and authorities having jurisdiction in writing at least 48 hours in advance of testing.
4. Conduct all tests in presence of ENGINEER.
5. Remove or protect pipeline-mounted devices that could be damaged by testing.
6. Provide all apparatus and services required for testing, including:

SECTION 400505 – EXPOSED PIPING INSTALLATION

7. Test pumps, compressors, hoses, calibrated gages, meters, test containers, valves, fittings, and temporary pumping systems required to maintain OWNER's operations.
 8. Temporary bulkheads, bracing, blocking, and thrust restraints.
 9. Provide air if an air test is required, power if pumping is required, and gases if gases are required.
 10. Unless otherwise specified, OWNER will provide fluid required for hydrostatic testing. CONTRACTOR shall provide means to convey fluid for hydrostatic testing into the pipe being tested. CONTRACTOR shall provide fluid for other types of testing required.
 11. Repair observed leaks and repair pipe that fails to meet acceptance criteria. Retest after repair.
 12. Unless otherwise specified, testing shall include existing piping systems that connect with new piping system. Test existing pipe to nearest valve. Piping not installed by CONTRACTOR and that fails the test shall be repaired upon authorization of ENGINEER or OWNER. Repair of existing piping will be paid as extra work unless otherwise specified.
 13. Test Schedule:
 - a. Refer to the Exposed Piping Schedule for type of test required and required test pressure.
 - b. Unless otherwise specified, the required test pressures are at lowest elevation of pipeline segment being tested.
 - c. For piping not listed in Exposed Piping Schedule:
 - i. Hydrostatically test pipe that will convey liquid at a pressure greater than five psig. Provide process air pipe test for pipe that will convey air or gas under pressure or vacuum, except chlorine gas, which requires a separate test.
 - d. Test Pressure:
 - i. Use test pressures listed in Exposed Piping Schedule.
 - ii. If test pressure is not listed in Exposed Piping Schedule, or if a test is required for piping not listed in the Exposed Piping Schedule, test pressure will be determined by the ENGINEER based on the maximum anticipated sustained operating pressure and the methods described in the applicable ANSI/AWWA manual or standard that applies to the piping system.
- B. Hydrostatic Testing:
1. Pipeline 30-inches diameter and larger shall be visually inspected that all debris has been removed prior to flushing.
 2. Prior to hydrostatic testing, pipelines shall be flushed or blown out as appropriate. The CONTRACTOR shall test pipelines in sections. Sections to be tested shall be defined by isolation valves in the pipeline. Where such valves are not present, the CONTRACTOR shall install temporary bulkheads or plugs for the purpose of testing. Sections that have a zero leakage allowance may be tested as a unit.
 3. No section of the pipeline shall be tested until field-placed concrete or mortar has attained an age of 14 Days. The test shall be made by closing valves when available or by placing bulkheads and filling the line slowly with water. The CONTRACTOR shall be responsible for ascertaining that test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to or movement of the adjacent pipe. Unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be

SECTION 400505 – EXPOSED PIPING INSTALLATION

- restrained or suitably anchored prior to the test to avoid movement and damage to piping and equipment. Remove or protect any pipeline-mounted devices that may be damaged by the test pressure.
4. The CONTRACTOR shall provide sufficient temporary tapings in the pipelines to allow for trapped air to exit. After completion of the tests, such taps shall be permanently plugged. Care shall be taken that air relief valves are open during filling.
 5. The pipeline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the release valves at a reasonable velocity. The air within the pipeline shall be allowed to escape completely. The differential pressure across the orifices in the air release valves shall not be allowed to exceed 5 psi at any time during filling. After the pipeline or section thereof has been filled, it shall be allowed to stand under a slight pressure for at least 24 hours to allow the concrete or mortar lining, as applicable, to absorb water and to allow the escape of air from air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to the ENGINEER shall be taken.
 6. Timed test period shall not begin until after the pipe has been filled, exposed to the required wetting period, air has been expelled, and pressure stabilized.
 7. The hydrostatic test shall consist of holding the indicated test pressure on the pipeline segment for a period of 2 hours. The test pressure for yard piping shall be as indicated on the Piping Schedule measured at the lowest point of the pipeline section being tested. No pressure test will be required for a reservoir or tank overflow line. Visible leaks that appear during testing shall be repaired in a manner acceptable to the ENGINEER. Add water to restore the test pressure if the pressure decreases 5 psi below test pressure during the test period.
 - a. Drainage piping shall be tested as follows: The water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be plugged except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than ten(10) feet of head of water. In testing successive section, at least the upper ten (10) feet of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost ten (10) feet of the system) shall have submitted to a test of less than a ten (10) foot head of water. The water shall be kept in the system, or in the portion under test, for at least fifteen (15) minutes before inspection starts. The system shall then be tight at all points, with no visible leakage.
 8. Pump from a test container to maintain test pressure. Measure volume of fluid pumped from test container and record on test report. Record pressure at test pump at fifteen minute intervals for duration of test.
 9. The maximum allowable leakage shall be as indicated on the Piping Schedule and the table below. Pipe with welded or soldered joints shall have no leakage. Exposed piping shall show no visible leaks and no pressure loss during the test. In the case of pipelines that fail to pass the leakage test, the CONTRACTOR shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipeline, repeating as necessary until the pipeline passes.

SECTION 400505 – EXPOSED PIPING INSTALLATION

10. Allowable Leakage Rates: Leakage is defined as the quantity of fluid supplied to pipe segment being tested to maintain pressure within five psi of the test pressure during timed test period. Allowable leakage rates for piping are:

Pipe Test Parameters

Pipe and Joint Type (See Note 3)	Test Standard	Test Pressure	Test Duration	Allowed Leakage
Ductile iron, all joint types	AWWA C600 AWWA Manual M41	150 percent of working pressure; See Note 1	2 hours	See Equation A
PVC	AWWA C605	125 percent of working pressure	2 hours	See Equation A
Welded Steel Pipe	AWWA Manual M11	125 percent of working pressure	2 hours min.	Zero

Note 1: 150 percent of working pressure, but also satisfy these conditions:

- no less pressure than 125 percent of working pressure at the highest point in the test reach
- do not exceed any pipe, fitting, or thrust restraint design pressure no more pressure than 200 percent of rated pressure of metal seated valves or hydrants
- no more than rated pressure of resilient seated gate or butterfly valves
- pressure during test must not vary more than 5 psi

SECTION 400505 – EXPOSED PIPING INSTALLATION

Equation A: $L = (SD/148,000)P^{1/2}$

Where:

- L = leakage, gallons per hour
- S = length tested or maximum test length allowed, whichever is smaller, feet
- D = pipe diameter, inches
- P = test pressure, psi

11. When testing against closed, metal-seated valves, an additional leakage per closed valve of 0.0078 gallons per hour per inch of nominal valve size is allowed.
12. Rates based on formula or table in AWWA Manual M41:
 - a. Metal and fiberglass pipe joined with rubber gaskets as sealing members, including the following joint types:
 - i. Bell and spigot and push-on joints.
 - ii. Mechanical joints.
 - iii. Bolted sleeve type couplings.
 - iv. Grooved and shouldered couplings.

C. Examination of Welds:

1. Personnel performing examination of welds shall be qualified to at least Level II, in accordance with ASNT SNT-TC-1A.
2. Conform to ASME Boiler and Pressure Vessel Code Section V and applicable articles for examination of welds.
3. Visually examine all welds, Category D Fluid Service, in conformance with ASME 831.3.
4. Examine at least ten percent of welds using liquid penetrant examination.
5. If a defect is detected, all welds shall be examined by liquid penetrant examination.
6. At conclusion of liquid penetrant examination, remove penetrant test materials by flushing, washing, or wiping clean with applicable solvents.

3.6 CLEANING AND DISINFECTION

A. General: Clean pipe systems as follows:

1. Thoroughly clean all piping, including flushing with water, dry air, or inert gas as required, in a manner approved by ENGINEER, prior to placing in service. Flush chlorine solution and sodium hypochlorite piping with water.
2. Piping 24-inch diameter and larger shall be inspected from inside and debris, dirt and foreign matter removed.
3. For piping that requires disinfection and has not been kept clean during storage or installation, swab each section individually before installation with a five percent hypochlorite solution.

3.7 EXPOSED PIPING SCHEDULE

SECTION 400505 – EXPOSED PIPING INSTALLATION

B. The schedules listed below, following the "End of Section" designation, are a part of this Specification section.

1. Table 40 05 05-A, Exposed Piping Schedule.

SECTION 400505 – EXPOSED PIPING INSTALLATION

**TABLE
40 05 05-A EXPOSED PIPING SCHEDULE**

Service	Diameter (inch)	Material	Interior Lining	Exterior Coating	Pressure Class/ Thickness	Joint	Test	Remarks
Mendenhall Headworks Facility								
RW (Pipe DP-N2)	12, 18	DI	CL	P	Class 53	Flg, GSEC	HYD (100)	Test from new 12" plug valves to temp cap before conn. to grit system
RW (Pipe IP-N1, IP-N2 and IP-N3)	24	DI	CL	P	Class 53	Flg, GSEC	HYD (15 +/-)	Fill pipes to grit chamber overflow level; Visual inspect
UW	<= 2	PVC	--	--	Sch 80	SW, SD	HYD (125)	
UW	>=3"	DI	CL	P	Class 53	GSEC	HYD (125)	
Drain	All	PVC	--	--	Sch 40/80	SW	HYD	See test procedure.
Juneau-Douglass Headworks Facility								
UW	<= 2	C	--	--	Type K	SD	HYD (125)	

SECTION 400505 – EXPOSED PIPING INSTALLATION

The following abbreviations are used in the Exposed Piping Schedule.

A. Service Abbreviations

Service	Abbrev.	Service	Abbrev.
Drain	D		
Raw Wastewater	RW		
Utility Water (non-pot)	UW		
Basin Drain	BD		

B. Material Abbreviations

Material	Abbrev	Material	Abbrev.
Ductile Iron	DI	Polyvinyl Chloride	PVC
Cast Iron	CI	Chlorinated Polyvinyl Chloride	CPVC
Carbon Steel	CS	Polyethylene	PE
Stainless Steel	SS	High Density Polyethylene	HDPE
Copper	C	Fiberglass Reinforced Plastic	FRP
Prestressed Concrete Cylinder Pipe	PCCP	Unlined	UL
Non-Prestressed Concrete Cylinder Pipe	CCP	Steel Cylinder Pipe	SCP

C. Lining/Coating Abbreviations

Lining	Abbrev	Coating	Abbrev.
Cement Mortar Lined	CL	Painted	P
Glass Lined	GL	Plastic Lined	PL
Ceramic Epoxy	CE	Insulated	I
Fusion Bonded Epoxy Lined	FBEL	Galvanized	Galv

SECTION 400505 – EXPOSED PIPING INSTALLATION

D. Joint Abbreviations

Joint Type	Abbrev	Joint Type	Abbrev.
Bell and Spigot	BS	Flanged	Flg
Restrained Bell and Spigot	RBS	Butt Weld	BW
Push-on Joint	POJ	Lap Weld	LW
Restrained Push-on Joint	RPOJ	Butt Fusion Weld	BFW
Mechanical Joint	MJ	Solvent Weld	SW
Restrained Mech. Joint	RMJ	Sleeve-type Flexible Coupling	SLFC
Soldered	Sd	Split Flexible Coupling	SPFC
Brazed	Bz	Plasticized PVC Coupling	PPVC
Threaded	Thd	Grooved or Shouldered End	GSEC
		Flanged Adapter	FA

E. Test Abbreviations

Test	Abbrev	Test	Abbrev.
Hydrostatic Test (test pressure in psig)	HYD ()	Disinfection and Bacteriological Testing	DBT
Process Air Pipe Test (test pressure in psig)	PA ()	Examination of Welds	EW
Chlorine Pipe Test	CL	Exfiltration Test	EX
		No Test Required	NR

END OF SECTION

SECTION 400506 – COUPLINGS, ADAPTERS AND SPECIALS FOR PROCESS PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

- 1.CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install all couplings, adapters, and specials for process piping.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before couplings, adapters, and specials for process piping Work.

C. Related Sections:

1. Section 099700 Painting.
2. Section 400505, Exposed Piping Installation
3. Section 400519 Ductile Iron Process Pipe and Fittings
4. Section 400524 Steel Process Pipe and Fittings
5. Section 400553 Process Valves

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.
2. ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-dipped, Zinc-Coated, Welded and Seamless.
3. AWWA C606, Grooved and Shouldered Joints.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer shall have at least five years' experience producing substantial similar products to those specified and shall be able to provide documentation of at least five installations in satisfactory operation for at least five years each.

B. Component Supply and Compatibility:

1. Obtain each type of coupling, adapter, and special for process piping product included in this Section, regardless of component manufacturer, from a single couplings, adapters, and specials manufacturer.
2. Supplier shall prepare, or review, and approve all submittals for components furnished under this Section.
3. Components shall be suitable for specified service conditions and be integrated into overall assembly by the Supplier.

SECTION 400506 – COUPLINGS, ADAPTERS AND SPECIALS FOR PROCESS PIPING

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:

- a. Submit piping layout Shop Drawings in accordance with Section 400505, Exposed Piping Installation.

2. Product Data:

- a. Submit product data on each type of coupling, expansion joint, and other piping specialties and accessories, including gaskets, hardware, and appurtenances sufficient to demonstrate compliance with the Contract Documents.

B. Informational Submittals: Submit the following:

1. Certificates:

- a. When requested by ENGINEER submit certificate attesting to compliance with standards referenced in this Section, signed by manufacturer.

2. Manufacturer's Instructions:

- a. Provide instructions for handling, storing, installing, and adjusting of products.

3. Source Quality Control:

- a. When requested by ENGINEER, submit results of source quality control tests.

4. Qualifications Statements:

- a. Submit qualifications of manufacturer when requested by ENGINEER.

PART 2 - PRODUCTS

2.1 COUPLINGS

A. Split-type Grooved or Shouldered End Couplings:

1. Pressure and Service: Same as connected piping. Use shouldered end where required by pressure rating.
2. Products and Manufacturers:
 - a. For coupling of cast-iron or ductile iron pipe, provide products of one of the following:
 - i. Style 31, as manufactured by Victaulic Company.
 - ii. Gruvlok, as manufactured by Grinnell Mechanical Products, division of Tyco.
 - iii. Or equal.
3. For coupling of standard steel pipe, where joint deflection is desired or allowed, provide products of one of the following:

SECTION 400506 – COUPLINGS, ADAPTERS AND SPECIALS FOR PROCESS PIPING

- a. Style 77, as manufactured by Victaulic Company.
 - b. Or equal.
4. For coupling of standard steel pipe, where joint deflection is not desired or allowed, provide products of one of the following:
 - a. Style HP-70, as manufactured by Victaulic Company.
 - b. Or equal.
 5. For coupling of stainless steel pipe, provide products of one of the following:
 - a. Style 77-S, as manufactured by Victaulic Company.
 - b. Or equal.
 6. Couplings shall conform to applicable requirements of AWWA C606.
 7. Housing Material:
 - a. For coupling of cast-iron pipe, ductile iron pipe, steel pipe, and thermoplastic pipe: Malleable iron or ductile iron.
 - b. For coupling of stainless steel pipe: Type 304 stainless steel, or equal.
 8. Gaskets:
 - a. “Flush Seal” (Victaulic), or equal. Halogentated Butyl, specially formulated to conform to ductile pipe surfaces.
 - b. Grade “E” EPDM for steel pipe.
 9. Bolts and Nuts: Heat-treated carbon steel track bolts, plated. For buried or submerged applications, provide stainless steel bolts complete with washers, Type 316 and with stainless nuts.
 10. Coating: Except for stainless steel couplings, provide orange enamel finish.
- B. Flanged Coupling Adapters(Flange by Sleeve):
1. Description: One end of adapter shall be flanged and opposite end shall have sleeve-type flexible coupling.
 2. Products and Manufacturers: Provide one of the following:
 - a. Style 128-W, with restraint pins, as manufactured by Dresser Piping Specialties, part of Dresser, Inc.
 - b. Style 911, by Smith Blair, Inc.
 - c. EBAA Iron Series 2100 MegaFlange
 - d. Or equal.
 3. Pressure and Service: Same as connected piping.
 4. Material: Ductile iron.
 5. Gasket: Recommended by the manufacturer.
 6. Bolts and Nuts: Heat-treated carbon steel track bolts, plated. For buried or submerged applications, provide stainless steel bolts complete with washers, Type 316 and with stainless nuts.
 7. Coating: Except for stainless steel couplings, provide orange enamel finish.

SECTION 400506 – COUPLINGS, ADAPTERS AND SPECIALS FOR PROCESS PIPING

C. Flanged Coupling Adapter (Flange by Groove)

1. Description: One end of adapter shall be flanged and opposite end shall have groove type coupling.
2. Products and Manufacturers: Provide one of the following:
 - a. Style VicFlange 341
 - b. Gruvlok Fig 7012
 - c. Approved equal.
3. Pressure and Service: Same as connected piping.
4. Material: Ductile iron.
5. Gasket: “Flush Seal” (Victaulic); or equal.
6. Coating: Except for stainless steel couplings, provide orange enamel finish.

D. Sleeve-type, Flexible Couplings:

1. Pressure and Service: Same as connected piping.
2. Products and Manufacturers: Provide products of one of the following:
 - a. Style 253, as manufactured by Dresser Piping Specialties, part of Dresser, Inc.
 - b. Style 441, by Smith Blair, Inc.
 - c. Or equal.
3. Material: Ductile Iron.
4. Gaskets: Suitable for specified service, as recommended by manufacturer.
5. Bolts and Nuts: Alloy steel, corrosion-resistant, primer-coated. For buried or submerged applications, provide stainless steel bolts complete with washers complying with ASTM F593, AISI Type 316 and with nitrided stainless nuts.

E. Dielectric Unions:

1. Use at piping joints between ferrous and non-ferrous piping and joints between dissimilar metals. Comply with manufacturer’s installation instruction. Provide standard products for use in service indicated, which effectively isolate piping (electric conductance), prevent galvanic action and stop corrosion.

PART 3 - PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect materials for defects in material and workmanship. Verify compatibility of products with pipe, fittings, valves, and appurtenances.

3.2 INSTALLATION

- A. Install piping specialties in accordance with the Contract Documents and manufacturer's instructions.

END OF SECTION

SECTION 400507 – HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. SCOPE: The work covered by this section includes furnishing and installation of pipe and equipment hangers, supports, and accessories necessary to complete the work.

1.2 RELATED SECTIONS

- A. Section 099700 Special Coatings
- B. Section 400505 Exposed Piping Installation
- C. Section 400506 Couplings, Adapters, and Specials for Process Piping
- D. Section 400509 Wall Pipes, Floor Pipes and Pipe Sleeves
- E. Section 400519 Ductile Iron Process Pipe and Fittings
- F. Section 400524 Steel Process Pipe and Fittings
- G. Section 400553 Process Valves

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Manufacturer's Standardization Society (MSS) SP-58 Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application and Installation

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. Detailed drawings showing all hangers and supports for each piping system specified.
 - 2. Product Data:
 - a. Submit manufacturers' catalogs, literature, and engineering data on all hangers and supports.

2.1 GENERAL REQUIREMENTS

- A. Piping systems and pipe connections to equipment shall be properly anchored and supported in order to prevent undue deflection, vibration, and dislocation due to seismic events, line pressures, pipe weight, fluid weight, liquid movement, thermal changes, vibration, probable forces applied during construction, and stresses on piping, equipment, and structures.
- B. Standard and fabricated hangers and supports shall be furnished complete with necessary inserts, bolts, nuts, rods, washers, and other accessories.

2.2 SUPPORT LOCATIONS

- A. Where locations are not specifically identified in the drawings, pipe supports shall be placed according to the following guidelines.

SECTION 400507 – HANGERS AND SUPPORTS FOR PROCESS PIPING

1. Generally, run piping in groups where practicable and parallel to building wall. Provide minimum clearance of 1-inch between pipe and other work.
2. Install hangers or supports at all locations where pipe changes direction.
3. All hangers and supports shall be capable of vertical adjustment after placement of piping.
4. Different types of hangers or supports shall be kept to a minimum.
5. All suspended or supported ductile iron pipe shall have a hanger or support adjacent to each hub.
6. Support vertical piping at each floor and between floors by stays or braces to prevent rattling and vibration.
7. Hanger rods shall be straight and vertical. Chain, wire, strap or perforated bar hangers shall not be used. Hangers shall not be suspended from piping.

2.3 SUPPORT SPACING

- A. Maximum support spacing unless otherwise shown or approved

Pipe Size (inches)	Maximum Pipe Span ¹ (feet)			
	Steel	Copper	Plastic ²	Cast/Ductile Iron
3/8 to 3/4	5	6	Cont. ³	-
1	6	6	5	-
1-1/4	6	6	5	-
1-1/2	6	6	5	-
2	10	10	5	-
2-1/2	10	10	5	-
3	10	10	5	
4	12	12	5	12 feet for pressure pipe
6	12	12	5	
8	12	12	5	
10	12	-	5	
12	12	-	10	
14	12	-	-	
16	12	-	-	10 feet for soil pipe
18	12	-	-	
20	12	-	-	
24 and larger	12	-	-	

¹Pipe shall not have pockets formed in the span due to sagging of the pipe between supports caused by the weight of the pipe, medium in the pipe, insulation, valves and fittings.

²Span shown is for Schedule 80 CPVC pipe at 100°F. Spans for other plastics, other CPVC pipe Schedules and pipes at higher temperatures shall be shortened in accordance with the pipe manufacturer's recommendations.

³Continuous means pipe shall be in unistrut or similar channel.

2.4 CONCRETE ANCHORS

- A. Unless otherwise indicated, concrete anchors for pipe supports shall be according to the following table; consult the ENGINEER for any anchor applications not appearing on the table.

SECTION 400507 – HANGERS AND SUPPORTS FOR PROCESS PIPING

Pipe Support Application	Type of Concrete Anchor
New Concrete	Use embedded concrete insert anchors on a grid pattern. Use Grinnell (Anvil International), Tolco, or equal.
Existing Concrete	<p>Use non-shrink grouted anchors, metallic type expansion anchors, or epoxy anchors.</p> <p>Hilti Kwik Bolt TZ (3-5/8" embedment), or approved equal</p> <p>Exceptions: Metallic type expansion anchors and epoxy anchors are not permitted for pipe supports subject to vibrating loads. Epoxy anchors are not permitted where the concrete temperature is in excess of 100 deg F or higher than the limiting temperature recommended by the manufacturer. Epoxy anchors are not accepted where anchors are subject to vibration or fire.</p>
Vibratory Loads and High-Temperature Conditions	Use non-shrink grouted anchors

2.5 HANGERS AND SUPPORTS

- A. Hangers and supports where shown shall be in accordance with detail drawings.
- B. Hangers and supports not shown shall be in accordance with MSS SP 58.
- C. Manufacturers
 - 1. Anvil International
 - 2. TOLCO
 - 3. Pipe Support Group (Bergen)
 - 4. Unistrut Corporation
 - 5. Or equal
- D. Concrete Rod Attachment Plates – Ceilings
 - 1. Use Anvil Figure 52, hot-dipped galvanized with four (4) concrete anchor locations
- E. Clevis Hangers
 - 1. Use Anvil Figure 590, adjustable clevis; hot-dipped galvanized.
- F. Riser Clamp – Floor Penetration Support
 - 1. Use Anvil Figure 40, hot-dipped galvanized
 - a. In lieu of weld on shear lugs use EBAA Iron mid span pipe restraint Model 1100SDB, or approved equal.

SECTION 400507 – HANGERS AND SUPPORTS FOR PROCESS PIPING

2.6 THREADED STEEL RODS:

- A. Two inch vertical adjustment with two nuts each end for positioning and locking.
- B. Size hanger rods according to the schedule below, unless otherwise noted:

<u>Nominal Pipe (Inches)</u>	<u>Rod Diameter (Inches)</u>
2 and less	3/8
2-1/2 to 3-1/2	1/2
4	5/8
6	3/4
8 through 12	7/8
14 through 18	1
20 through 30	1-1/4

- C. Use Type 304 stainless steel rods, Anvil Figure 146, or equal.

2.7 COATING

- A. Galvanizing
 - 1. Unless otherwise indicated, fabricated pipe supports other than stainless steel or non-ferrous supports shall be blast-cleaned after fabrication and hot-dip galvanized in accordance with ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

3.1 INSTALLATION

- A. General
 - 1. Pipe supports, hangers, brackets, anchors, guides, and inserts shall be fabricated and installed in accordance with the manufacturer's printed instructions.
 - 2. Concrete inserts for pipe hangers and supports shall be coordinated with the formwork.
- B. Appearance
 - 1. Pipe supports and hangers shall be positioned in order to produce an orderly, neat piping system.
 - 2. Hanger rods shall be vertical, without offsets.
 - 3. Hangers shall be adjusted to line up groups of pipes at the proper grade for drainage and venting, as close to ceilings or roofs as possible, and without interference with other WORK.
- C. Fabrication
 - 1. Quality Control
 - a. Pipe hangers and supports shall be fabricated and installed by experienced welders and fitters, using the best welding procedures available.
 - b. Fabricated supports shall be neat in appearance without sharp corners, burrs, or edges.

END OF SECTION

SECTION 400509 – WALL PIPES, FLOOR PIPES AND PIPE SLEEVES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. SCOPE: The work covered by this section includes furnishing and installation of wall pipes, floor supports, pipe sleeves and associated appurtenances.

1.2 RELATED SECTIONS

- A. Section 033000 Cast-In-Place Concrete
- B. Section 099700 Special Coatings
- C. Section 400505 Exposed Piping Installation
- D. Section 400519 Ductile Iron Process Pipe and Fittings
- E. Section 400524 Steel Process Pipe and Fittings

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

AWWA C104	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C115	Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C150	Thickness Design of Ductile-Iron Pipe
AWWA C151	Ductile-Iron Pipe, Centrifugally Cast for Water
AWWA C600	Installation of Ductile Iron Water Mains and Their Appurtenances

PART 2 - PRODUCTS

2.1 WALL AND FLOOR PIPES

- A. Material: Same as specified for the piping connected to wall or floor pipe, unless otherwise approved by ENGINEER.
- B. End Connections: As shown.
- C. Thickness: Same as specified for the piping connected to wall or floor pipe.
- D. Collars: Provide collars at mid-point of wall for anchorage and watertightness.

2.2 WALL PENETRATIONS:

- A. Pipe penetrations through concrete walls without wall pipes shall be cast with pipe penetration sleeves molded from non-conductive, high impact resistant HDPE. Pipes shall be sealed within the sleeve with Link Seal modular seals. The seal shall provide a watertight penetration. Use wall penetration sleeves as provided by Century-Line and modular Link Seal system as manufactured by PSI / Thunderline / Link-Seal®.

SECTION 400509 – WALL PIPES, FLOOR PIPES AND PIPE SLEEVES

2.3 CAST WALL SLEEVES:

- A. Material: Ductile iron furnished with integral wall collar.
- B. Dimensions: As required for mechanical joint pipe to pass through sleeve.
- C. Length as required.

PART 3 - EXECUTION

3.1 GENERAL

A. INSTALLATION

- 1. Wall and Floor Pipes: Install as shown and in accordance with approved Shop Drawings.
- 2. Pipe Sleeves:
 - a. Use sleeves wherever pipes pass through walls, partitions, floors, and roofs, unless otherwise shown.
 - b. Extend all sleeves through floor slabs a minimum of 2-inches above finished floor.
 - c. Anchor sleeves to concrete and masonry walls as shown or otherwise approved.
 - d. All sleeves through walls shall be flush with wall face.
 - e. All pipe joints and annular spaces in exterior walls or walls subjected to hydrostatic pressure shall be completely watertight.
 - f. Use link type seals to seal sleeve against hydrostatic pressure. Size sleeves to provide annular space required to suit the link type mechanical seals that are used.
 - g. Do not install sleeves and pipes through structural members, unless specifically shown and approved by ENGINEER.
 - h. Size sleeves to provide annular space as follows:

<u>Pipe Size</u>	<u>Sleeve ID Minus Pipe Or Insulation OD</u>
Less than 2-inches	1/2-inches to 3/4-inches
2-inches to 4-inches	3/4 inches to 1-1/4-inches.
6-inches to 12-inches	1-1/4 inches to 2-inches
Over 12-inches	2-inches to 3-inches

- 3. Install wall and ceiling plates in accordance with the manufacturer's recommendations and approved Shop Drawings.

END OF SECTION

SECTION 400519 – DUCTILE IRON PROCESS PIPE AND FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. SCOPE: The work covered by this section includes furnishing of ductile iron pipe, fittings and appurtenances.

1.2 RELATED SECTIONS

- A. Section 099700 Special Coatings
- B. Section 400502 Piping and Equipment Identification
- C. Section 400505 Exposed Piping Installation
- D. Section 400506 Couplings, Adapters, and Specials for Process Piping
- E. Section 400507 Hangers and Supports for Process Piping
- F. Section 400509 Wall Pipes, Floor Pipes and Pipe Sleeves
- G. Section 400553 Process Valves

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

AWWA C104	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C110	Ductile-Iron and Gray-Iron Fittings, 3 in through 48 in for Water
AWWA C111	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115	Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C116	Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.
AWWA C150	Thickness Design of Ductile-Iron Pipe
AWWA C151	Ductile-Iron Pipe, Centrifugally Cast for Water
AWWA C153	Ductile-Iron Compact Fittings. for Water Service
AWWA C600	Installation of Ductile Iron Water Mains and Their Appurtenances
AWWA C606	Grooved and Shouldered Joints
ASTM C 150	Portland Cement

PART 2 - PRODUCTS

2.1 PIPE GENERAL

- A. Markings: The CONTRACTOR shall legibly mark specials 24-inches diameter and larger in accordance with the laying schedule and marking diagram. Each fitting shall be marked at each end with top field centerline.

SECTION 400519 – DUCTILE IRON PROCESS PIPE AND FITTINGS

- B. Handling and Storage: The pipe shall be handled as a minimum at the 1/3 points by use of wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment that might injure the pipe coating/exterior will not be permitted. Stockpiled pipe shall be supported on padded skids, sand or earth berms free of rock exceeding 3-inches diameter, sand bags, or suitable means so that the coating will not be damaged. The pipe shall not be rolled and shall be secured to prevent accidental rolling
- C. Laying Lengths: Nominal pipe laying lengths shall be 20-feet.
- D. Finish: The pipe shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing, and roughness.
- E. Closures and Correction Pieces: Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing on the Drawings. The locations of correction pieces and closure assemblies are indicated. Any change in location or number of said items shall only be as accepted by the ENGINEER.

2.2 SPECIALS AND FITTINGS

- A. Fittings for ductile iron pipe shall conform to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Ductile iron fittings larger than 48-inches shall conform to AWWA C153.

2.3 DUCTILE IRON PIPE, JOINTS AND FITTINGS

- A. The pipe shall be designed, manufactured, tested, inspected, and marked according to AWWA
- B. Flanged Pipe: Fabricate in accordance with ANSI/AWWA C115.
- C. Non-Flanged Pipe: Conform to ANSI/AWWA C151 for material, pressure, dimensions, tolerances, tests, markings, and other requirements.
- D. Exposed Piping Installation. If not otherwise specified, use Special Thickness Class 53 for three-inch to 54-inch diameter.
- E. Pipe Joints:
 - 1. Flanged Joints: Conform to ANSI/AWWA 0110 and ANSI/AWWA C111 capable of meeting the pressure rating or special thickness class, and test pressure specified in
 - a. Gaskets: Unless otherwise specified, gaskets shall be at least 1/8-inch thick, ring or full-face as required for the pipe, of synthetic rubber compound containing not less than 50 percent by volume nitrile or neoprene, and shall be free from factice, reclaimed rubber, and other deleterious substances. Gaskets shall be suitable for the service conditions specified, specifically designed for use with ductile iron pipe and fittings.
 - b. Bolts: Comply with ANSI B18.2.1.
 - i. Exposed: ASTM A307, Grade B.

SECTION 400519 – DUCTILE IRON PROCESS PIPE AND FITTINGS

- ii. Buried or Submerged: ASTM A193, Grade B8M, Class 2, Heavy hex, Type 316 stainless steel.
- c. Nuts: Comply with ANSI B18.2.2.
 - i. Exposed: ASTM A563, Grade A, Heavy hex.
 - ii. Buried or Submerged: ASTM A194, Grade B8M, Heavy hex, Type 316 stainless steel.
- 2. Grooved End Joints: Comply with ANSI/AWWA C606.
 - a. Gaskets: Flush seal type designed for ductile iron that complies with or exceeds requirements of ASTM D2000
 - b. See Section 4000506 Couplings, Adapters, and Specials for Process Piping

2.4 CEMENT-MORTAR LINING

- A. Cement-Mortar Lining for Shop Application: Except as otherwise provided herein, interior surfaces of ductile iron pipe, fittings, and specials shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with AWWA C104. During the lining operation and thereafter, the pipe shall be maintained in a round condition by suitable bracing or strutting. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found defective at the Site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.
 - 1. Cement: Cement for mortar lining shall conform to the requirements of AWWA C104; provided, that cement for mortar lining shall be Type II or V. Cement shall not originate from kilns that burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement.
- B. The minimum lining thickness shall be as follows:

Nominal Pipe Diameter, inches	Minimum Lining Thickness, inches
3 - 12	1/16
14 - 24	3/32
30 - 64	1/8

- C. Protection of Pipe Lining/Interior: Shop-applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with AWWA C104.

SECTION 400519 – DUCTILE IRON PROCESS PIPE AND FITTINGS

2.5 EXTERIOR PROTECTION OF PIPE

- A. Exterior Coating of Exposed Piping: The exterior surfaces of pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then coated according to the project requirements and Section 099700 – Special Coatings.**

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPE

- A. The CONTRACTOR shall inspect each pipe and fitting prior to installation to insure that there are no damaged portions of the pipe. Pipe damaged prior to Substantial Completion shall be repaired or replaced by the CONTRACTOR.
- B. For exposed piping installation and testing, refer to Section 400505, Exposed Piping Installation.

END OF SECTION

SECTION 400524 – STEEL PROCESS PIPE AND FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. SCOPE: The work covered by this section includes the furnishing and installation of steel process pipe and fittings.
- B. Related sections
 - 1. Section 099700 Special Coatings
 - 2. Section 400502 Piping and Equipment Identification
 - 3. Section 400505 Exposed Piping Installation
 - 4. Section 400506 Couplings, Adapters, and Specials for Process Piping
 - 5. Section 400507 Hangers and Supports for Process Piping
 - 6. Section 400509 Wall Pipes, Floor Pipes and Pipe Sleeves
 - 7. Section 400553 Process Valves

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. All pipe, fitting, and accessories shall conform to the following American Society for Testing and Materials (ASTM) Specifications.
 - 1. ASTM A53 - Pipe, steel, black and hot-dipped, zinc-coated welded and seamless.
 - 2. ASTM A234 - Pipe fittings of wrought carbon steel and alloy steel for moderate and elevated temperature.
 - 3. ASTM A307 - Carbon steel externally threaded standard fasteners.

1.3 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Product Data:
 - a. Manufacturer's literature, including materials of construction, dimensions, weights, specifications and other engineering data.

PART 2 - PRODUCTS

2.1 PIPE:

- A. All interior steel pipe shall be Sch. Grade A53.
 - 1. Pipe shall be internally and externally coated as follows:
 - a. Internal Galvanized Steel
 - b. External Coating: Galvanized and coated as identified in Section 099700 of this specification.

2.2 JOINTS AND COUPLINGS:

- A. Less than 4 inches: Screwed unless otherwise specified or indicated.

SECTION 400524 – STEEL PROCESS PIPE AND FITTINGS

B. 4 inches and greater: Grooved.

2.3 FABRICATED STEEL FITTINGS:

A. Steel fittings shall be Sch 40 Grade A53.

B. Fittings shall be coated in accordance with Section 099700

PART 3 - EXECUTION

3.1 INSTALLATION

A. Conform to installation requirements specified in Section 400505, Exposed Piping Installation.

END OF SECTION

SECTION 400531 – THERMOPLASTIC PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to install and test all thermoplastic pipe and associated fittings.
 - 1. Extent of piping is shown and shall be in accordance with piping schedules in Section 40 05 05, Exposed Piping Installation.
- B. Related Sections:
 - 1. Section 400502 Piping and Equipment Identification
 - 2. Section 400505 Exposed Piping Installation
 - 3. Section 400507 Hangers and Supports for Process Piping
 - 4. Section 400553 Process Valves
 - 5. Section 400509 Wall Pipes, Floor Pipes, and Pipe Sleeves

1.2 REFERENCES

- A. Standards referenced in this Section are:
 - 1. ASTM D1784, Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
 - 2. ASTM D1785, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - 3. ASTM D2466, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - 4. ASTM D2467, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
 - 5. ASTM D2564, Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
 - 6. ASTM D2665, Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
 - 7. ASTM D3034, Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - 8. ASTM D3035, Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
 - 9. ASTM D3139, Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 - 10. ASTM D3212, Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 - 11. ASTM D3261, Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
 - 12. ASTM F441/F441M, Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
 - 13. ASTM F477, Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - 14. ASTM F1336, Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings.

SECTION 400531 – THERMOPLASTIC PIPE

1.3 SUBMITTALS

B. Shop Drawings:

1. Submit piping layout Shop Drawings in accordance with Section 40 05 05, Exposed Piping Installation.
2. Submit product data on pipe, fittings, gaskets, hardware, and appurtenances sufficient to demonstrate compliance with the Contract Documents.
3. Submit manufacturer's certificate of compliance standards referenced in this Section.

PART 2 - PRODUCTS

2.1 SERVICE CONDITIONS

A. General:

1. Pipe materials shall be suitable for services intended. Refer to piping schedules in Section 40 05 05, Exposed Piping Installation.
2. Pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, and other defects. Unless otherwise shown or indicated, pipe shall be uniform in color, opacity, density, and other physical properties.
3. Pipe, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in ANSI/NSF 61 as being suitable for contact with potable water, and shall comply with requirements of the authorities having jurisdiction at the Site.

2.2 POLYVINYL CHLORIDE (PVC) PIPING

A. PVC Pipe — General Applications: Unless otherwise shown or indicated, PVC pipe shall comply with the following:

1. Manufacturers: Provide products of one of the following:
 - a. Iplex, Inc.
 - b. Spears Manufacturing Company.
 - c. Or equal.
2. Material: Unless otherwise specified, comply with the following:
 - a. Type and Grade: Type 1, Grade 1.
3. Wall Thickness: Schedule 80 complying with ASTM D1784 and ASTM D1785, and US Product Service PS 21-70 as having same outside diameter dimension as cast-iron pipe.
4. Temperature Rating: Rated for temperature to 140 degrees F.
5. Color: Gray.

B. Fittings: Type, grade, schedule, and color of fitting shall match the associated pipe.

1. Solvent Weld: Comply with ASTM D2467.
2. Threaded: Threaded fittings shall comply with ASTM D2464.
3. Flanged: Provide flanged fittings with Neoprene gaskets.

SECTION 400531 – THERMOPLASTIC PIPE

C. Joints:

1. Solvent Weld: Use primer and solvent cement recommended by PVC pipe manufacturer for the application. Primer shall be in accordance with ASTM F656, and solvent cement shall be in accordance with ASTM D2564.
2. Threaded: Use 100 percent virgin polytetrafluoroethylene (Teflon or PTFE) tape for threaded fittings. Pipe shall not be threaded.
3. Flanged: Provide with backup flange minimum 1/8-inch thick. Backup flanges and connecting bolts shall be Type 304 stainless steel.

2.3 PVC DRAIN, WASTE, AND VENT (PVC-DWV) PIPE.

A. Manufacturers: Provide products of one of the following:

1. Chemtrol, manufactured by Nibco, Inc.
2. Spears Manufacturing Company.
3. Or equal.

B. Material: In accordance with ASTM D1784. Unless otherwise shown or indicated, PVC-DWV pipe shall be:

1. a.Type and Grade: Type 1, Grade 1.
2. b.Wall Thickness: Schedule 40.

C. Color: White.

D. Fittings: Manufactured in accordance with ASTM D2665 and ASTM D3311.

1. Solvent weld.
2. Spigot.

E. Joints:

1. Solvent weld.
2. Threaded.

2.4 CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPING

A. CPVC Pipe — General Applications: Unless otherwise shown or indicated, CPVC pipe shall comply with the following:

1. Manufacturers: Provide products of one of the following:

- a. Ipex, Inc.
- b. Spears Manufacturing Company.
- c. Or equal.

2. Material: Comply with ASTM F441/F441M and US Product Standard PS 21- 70 as having same outside diameter as iron pipe. Comply with the following:

SECTION 400531 – THERMOPLASTIC PIPE

- a. Type and Grade: Type IV, Grade 1.
3. Wall Thickness: Schedule 80.
4. Temperature Rating: Rated to 210 degrees F.
5. Color: Gray.
6. Manufacture pipe and fittings with minimum of two percent of titanium oxide for ultraviolet protection.
7. Fittings: Type, grade, schedule, and color of fittings shall match the associated pipe.
 - a. Solvent Welded: Fittings shall comply with ASTM F439 for socket type.
 - b. Threaded: Shall comply with ASTM F437.
 - c. Flanged: Provide flanged fittings with Neoprene gaskets.
8. Joints:
 - a. Solvent Welded: Use primer and solvent cement recommended by CPVC pipe manufacturer. Primer shall be in accordance with ASTM F656, and solvent cement shall be in accordance with ASTM D2564.
 - b. Threaded: Use 100 percent virgin polytetrafluoroethylene (Teflon or PTFE) tape for threaded fittings. Pipe shall not be threaded.
 - c. Flanged: Provide with backup flanges minimum 1/8-inch thick. Backup flanges and connecting bolts shall be Type 304 stainless steel.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect pipe materials for defects in material and workmanship. Verify compatibility of pipe and fittings.

3.2 INSTALLATION

- A. For exposed piping installation, refer to Section 40 05 05, Exposed Piping Installation.

END OF SECTION

SECTION 400553 – PROCESS VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. SCOPE: The work covered by this section includes the furnishing and installation of interior valves and appurtenances.
- B. Related Sections:
 - 1. Section 099700 Special Coatings
 - 2. Section 400502 Piping and Equipment Identification
 - 3. Section 400506 Couplings, Adapters and Specials for Process Piping
 - 4. Section 400519 Ductile Iron Process Pipe and Fittings
 - 5. Section 400524 Steel Process Pipe and Fittings

PART 2 - PRODUCTS

2.1 GATE VALVES:

- A. A. Greater Than 2 Inches: Gate valves shall be iron body gate valves conforming to AWWA C500. The gate valves shall be made with flanged ends conforming to ANSI B16.1 Class 125. Valves shall be designed for a working pressure of 150 psi up to 12 inch valves. Gate valves shall have a non-rising stem, "O" rings seals and shall have iron bodies, parallel seats, double disc gates, and shall be fully bronze mounted. The valve interior shall be coated with an epoxy coating conforming to AWWA C550. Hand wheel operators shall be provided for all gate valves. A chain wheel operator shall be provided for all valves where the centerline of the hand wheel will be more than 6 feet above the finished floor. The direction of opening shall be counter clockwise, and the word "OPEN" shall, in 1/2 inch or larger letters, be cast on the handwheel to indicate clearly the direction to turn the handwheel when opening the gate valve. Gate valves shall be Mueller, M&H, American Darling or an approved equal.
- B. Two Inches and Smaller: Shall be stainless steel gate valves manufactured by Velan, or approved equal. Valves shall have a 300 pound W.O.G. pressure rating. Shall be handwheel operated with a non-rising stem and double wedge disc. Valve ends shall be screwed.

2.2 HYDROBRAKE / VORTEX VALVE

- A. The flow control valve shall be manufactured by Hydro International, Hillsboro, OR or approved equal. The valve shall be designed to regulate the flow between the grit removal unit and the grit classifier to a flow of 115 gpm with a design head of 20 feet. The valve shall have a 4-inch flanged (ANSI B16.1) inlet connection and a 4-inch thread underflow connection. The valve shall be manufactured of 316 stainless steel. All flow passages shall be self-cleaning and free of sharp projections or fittings that may snag stringy or fibrous material. The valve walls shall be 3/16 inch thick.
- B. The Manufacturer of the valve shall submit evidence of having supplied a minimum of ten (10) installations of similar size to the proposed valve.

SECTION 400553 – PROCESS VALVES

2.3 BALL VALVES

- A. Standard Ball Valves: 2 Inches and Less: Ball valves shall be constructed of stainless steel with 316 SS ball and reinforced TFE seats. Valves shall be full port with blowout proof stem. Valve operator shall be handle operated. Valves shall be Apollo, Series 76, or approved equals.

2.4 ECCENTRIC PLUG VALVES:

- A. Eccentric Plug Valves shall be of the tight closing, resilient faced, non-lubricating variety and shall be of eccentric design such that the valves pressure member (plug) rises off the body seat contact area immediately upon shaft rotation during the opening movement. Valves shall be drop-tight at the rated pressure (175 psi through 12", 150 psi 14" and above) and shall be satisfactory for applications involving throttling service as well as frequent or infrequent on-off service. The valve closing member should rotate approximately 90 degrees from the full-open to full-close position and vice-versa.
- B. The valve body shall be constructed of cast iron (semi-steel) conforming to ASTM A126, Class B. Body ends shall be:
 - 1. Flanged with dimensions, facing, and drilling in full conformance with A-ANSI B16.1, Class 125.
 - 2. Eccentric Plug Valves shall have a rectangular shaped port. Port areas for 3" - 20" valves shall be a minimum 80% of full pipe area. Port area for valves larger than 20" diameter shall be 70%.
 - 3. Valve seat surface shall be welded-in overlay, cylindrically shaped of not less than 90% pure nickel. Seat area shall be raised, with raised area completely covered with weld to insure proper seat contact. The machined seat area shall be a minimum of 0.125 thick and .500" wide.
 - 4. The valve plug shall be constructed of cast iron (semi-steel) conforming to ASTM-A126, Class B. The plug shall have a cylindrical seating surface that is offset from the center of the plug shafts. The plug shafts shall be integral. The entire plug shall be 100% encapsulated with Buna-N rubber in all valve sizes. Where 100% encapsulation is not available the plug shall have a rubber facing. The rubber compound shall be approximately 70 (Shore A) durometer hardness. The rubber to metal bond must withstand 75 lbs. pull under test procedure ASTM D-429-73 Method B.
 - 5. Shaft bearings, upper and lower, shall be sleeve type metal bearings, sintered, oil impregnated, and permanently lubricated type 316 stainless steel conforming to ASTM A Grand C-8M. Thrust bearings shall be Nylatron.
 - 6. Plug valve shaft seals shall be of the multiple V-ring type (Chevron) and shall be adjustable. All packing shall be replaceable without removing the bonnet or actuator and while the valve is in service. Shaft seals shall be made of Buna N.
 - 7. Each valve shall be given a test against the seat at the full rated working pressure and a hydrostatic shell test at twice the rated working pressure. Certified copies of individual tests shall be submitted when requested. Certified copies of proof-of-design tests shall be submitted upon request.
 - 8. Manual valves shall have worm gear type actuators with handwheels or chainwheels.
 - a. Chainwheels shall be provided on all valves as indicated in the drawings. Chainwheels shall be constructed of epoxy coated ductile iron equipped with a chain guide arm and cap. Chains shall be galvanized steel provided by the manufacturer.

SECTION 400553 – PROCESS VALVES

9. All eccentric plug valves shall be DeZurik, or approved equal.
10. Unless otherwise necessary for proper operation or permitted by the ENGINEER, all eccentric plug valves shall be installed with the shaft horizontal and the plug in the upper half of the valve body. Valves in sewage or sludge lines shall be installed with the seat on the upstream end.

2.5 CHECK VALVES:

- A. Check valves shall be full port, swing check style with lever and spring closure assist device. End connections shall be ASME125/150. Valve body, cover, disc, and disc arm material shall be ductile iron, pivot shaft shall be 303 stainless steel. Body seat shall be aluminum bronze and seat material shall be NBR. Internals of the valve shall be removable without removal of valve from the pipeline. Valves shall be APCO CVS-6000 swing check valves, or approved equal.

2.6 THERMOPLASTIC BALL VALVES, 2 INCHES AND SMALLER:

- A. Valves shall be rated at a pressure of 150 psi at a temperature of 105°F. Body, ball, and stem shall be PVC conforming to ASTM D 1784, Type 1, Grade 1. Seats shall be Teflon. O'ring seals shall be Viton. Valve ends shall be of the true union design. Valves shall be as manufactured by Chemtrol, Spears, or equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine conditions under which materials and equipment are to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install valves and appurtenances in accordance with:
 1. Supplier's instructions and the Contract Documents.
- B. Install valves plumb and level. Install all valves to be free from distortion and strain caused by misaligned piping, equipment, and other causes.
- C. Exposed Valves:
 1. Provide supports for large or heavy valves and appurtenances as shown or required to prevent strain on adjoining piping.
 2. Operators:
 - a. Install valves so that operating handwheels or levers can be conveniently turned from operating floor without interfering with access to other valves, piping, structure, and equipment, and as approved by ENGINEER.
 - b. Avoid placing operators at angles to floors or walls.
 - c. Orient chain operators out of way of walking areas.
- D. Install valves so that indicator arrows are visible from floor level.

SECTION 400553 – PROCESS VALVES

E. Floor Stands and Stems:

1. Install floor stands as shown and as recommended by manufacturer.
2. Provide lateral restraints for extension bonnets and extension stems as shown and as recommended by manufacturer.
3. Provide sleeves where operating stems pass through floor. Extend sleeves two inches above floor.

F. Plug Valves:

1. Install plug valves that are in horizontal liquid piping with stem horizontal and plugs on top when valve is open. Plug shall be on upstream end when valve is closed.
2. Install plug valves that are in vertical liquid piping with plug at top when closed or as recommended by valve Supplier.
3. Supplier shall tag or mark plug valves to indicate proper mounting position.

3.3 FIELD QUALITY CONTROL

A. Field Tests:

1. Adjust all parts and components as required to provide correct operation of valves.
2. Conduct functional field test on each valve in presence of ENGINEER to demonstrate that each valve operates correctly.
3. Demonstrate satisfactory opening and closing of valves at specified criteria requiring not more than 40 pounds effort on manual actuators.
4. Test ten percent of valves of each type by applying 200 pounds effort on manual operators. There shall be no damage to gear actuator or valve.
5. Motor operated valves.
 - a. Provide services of qualified factory-trained service technicians to check and approve installation of the valve and actuator. Supplier's serviceman shall perform the following:
 - i. Supervise installation of equipment.
 - ii. Inspect and adjust equipment after installation and ensure proper operation.
 - iii. Instruct OWNER's personnel in operating and maintaining the equipment.

END OF SECTION

SECTION 400559 – STOP LOGS

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Provide stop logs for channel isolation for the Juneau Douglass WWTP as indicated in the Contract Documents. Stop log assemblies are to be inserted into different channels as maintenance needs dictate, and more guide frame assemblies will be required than sets of stop logs (only one channel or inlet box can be isolated at a time). A general schedule of materials is provided in Table 1.1 A. Note that stop logs will not be used for channel isolation at the Mendenhall WWTP.

TABLE 1.1 A – SCHEDULE OF MATERIALS

Item	Number	Comments
Screen Channel Isolation Systems		
Embedded-Style Guide Frames	4	
3-ft Wide by 1-ft High Stop Logs	10	Supply two sets of five identical stop logs
3-ft Wide Storage Racks	2	
3-ft Lifting Device	1	
Aeration Line Isolation Systems		
Embedded-Style Guide Frames	2	
5-ft Wide by 1-ft High Stop Logs	5	Supply one set of five identical stop logs
5-ft Wide Storage Rack	1	
5-ft Wide Lifting Device	1	

SECTION 400559 – STOP LOGS

1.2 REFERENCES

- A. Design, fabricate and test stop log systems and materials in accordance with manufacturer's recommended procedures and the following codes and standards:

TABLE 1.2 A – REFERENCE STANDARDS

Standard	Section	Description
ASTM	A193	Stainless Steel Anchor Bolts
ASTM	A276	Stainless Steel Bars
ASTM	D256	Izod Impact Strength
ASTM	D570	Water Absorption Rate
ASTM	D638	Tensile Strength
ASTM	D695	Compressive Properties of Rigid Plastic
ASTM	D696	Coefficient of Linear Expansion
ASTM	D790	Flexural Properties
ASTM	D1056	Polymer Grade
ASTM	D2583	Indentation Hardness
ASTM	D2563	Visual Defects
ASTM	D2584	Resin, Glass & Filler Content
AWWA	C563	Leakage Rate

- B. Manufacturer shall be experienced in the design and manufacture of stop logs and accessories for a minimum of 5 years.
- C. Manufacturer must provide warranty for 25 years against failure due to corrosion.

1.3 SUBMITTALS

- A. Provide shop drawings and product data in accordance with Section 01300 for the equipment Furnished.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Ship all stop logs with suitable packaging to protect products from damage.
- B. Protect stop logs, lifting pins, guide frames, lifting devices and storage racks from damage.

SECTION 400559 – STOP LOGS

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Stop logs, embedded guide frames, lifting devices, and storage racks shall be provided by Plasti-Fab, Inc., or approved equal.
- B. The manufacturer shall have supplied similar equipment on at least five (5) project of comparable size and complexity in the past five years.
- C. Stop log assemblies shall meet or exceed the leakage requirements of AWWA C563.

2.2 MATERIALS

A. Stop Log Panels

- 1. Stop log panels shall be fabricated with a composite polyester fiberglass reinforced plastic exterior that completely encapsulates an internal system of steel reinforcement and foam-core filling and which forms a seamless moisture barrier around these internal materials. Perimeter seals around the panel edges shall be fabricated from neoprene gasket material. Each panel shall T-316L stainless steel lifting points (two on the upstream face and two on the downstream face) to allow the panels to be placed in and removed from guide frames using a manufacturer-supplied lifting device.
- 2. Typical physical properties shall be:

TABLE 2.2 A – TYPICAL PHYSICAL PROPERTIES

Property	Value
Stop log panels	
Tensile strength, psi	15,000
Flexural strength, psi	20,000
Flexural modulus, 10 ⁶ psi	1.0
Notched Izod impact, ft-lbs/in	9
Water absorption, percent in 24 hrs	0.13
Extruded neoprene seals	
Specific gravity	1.25
Hardness, Shore A Durometer	55 to 65
Tensile strength, psi	1,500
Elongation, percent	300
Low-temperature brittleness °F	-40

SECTION 400559 – STOP LOGS

B. Guide Frames

- 1. Guide frames shall be fabricated from 316 stainless steel.

C. Lifting Devices

- 1. Lifting devices (lifting beams) shall be manufactured to meet the dimensions of each set of stop logs called out in Table 1.1 A. The lifting devices shall be fabricated from 316 stainless steel and shall be designed to fit fully within either 3- or 5-foot wide stop log guide frames. The lifting devices shall be designed to engage the stop log panels using a wire- or chain-engaged hook system.

D. Storage Racks

- 1. Storage racks for both 3-foot wide and 5-foot wide stop log panels shall be provided and shall be fabricated from 316 stainless steel. The racks shall be designed to be mounted on a wall (or floor mounted).

2.3 DESIGN CRITERIA

- A. Stop log placement and removal will be accomplished using a portable davit crane that will have limited lifting capacity. The lifting force required to lift individual stop log panels cannot exceed the davit crane lifting capacity. Lifting force shall be defined as the combined weight of a stop log, the lifting beam, and the frictional force required to unseat a stop log panel when the downstream face is dry and water on the upstream face is at the crest of the panel. Maximum allowable lifting force is defined in Table 2.3 A for stop logs that are 12 inches high and either 3 or 5 feet wide.

TABLE 2.3 A – MAXIMUM ALLOWABLE LIFTING FORCE

Log width, feet	Approx. panel weight, lbs.	Approx. lifting force, lbs.
3	65	335
5	100	475

- B. Deflection across the stop log width shall be limited to: $L/360$ or $1/4"$ (6mm), whichever is less, at the maximum operating head of 5 feet of water column.
- C. Maximum allowable leakage of stop logs with seating head shall not exceed 0.10 gpm/ft. (1.24 Lpm/m) of wetted linear seal under full design head when installed in manufacturer’s guide frames.
- D. All stop log panels shall be flat and level. Warpage throughout the entire stop log panel shall not produce a crown of more than $1/16"$ (1.6mm) in any direction.

2.4 FABRICATION

- A. Stop logs

SECTION 400559 – STOP LOGS

1. The stop log shall be fabricated by means of vacuum infusion so as to totally encapsulate the internal structural matrix and protect it against corrosion from moisture or chemical deterioration with a minimum thickness of ¼ inch (6mm) FRP on the front and back facings, and ¾ inch (19mm) FRP on the remaining perimeter. Stop logs shall be designed so that the maximum fiber stress (ultimate or yield, whichever applies) shall exceed 2.5 times the working stress. Stop log covers that are fabricated from pressed or laminated sheet material and/or glued/bonded to a substructure shall not be acceptable. No seams or joints that may allow water intrusion will be acceptable. Each Stop Log shall be molded individually to the exact dimensions specified.
2. Stop log shall have UV stabilizing pigment in the resin to provide long-term protection from UV.
3. The surface shall be free of exposed reinforcing fibers.
4. Structural reinforcing shall be utilized to attain the necessary stiffness to meet deflection requirements, and shall be well encapsulated with a laminate not less than ¼” (6mm) thick on each side to ensure against any permeation by water to the core areas. Internal steel structure to be welded per ASME/ASTM standards, sandblasted and coated with vinyl ester resin immediately prior to vacuum infusion in order to ensure complete bonding with external corrosion barrier.
5. Two stainless steel lifting pins shall be attached to each stop log by passing completely through the log so that there are a total of four lifting points provided for each log. Stainless steel lifting pin shall be fastened to the log with sufficient reinforcing to withstand the lifting force. Lifting pins attached to the surface of the log are not acceptable. The through holes shall not pass through or be in contact with the internal steel reinforcing.
6. Core material must be 100 percent resistant to decay and attack by fungus and bacteria and be resistant to hydrocarbons.

B. Seals

1. The stop logs shall be equipped with elastomeric bottom seals to seal between the logs. Vertical seals shall be mounted on the face at the ends of the stop logs positioned to contact the inside of the guide rails. Seals shall be made of molded Neoprene.

C. Guide Frames

1. Guide frames shall be styled for embedment as shown on the contract drawings.
2. Guide frames shall be fabricated from 316 stainless steel and shall have a slot suitable for mating with the stop log panels.

END OF SECTION

SECTION 404113 – PROCESS PIPING HEAT TRACING

PART 1 - GENERAL

1.1 REQUIREMENTS

- A. This section includes providing heat tracing tape and jacketed insulation for freeze protection. Pipe insulation system shall consist of heat tracing cable, pipe insulation, metal jacketing, and all required installation kits and accessories.
- B. Heat tracing shall be installed on Juneau Douglas WWTP selected pipe runs for process water feed lines to perforated plate screens and screenings washer/compactor units. Heat tracing will not be required at the Mendenhall WWTP.

1.2 RELATED SECTIONS

- A. The following sections apply to the work of this section.
 - 1. Section 40050 Exposed Piping Installation
 - 2. Section 462153 Perforated Plate Screens
 - 3. Section 462173 Screening Washing and Compacting Equipment

1.3 CODES

- A. The work of this section shall comply with the current editions of the following codes as adopted by the City and Borough of Juneau Municipal Code.
 - 1. Uniform Building Code
 - 2. Uniform Mechanical Code
 - 3. Uniform Plumbing Code
 - 4. Uniform Fire Code
 - 5. National Electrical Code

1.4 STANDARDS

- A. The current editions of the following standards apply to the work of this section.
 - 1. ASTM
 - 2. Underwriters Laboratory (UL)

1.5 SUBMITTALS

- A. The following shall be submitted in compliance with Section 01300.
 - 1. Shop drawings of all thermal insulation system components with manufacturer's data on materials, insulation, electric heat tracing cable, and aluminum jackets.
 - 2. Operation and maintenance manuals as applicable for thermal insulation system components.

1.6 QUALITY ASSURANCE

- A. Manufacturers shall have supplied similar products on projects of similar size and complexity in recent years.

SECTION 404113 – PROCESS PIPING HEAT TRACING

PART 2 - PRODUCTS

2.1 GENERAL

- A. The Contractor shall insulate all piping identified on the Contract Drawings.
- B. All components of the insulation system including covering, mastics, and adhesives shall have a flame-spread rating of not over 25 and a smoke development rating of not over 50. Ratings shall be as established by tests in accordance with ASTM E 84 standards.
- C. Heat tracing cable and insulation shall be installed in strict accordance with manufacturer instructions.
- D. Contractor shall supply all kits, seals, sealants, tape, tools, and other accessories required for successful installing of heat tracing cable, insulation, and jacketing.
- E. All insulation shall be covered with aluminum jacketing having a factory-attached moisture barrier. Jackets for fittings shall consist of precision-formed smooth-sided sections and shall be sized to cover and protect the insulated fitting.
- F. All insulation system components shall be suitable for operation in a Class 1, Division 1 environment.

2.2 MATERIALS

- A. Heat Tracing Cable
 - 1. Heat tracing cable shall be self-regulating industrial grade heating cable to be applied to the indicated pipe runs. Cable shall be braided, with a heating capacity of 8 to 10 watts per foot using 120 Volt single-phase electrical wiring.
 - 2. Heat tracing cable shall be UL approved and shall operate without the use of thermostats.
- B. Insulation
 - 1. Insulation shall be a pre-molded fiberglass or pre-molded foamed urethane. Maximum “K” factor shall be 0.25. Minimum insulation thickness for pipes 6-inches in diameter or less shall be 1-1/2 inches.
- C. Jacketing and strapping
 - 1. Jacketing shall be Type 3105/3003 aluminum alloy, H14 temper, with a factory-applied 3 mil polyfilm moisture barrier. Minimum allowable thickness shall be 0.024 inches. Jacketing shall comply with ASTM C1729. Alloys shall comply with ASTM B209.
 - 2. Strapping shall be used to affix jackets to insulated pipe. Strapping shall be Type 304 or Type 316 stainless steel. Strapping shall be minimum ½ inches wide by minimum 0.020 inches thick.
 - 3. Jacketing and flashing sealants shall be vapor-retarder type, moisture and water resistant, non-hardening and flexible with a service temperature range from -40°F to 250°F. Jacketing and flashing sealant shall be Childers, Foster, or approved equal.

SECTION 404113 – PROCESS PIPING HEAT TRACING

2.3 MANUFACTURERS

A. Heat Tracing Cable

1. Heat tracing cable shall be supplied by Nelson, Raychem, or approved equal.

B. Insulation

1. Insulation shall be supplied by Owens-Corning or approved equal.

C. Jacketing

1. Jacketing shall be supplied by ITW or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All insulation system components shall be installed by a qualified insulation contractor in strict accordance with manufacturer recommendations.

END OF SECTION

SECTION 407188 – FLUME INSERTS

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. This section includes cutthroat flume inserts that will be used to regulate flow through perforated plate fine screens. Two flume inserts shall be provided at the JD plant, one each for each screen channel. The flume inserts shall have a throat width of 2 feet, an overall length of 4 feet 6 inches, and shall be configured to the standard dimensions noted on the Contract Drawings.

1.2 REFERENCES

- A. Design, fabricate and install Cutthroat Flumes and materials in accordance with manufacturer's recommended procedures and the following codes and standards:

TABLE 1.2 A – APPLICABLE CODES AND STANDARDS

Standard	Description
ASTM A193	Stainless Steel Anchor Bolts
ASTM D256	Izod Impact Strength
ASTM D570	Water Absorption Rate
ASTM D638	Tensile Strength
ASTM D695	Compressive Properties of Rigid Plastic
ASTM D696	Coefficient of Linear Expansion
ASTM D790	Flexural Properties
ASTM D792	Density and Specific Gravity at 230 C
ASTM D1056	Polymer Grade
ASTM D2583	Indentation Hardness
ASTM D2584	Resin, Glass & Filler Content
ISO1438/1-1980	Open Channel Flow Measurement

1.3 SUBMITTALS

- A. Provide shop drawings and product data in accordance with Section 01300 for the equipment being furnished, to include at minimum the following:
1. Fully-dimensioned shop drawings
 2. Data on materials of construction
 3. Information regarding the methods used for fabricating the flume inserts
 4. Operation and maintenance manual

SECTION 407188 – FLUME INSERTS

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Ship all Cutthroat Flumes with suitable packaging to protect products from damage.
- B. Protect flume flanges, tabs and accessories from damage.
- C. The flume shall be stored on a smooth flat surface, free of sharp objects, and if laid horizontally, shall be placed in such a way as to avoid structural damage.

PART 2 -- PRODUCTS

2.1 MATERIALS

- A. Flume body shall be fabricated using composite fiberglass reinforced plastic (FRP). The FRP resin shall be either polyester or vinyl ester and shall be molded in one piece.
- B. The walls and floor of the insert shall have a minimum thickness of ¼ inch.
- C. The finishing gelcoat shall have a minimum thickness of 10 to 20 mil.
- D. The glass content, exclusive of the gelcoat, shall be minimum 30 percent
- E. Stiffeners shall be molded into the flume inserts. The inserts shall be structurally designed to maintain dimensional integrity while free-standing and filled with water.

2.2 ACCEPTABLE MANUFACTURERS

- A. Flume inserts shall be fabricated by Plasti-Fab, Inc., or approved equal.

PART 3 -- EXECUTION

3.1 INSTALLATION

- A. Verify that dimensions are correct and project conditions are suitable for installation. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Thoroughly clean and remove all shipping materials prior to setting.
- C. Install products in accordance with plans, general comments below and the Manufacturer's recommendations.
- D. Care shall be taken in the handling, storage and placement of the flume in preparation for installation. The top spreaders shall be left on the flume until after installation is complete. They may be removed after the grout has cured if desired.
- E. The flume shall be installed level end-to-end and side-to-side, and must remain level throughout installation. Flume assembly should be set into a pre-poured block-out / channel.
- F. The contractor shall provide sufficient shoring and bracing of the floor and sidewalls to prevent lifting, floating, buckling or bulging of the sides and bottom during installation. The side locking clips are not intended to be used as anchorage points. Their function is to key the flume into the grout or concrete.

SECTION 407188 – FLUME INSERTS

- G. Concrete shall be poured in successive lifts of not more than 6" - 8" (152-203mm) per lift. Extra care shall be exercised during the first pour to insure that grout flows smoothly under the floor, and an even fill is achieved. The first lift shall be allowed to set so that excessive hydraulic forces are not transferred to the bottom of the flume by later lifts.

END OF SECTION

SECTION 412213.23 – MOBILE (DAVIT) CRANES

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. Provide a complete and operating mobile (davit) crane with multiple mounting points as shown on the Contract Drawings and as specified herein.

B. RELATED SECTIONS

1. Section 400559: Stop Logs

1.2 SUBMITTALS

A. Submit shop drawings and product data as a single complete initial submittal in accordance with Section 1300.

B. Provide manufacturer’s installation, operation and maintenance manuals, bulletins, and spare parts lists.

1.3 QUALITY ASSURANCE

A. Equipment furnished under this section shall be supplied by a single manufacturer that has provided similar equipment for projects of similar size and complexity in the recent past.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The davit crane shall be a Thern Ensign 1000, Model 5PA10S or approved equal.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

A. Davit cranes shall be classified by Underwriters Laboratories Inc. as to the specified load capacity and shall meet all applicable OSHA and ANSI standards. Other design requirements shall be as follows:

Table 2.2 A – PERFORMANCE REQUIREMENTS

Item	Value
Lifting capacity, pounds	
With hook reach at 22 inches and hook height at 83 inches	1,200
With hook reach at 48 inches and hook height at 98 inches	650
Adjustment range for hook reach, inches	22 to 48
Adjustment range for hook height, inches	79 to 106

SECTION 412213.23 – MOBILE (DAVIT) CRANES

2.3 MATERIALS

- A. Materials shall be as follows:

TABLE 2.3 A - MATERIALS

Component	Material
Mast and boom	Type 316 stainless steel
Bases	Type 316 stainless steel
Wire rope	Type 316 stainless steel
Electric winch coating	Epoxy paint

2.4 EQUIPMENT

- A. General: One complete davit crane with one equipment-rated electric winch shall be provided. Davit bases shall be supplied in quantity and installed in locations as shown on the drawings. Davit cranes shall break down into separated pieces for transport. The heaviest separated piece (boom with handle) shall be no more than 55 pounds. The weight of the electric winch assembly shall not exceed 85 pounds.
- B. Davit Cranes: The davit cranes shall be capable of 360 degree rotation. They shall be portable and designed to fit into permanent davit bases. Reach and hook height shall both be adjustable within the range specified in this section.
- C. Davit Bases: Davit bases shall be permanently mounted and installed on concrete surfaces. Davit bases shall be a socket base mounted flush as shown on the drawings. All bases shall be supplied with removable sleeve plugs and lanyards to exclude water and debris.
- D. Electric Winches: Electric winches shall be of the spur gear type with capacities specified in this section. Capacities shall be permanently marked on the winch. Winch shall allow for quick connection to the davit crane and shall be rated for 115 volts, single-phase, 60-Hz service. An adapter plate for mounting the winch to the crane mast shall also be provided.
- E. Wire Rope: Wire rope shall be 1/4-inch diameter and minimum 28 feet long, with a minimum capacity of 1,400 pounds. An appropriately-sized headache ball shall be provided. Contractor shall coordinate with the stop log manufacturer (Section 400559) to ensure that the wire rope lifting hook is compatible with the lifting beam system used to place and remove the stop logs.
- F. Anchors: Provide all needed anchors as shown on Contract Drawings.

SECTION 412213.23 – MOBILE (DAVIT) CRANES

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The davit bases shall be installed as shown on the drawings and in accordance with the manufacturer's recommendations. The davit cranes shall be installed in the davit bases and operated to remove the equipment.

END OF SECTION

SECTION 462153 – PERFORATED PLATE SCREENS

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Contractor shall furnish all labor, equipment, materials, tools, and incidental items required to install and place into proper operation four mechanically-cleaned perforated plate fine screens with 3 mm perforations. Two screens shall be provided as specified in this section for the Mendenhall WWTP, and two screens shall be provided as specified for the Juneau Douglas WWTP (see Table 2.2 A in this specification for product details). All equipment shall be installed as shown on the plans, as recommended by the supplier, and in compliance with all OSHA, local, state, and federal codes and regulations.
- B. Each screen shall be furnished complete with filter panels, discharge chute, side frames, covers, drive chains, sprockets and bearings, brush assembly, drive motor, gear reducer, anchor bolts, controls for operation of the screen and all accessories and appurtenances specified or otherwise required for a complete and properly operating installation.
- C. Contractor shall be responsible for coordination of all related parts of the work. The contractor shall verify all structures, piping, wiring, and components are compatible. Contractor shall be responsible for all structural and other alterations required to accommodate equipment differing in dimensions or other characteristics from these specifications and drawings.
- D. **The existing headworks building at Mendenhall has significant vertical installation constraints and will require the screen to be segmented to enable installation of the screen in sections. The available hoist capacity is two (2) tons and the hoist and ceiling heights for the respective floors of the building are shown in the construction drawings. Pick height is approximately 18” below the crane rail.**
 - 1. **Provide submittal drawings showing proposed segment lengths and weights and description of how screen will be installed using the available hoist and/or crane rail or other rigging provided by the Contractor.**
- E. **The screen manufacturer shall provide cold weather protection for the screens and washer/compactors at the Juneau Douglas plant. The screen shall have a radiant heater located under the front cover of the screen. The heater shall be rated for a Class I, Division 1, Group D environments and a 230/460V/3/60Hz electrical supply. The heater shall include a thermostat for control of the heater. The discharge pipe of the washer/compactors shall be provided with heat tracing, thermostats, and 316 stainless steel cladding.**

1.2 BASIS OF DESIGN

- A. The screens shown on the plans and specified herein are based on screens supplied by Kusters Water of Spartanburg South Carolina. Modifications to the plans may be required with other system suppliers. The CONTRACTOR will be responsible for providing detailed shop drawings of layout changes (including structural, electrical changes, and utility water) for a system supplied by any other alternative supplier.

SECTION 462153 – PERFORATED PLATE SCREENS

1.3 CONTRACTOR SUBMITTALS

- A. Provide shop drawings and product data in accordance with Section 01300 for the equipment being furnished, to include at minimum the following:
 - 1. Certified shop drawings showing the details of construction, dimensions and anchor bolt requirements.
 - 2. Complete wiring diagrams detailing all required field connections.
 - 3. Descriptive literature, brochures, and/or catalogs of submitted equipment.
 - 4. Complete bill of materials for the equipment.
 - 5. List of Manufacturer's recommended spare parts.
 - 6. Operation and maintenance manuals in accordance with the requirements of Section 01300.
 - 7. Installation reference list with current contact information for screens installed within the last two years.
 - 8. Equipment weights and lifting points.
 - 9. Short and long term storage requirements.
 - 10. Manufacturer's installation instructions.
 - 11. A copy of Manufacturer's warranty.
- B. Provide submittal drawings showing proposed segment lengths and weights and description of how screen will be installed using the available hoist and/or crane rail or other rigging provided by the Contractor.

1.4 REFERENCE STANDARDS

- A. American Iron and Steel Institute (AISI)
- B. American National Standards Institute (ANSI)
- C. American Society for Testing Materials (ASTM)
- D. American Bearing Manufacturers Association (ABMA)
- E. American Gear Manufacturers Association (AGMA)
- F. National Electrical Manufacturers Association (NEMA)
- G. Underwriters Laboratory (UL)

1.5 QUALITY ASSURANCE

- A. A single manufacturer shall be assigned unit responsibility for the screening assemblies and shall provide all components including but not limited to the screens, motors, gear reducers, controls, and control panels as a complete integrated package to ensure proper coordination, compatibility, and operation of the system.
- B. All welding is to be performed in accordance with American Welding Society (AWS) D1.1 Structural Welding Code.

SECTION 462153 – PERFORATED PLATE SCREENS

- C. Screen shall undergo a passivation process to ensure maximum resistance to corrosion. All stainless steel surfaces shall be thoroughly cleaned and glass bead-blasted to a minimum SSPC-SP-6 finish. The use of nitric and hydrofluoric acid passivation is not acceptable.
- D. All structural members of the equipment shall be designed for shock and vibratory loads. Additionally, the screen shall be designed to withstand the forces generated by maximum operating head without damage to the screen or its structure.
- E. Each screen shall have the manufacturer's name, address, and product identification information on a corrosion resistant nameplate securely affixed to the equipment.

1.6 WARRANTY

- A. The equipment shall be warrantied by the manufacturer for 3 years from the date of shipment.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Shipping

1. Ship equipment, material, and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.
2. Pack spare parts in containers bearing labels clearly designating contents and equipment for which they are intended.

B. Receiving and Storage

1. Store and safeguard equipment, material, and spare parts. All spare parts must be stored in accordance with manufacturer's recommendations.

1.8 OPERATION AND MAINTENANCE MANUALS

- A. The manufacturer shall furnish operation and maintenance manuals in accordance with Section 01300.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Screens shall comply with all Contract Documents, fit within space available, and shall be a Water ProTechtor Model FBS as supplied by Kusters Water which was the basis of design. Other acceptable screen manufacturers include Enviro-Care, JWC, Parkson, or Huber. The use of a screen other than the basis of design screen will require submittal information per Specification Section 012500 within 30 days of the Notice to Proceed. . The screen manufacturer shall provide screens for both the Mendenhall plant and the Juneau Douglas plant.
- B. The screens shown on the plans and specified herein are based on the Water ProTechtor Model FBS as supplied by Kusters Water. Modifications to the plans may be required with other system suppliers. The CONTRACTOR will be responsible for providing detailed shop drawings of layout changes (including structural, electrical changes and utility water) for systems supplied by any other alternate supplier.

SECTION 462153 – PERFORATED PLATE SCREENS

- C. Other screen manufactures must provide submittal information to document performance, ability to fit into the existing space and follow the applicable submittal requirements in Section 012500 or Section 016000.
- D. The manufacturer shall have provided screening equipment on at least fifteen (15) projects of comparable size and complexity in the past 5 years and at least five (5) projects of similar size and complexity within the last two (2) years.

2.2 FINE SCREEN UNITS

A. GENERAL DESIGN REQUIREMENTS

1. The perforated plate screens shall be a self-contained, screening system designed to positively clean and remove debris from the influent flow stream and transport the retained debris to the discharge point. The screen system shall be fully automated and controlled by the manufacturer supplied control system.
2. The screen shall be mounted by fastening to the top of the channel. Routine service, repair or replacement of damaged parts, shall be possible with the screen in the channel. The screen shall be designed so that maintenance of the drive mechanism can be accomplished at operating floor level. Screen elements shall be capable of removal at the operating level without taking the screens out of the channel or affecting the continuous or intermittent rotation of the screen.
3. The screen shall be designed to provide maximum solids filtration and thus maximize capture of debris and minimize rate of head loss increase through the screen. This shall be achieved by means of one piece perforated curved filter elements. The one piece curved screening elements shall be minimum 1/8" thick and fixed by four fasteners to a heavy duty box link drive chain. The use of roller chain or filter shafts and rollers will not be acceptable.
4. The chains shall run over sprockets keyed to a main, solid drive shaft which shall be mounted in externally mounted bearings and driven by a shaft mounted motor-driven gear unit.
5. The screen shall be automatically self-cleaning through the interaction of the one piece filter elements with the rotating cleaner brush and shall not require the use of spray water for supplementary cleaning.
6. A rotating deflector consisting of a tube roller and wiper supported by pillow block bearings shall be provided at the discharge point of the screen. The roller shall function to direct all solids removed from the screen by the revolving brush cleaner to the screenings discharge chute and shall prevent bypassing of solids into the downstream channel.
7. Stainless steel channel seals shall be provided and mounted to the channel walls to seal the vertical gaps between the channel wall and the screen side frames. The channel seals shall not require the use of rubber, plastic, or other non-metallic materials to form a positive seal.

SECTION 462153 – PERFORATED PLATE SCREENS

B. DESIGN CRITERIA

TABLE 2.2 A – DESIGN CRITERIA

Item	Value	
	Mendenhall	Juneau Douglas
Number of units supplied	2	2
Normal duty peak flow each screen, mgd	4.38	4.35
Peak flow with one unit out of service, mgd	8.50	8.86
Channel width, feet	4.00	3.00
Channel depth, feet	4.00	5.6
Channel Floor Recess- inches	0	6
Top of channel to operating floor, feet	15.00	0.0
Screening discharge height above operating floor, feet	4.50	4.50
Downstream water depth at peak flow, feet	0.69	1.52
Downstream water depth at normal flow, feet	0.45	0.96
Perforation size, mm	3	3
Screen angle, degrees	75	60
Headloss at 30 percent blockage, feet	2.21	3.02
Frame material, stainless steel grade	316	316
Screen material, stainless steel grade	316	316
Hardware material, stainless steel grade	316	316
Screen motor, HP/volts/phase/frequency/rpm	2.0/460/3/60/1800	2.0/460/3/60/1800
Brush motor, HP/Volts/phase/frequency/rpm	2.0/460/3/60/1800	2.0/460/3/60/1800
Deflector motor, HP/volts/phase/frequency/rpm	0.5/460/3/60/1800	0.5/460/3/60/1800
Control panel wiring, volts/phase/frequency	460/3/60	460/3/60
Environment condition, space class/division/group	1/1/D	1/1/D

C. PERFORMANCE AND DESIGN REQUIREMENTS

1. Each screen shall be capable of processing the specified peak flow of municipal wastewater when installed in the channel at a screen inclination as specified in Table 2.2 A. The screen

SECTION 462153 – PERFORATED PLATE SCREENS

shall lift and discharge screenings to an elevation as specified in Table 2.2 A into the discharge chute without use of spray washes.

2. The maximum upstream water level shall not exceed that specified in Table 2.2 A. The screen shall be capable of processing the peak flow without exceeding the maximum upstream water level based on a 30 percent reduction of the screens free open area.
3. All parts shall be designed and manufactured so the filter screen structure can withstand the hydraulic force exerted by the maximum water depth. All structural and functional parts shall be adequately sized to prevent deflection and vibration which could impair screen operation.
4. All components shall be so designed that jamming at any point will not result in structural failure, but will cause the drive motor to stall. All components, including the gear reducer, shall be designed to withstand, without damage or permanent distortion, the full stalling torque of the drive motor and/or the maximum differential head at any water depth.
5. Equipment furnished under this section shall be designed and selected for installation in areas having a hazardous-area classification of Class 1, Division 1, Group D. The equipment will be subjected to frequent hose-down for cleaning.

D. SCREEN COMPONENTS

1. Screen Frame Assemblies

- a. The screen frame shall be provided and designed to support all required static and dynamic loads.
- b. Screen frame shall be made of the material specified in Table 2.2 A and be minimum 3/16 inch thick.
- c. The side frames shall be connected with each other through engineered structural support members and shall be of welded construction.
- d. Each side frame shall include a separate chain guide track to guide and support the drive chains. The tracks must support both the upstream and downstream chain lengths and be welded to the side frames. The guide tracks shall be made of material as specified in Table 2.2 A.
- e. Each guide track shall incorporate a replaceable UHMW-PE chain support.
- f. The side frames shall incorporate adjustable UHMW-PE side seals to provide a sliding seal between the filter panel side plates and the screen frame. The side seals shall be adjustable to compensate for any wear that may occur over the life of the screen.
- g. A curved stainless steel deflector plate shall be provided at the foot of the screen to prevent ingress of stones and grit that create wear on the filter panels. A lateral seal element consisting of a full width brush and neoprene flap shall be attached to the curved deflector plate to seal the gap between the screen frame and the channel floor as well as the gap between the deflector plate and the filter panels.

2. Filter Screens

- a. To prevent deflection, the screen filtration belt shall be provided with one piece perforated curved elements, which limits the maximum opening as specified in Table 2.2 A in any direction. The one piece curved screening elements shall be minimum 1/8" thick and fixed by four fasteners to the heavy duty drive links. The panels shall incorporate integral stainless steel side plates which are welded to the panel for durability and to prevent material from bypassing the panel. Screen panels which are not curved, that incorporate removable side plates, or are manufactured with slots or a bar type grid shall not be acceptable.

SECTION 462153 – PERFORATED PLATE SCREENS

- b. On every fifth screen panel a set of static 'finger' type lifters shall be attached to the lower edge of the panel, designed specifically to lift spherical and large size solids (stones, cans, bottles, rag clumps etc) from the bottom of the channel. Screen panels formed with ledges, lifters located on the panel other than the lower edge, or hook type lifters shall not be acceptable.
 - c. The horizontal space between adjoining screen panels will not exceed 2.5 mm at any point between adjacent panels. If more than 10% are greater than the dimension of the specified screen perforation the screen will not be accepted until the manufacturer has corrected the problem.
 - d. The screen elements shall be cleaned by a motorized polypropylene bristle brush. The brush shall be adjustable such that as the brush wears during use, it can be manually adjusted to increase cleaning efficiency. The brush shall be driven independently with a single speed motor coupled to a shaft-mounted gear reducer.
 - e. To control the build-up of biological slimes behind the screen panels, an internal spray water wash bar will be provided, manufactured from material as specified in Table 2.2 A. The spray bar will be attached in the internal space between the rotating screen panels and the spray water will be directed to wash each screen panel as the panel moves past the spray nozzles. The spray bar will supply approximately 1 gpm per ft. width of screen panel at a pressure of 40 psi. The spray orifices will be non-plugging and suitable for use with treated effluent water. A minimum 1" NPT connection will be located on one side of the screen frame above the operating floor level and the water supply connection will include a manually operated ball valve, inline strainer, and solenoid valve suitable for attaching to the 1" NPT connection. The solenoid valve shall be rated for the area electrical classification as specified in Table 2.2 A. The screen internal spray washer shall be operated manually at the discretion of the plant personnel based on a visual inspection of the screen panel internal surfaces.
3. Drive Shafts, Sprockets, and Chains
- a. The drive shaft shall be a solid shaft which shall be manufactured using the material specified in Table 2.2 A.
 - b. The drive shaft shall be supported on each side by an externally mounted, grease lubricated take-up bearing assembly.
 - c. The screen shall be provided with two upper drive sprockets with a reference diameter of 13" and shall have a minimum thickness of 3/4". The sprockets shall be two piece design and be bolted to the drive hubs allowing the sprockets to be changed without removal of the drive hubs or drive shaft bearings. Designs that do not incorporate a split sprocket design will not be acceptable.
 - d. A revolving lower guide arrangement consisting of two discs with a reference diameter of 13" and a minimum thickness of 3/4" shall be located at the lower portion of the screen frame and shall maintain accurate alignment of the screen chain and elements. The lower guides will be mounted on two stub shafts bolted to the screen side frames and incorporate high performance metallic bushings that can be lubricated from the operating floor.
 - e. Drive chains for the screen panels shall be box link type chains manufactured using the material specified in Table 2.2 A. Each chain shall have a minimum breaking load of 25,000 lbf.
 - f. The chain shall be guided by the guide tracks mounted on each side frame.

SECTION 462153 – PERFORATED PLATE SCREENS

4. Discharge Chutes

- a. A discharge chute shall be provided for each unit that fully encloses the discharge section of the screen.
- b. The height of discharge chutes shall be as specified in Table 2.2 A and shall allow proper discharge of screenings.
- c. The discharge chute shall contain inspection ports on each side and shall pivot away from the screen frame for access to the cleaning brush.

5. Guards and Covers

- a. The portion of the screen above the influent channel level shall be provided with easily removable, properly stiffened stainless steel covers.
- b. The covers shall fully enclose the screen to provide safety and to contain odors. The covers will allow quick access for maintenance of the equipment.
- c. The covers shall be removable to facilitate visual observation by maintenance personnel when required.

6. Screen Drive Units

- a. The screen shall be driven by a heavy-duty, shaft-mounted gear reducer as manufactured by SEW Eurodrive. The gear reducer shall be equipped with anti-friction bearings and designed in accordance with AGMA recommendations for 24-hour, Class II service. The gear reducer shall be sized to provide the proper input power and torque to operate the screen and be rated for greater than the nominal horsepower of the drive motor.
- b. The gear reducer shall be driven by an industrial duty electric motor. The motor shall be UL rated for the operational environment as specified in Table 2.2 A. The motor shall be rated for a minimum horsepower and voltage as specified in Table 2.2 B with a minimum service factor of 1.0. Overload protection shall be provided by an electrical overload device (Tsubaki Shock Relay Model TSB50 or equal) that senses motor current draw.

7. Screen Cleaner Brush Drive Units

- a. The screen cleaner brush shall be driven by a heavy-duty, shaft-mounted gear reducer as manufactured by SEW Eurodrive. The gear reducer shall be equipped with anti-friction bearings and designed in accordance with AGMA recommendations for 24 hour, Class II service. The gear reducer shall be sized to provide the proper input power and torque to operate the screen cleaner brush and be rated for greater than the nominal horsepower of the drive motor.
- b. The gear reducer shall be driven by an industrial duty electric motor. The motor shall be UL rated for the operational environment as specified in Table 2.2 A. The motor shall be rated for a minimum horsepower and voltage as specified in Table 2.2 A with a minimum service factor of 1.0. Overload protection shall be provided by an electrical overload device (Tsubaki Shock Relay Model TSB50 or equal) that senses motor current draw.

8. Rotating Deflector Drive Units

- a. The rotating deflector shall be driven by a heavy-duty, shaft-mounted gear reducer as manufactured by SEW Eurodrive. The gear reducer shall be equipped with anti-friction bearings and designed in accordance with AGMA recommendations for 24-hour, Class II service. The gear reducer shall be sized to provide the proper input power and torque to

SECTION 462153 – PERFORATED PLATE SCREENS

operate the rotating deflector and be rated for greater than the nominal horsepower of the drive motor.

- b. The gear reducer shall be driven by an industrial duty electric motor. The motor shall be UL rated for the operational environment as specified in Table 2.2 A. The motor shall be rated for a minimum horsepower and voltage as specified in Table 2.2 A with a minimum service factor of 1.0. Overload protection shall be provided by an electrical overload device (Tsubaki Shock Relay Model TSB50 or equal) that senses motor current draw.

9. Cold Weather Protection (Juneau Douglas Plant)

- a. Cold Weather Protection – Radiant heater located under the front cover of the screen just above the operating floor. Heater to be suitable for use in a Class 1, Div. 1, Group D environment and a 230/460v/3/60 Hz electrical supply. Includes XP thermostat for control of heater.

2.3 CONTROLS AND INSTRUMENTATION

A. GENERAL

1. The screen control panel shall be the supplier's standard UL listed enclosure and wired for the voltage as specified in Table 2.2 A. The enclosure shall be furnished completely pre-wired and tested, requiring only mounting and connection to field mounted electrical devices. The control panel shall include all equipment required to control the bar screen specified herein. The control panel will be wired for volts, ph.
2. The control panel enclosure shall be NEMA 4X, 304 stainless steel and suitable for wall mounting. The enclosure shall house the control devices, relays, terminal blocks, motor starter, and variable frequency drive (VFD). All hinges and latches shall be corrosion-resistant.
3. A separate local control station in a NEMA 7 rated enclosure shall be provided for the bar screen and screenings washer compactor. The local control station shall include an emergency power off maintained red mushroom pushbutton, a screen Hand/Off/Auto switch.
4. The screen shall be equipped with an inverter duty motor and shall be controlled by a variable frequency drive (VFD) sized as required.

B. OPERATION

1. The control system shall be equipped with one Local-Off-Hand three position selector switches. In the Off mode the screen will not run. In the Hand mode the screen shall run continuously. In the Local position, the screen will run according to the position of the local control station screen selector switch for the corresponding component.
2. When the screen is in Auto mode the screen shall run when initiated by the level control system and/or the 24-hour delay timer. The run time frequency can be adjusted on the 24-hour timer located in the main control enclosure. The screen run time duration can be adjusted on the screen off delay timer located in the main control enclosure.

C. SAFETY FEATURES

1. If a power failure occurs while the screen is running, operation shall resume when power is restored.
2. If a power failure occurs while the screen is in a fail condition, the fail indicator shall reactivate when power is restored.

SECTION 462153 – PERFORATED PLATE SCREENS

3. Short-circuit protection requires that a properly sized circuit breaker be provided by the Electrical Contractor.
4. Control reset shall be from the main control panel only.

D. COMPONENTS

1. Enclosure

- a. Enclosures shall be NEMA 4X or NEMA 7, as required, and shall be suitable for wall mounting. Doors shall have corrosion resistant hinges and latches.
- b. Enclosure shall house the circuit breaker, VFD, motor starter, control devices, relays, and terminal blocks.

2. Control Devices

- a. Pilot devices shall be mounted on the enclosure front panel door.
- b. The enclosure shall have indicator lights for screen, On, Off, Jam, and Overload.
- c. Indicator lights shall be LED type. Selector switches shall be heavy duty NEMA type.
- d. Control transformer shall be protected by two primary fuses and one secondary fuse. The 120-volt secondary shall have one leg grounded.
- e. Auxiliary relay contacts shall be included for screen, Run, Off, Jam, and Overload signal outputs. The contacts shall be rated 10 amp, 240 VAC, resistive load.

3. Field-Mounted Devices

- a. The upstream level will be monitored using an ultrasonic level sensor. The sensor will be a Siemens HydroRanger monitoring system, suitable for 120 VAC power and a Class I, Division 1 hazardous environment.

2.4 SOURCE QUALITY CONTROL

- A. Screen system and control panel shall be factory assembled and tested to ensure proper design and satisfactory operation. Equipment shall be shipped in the minimal practical number of pieces for minimal field assembly by the Contractor.

2.5 SHOP PAINTING

- A. Stainless steel and other corrosion-resistant surfaces shall not be painted. Gearboxes, Motors, and other manufactured components will receive the manufacturer's standard weather- and corrosion-resistant coating.

2.6 SPARE PARTS

- A. The following spare parts shall be provided
 1. Two replacement screen panels without lifters
 2. One replacement screen panel with lifters
 3. One set of rotating brushes
 4. Three fuses of each size and type used in the control panel

SECTION 462153 – PERFORATED PLATE SCREENS

PART 3 -- EXECUTION

3.1 INSTALLATION AND TESTING

- A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify Engineer of any significant deviations.
- B. Installation of the equipment shall be in strict accordance with the contract documents and the Manufacturer's instructions and shop drawings. Manufacturer shall supply anchor bolts for the equipment. Contractors shall install the anchor bolts in accordance with the Manufacturer's recommendations.
- C. Supplier shall furnish the services of a factory-trained manufacturer/ supplier Service Engineer for two trips. One trip of one day for installation inspection services. One trip of two days for start-up, commissioning, and to provide operator training.
 - 1. Equipment shall not be energized, or "bumped", to check the electrical connection for motor rotation without installation inspection and the Service Engineer present.
 - 2. The Service Engineer shall make all necessary adjustments and settings to the controls.
 - 3. The Service Engineer shall demonstrate proper and sequential operation of the screen. The screen shall be operated in both automatic and hand mode by the service engineer during the start-up and commissioning to demonstrate proper operation of the screen system.

END OF SECTION

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Contractor shall furnish all labor, equipment, materials, tools, and incidental items required to install and place into proper operation. Four washer/compactor assemblies shall be provided. Two of the assemblies will be installed at the Mendenhall WWTP over 4-foot wide channels; the other two assemblies will be installed at the Juneau Douglas WWTP over 3-foot wide channels. All equipment shall be installed as shown on the plans, as recommended by the supplier, and in compliance with all OSHA, local, state, and federal codes and regulations.
- B. Each washer/compactor shall be furnished complete with motor, inlet hopper, discharge pipe, screen bagging system, supports, and accessories for the washing and compacting municipal sewage screenings, and all accessories and appurtenances specified or otherwise required for a complete and properly operating installation.
- C. Contractor shall be responsible for coordination of all related parts of work. Contractor shall verify all structures, piping, wiring, and components are compatible. Contractor shall be responsible for all structural and other alterations required to accommodate equipment differing in dimensions or other characteristics from these specifications and drawings.
- D. All equipment to be installed in an area rated for Class I, Divison. 1, hazardous locations.

1.2 SUBMITTALS

- A. Provide shop drawings and product data in accordance with Section 01300 for the equipment being furnished, to include at minimum the following:
 - 1. Certified shop drawings showing the details of construction, dimensions and anchor bolt requirements.
 - 2. Complete wiring diagrams detailing all required field connections.
 - 3. Descriptive literature, brochures, and/or catalogs of submitted equipment.
 - 4. Complete bill of materials for the equipment.
 - 5. List of Manufacturer's recommended spare parts.
 - 6. Operation and maintenance manuals in accordance with the requirements of Section 01300.
 - 7. Equipment weights and lifting points.
 - 8. Short and long term storage requirements.
 - 9. Manufacturer's installation instructions.
 - 10. A copy of manufacturer's 3-year factory warranty.

1.3 BASIS OF DESIGN

- A. The washer compactor shown on the plans and specified herein are based on compactors supplied by Kusters Water of Spartanburg South Carolina. Modifications to the plans may be required with other system suppliers. The CONTRACTOR will be responsible for providing detailed shop drawings of layout changes (including structural, electrical changes, and utility water) for system supplied by any other alternative supplier.

1.4 REFERENCE STANDARDS

- A. American Iron and Steel Institute (AISI).

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

- B. American National Standards Institute (ANSI).
- C. American Society for Testing Materials (ASTM).
- D. American Bearing Manufacturers Association (ABMA).
- E. American Gear Manufacturers Association (AGMA).
- F. National Electrical Manufacturers Association (NEMA).
- G. Underwriters Laboratory (UL).

1.5 QUALITY ASSURANCE

- A. Qualifications: Qualified manufacturers shall have provided similar equipment on fifteen (15) projects of similar size and complexity in the past 5 years and at least two projects of similar size and complexity in the past two years..
- B. A single manufacturer shall provide all components including but not limited to the, motors, gear reducers, controls, and control panels as a complete integrated package to ensure proper coordination, compatibility, and operation of the system.
- C. Washer/compactor shall be Manufacturer's standard product and only modified as necessary to comply with the drawings, specifications, and specified service conditions.
- D. All welding is performed in accordance with American Welding Society (AWS) D1.1 Structural Welding Code.
- E. Washer/compactor shall undergo a passivation process to ensure maximum resistance to corrosion. All stainless steel surfaces shall be thoroughly cleaned and glass bead-blasted to a minimum SSPC-SP-6 finish. The use of nitric and hydrofluoric acid passivation is not acceptable due to the negative impact these chemicals have on the environment.
- F. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or installation, defective workmanship or materials, and breakage or other failure. Materials shall be suitable for service conditions.
- G. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practices. Welders shall be certified in accordance with AWS or ASME. Welder certificates shall be provided to the Engineer upon request.
- H. All structural members of the equipment shall be designed for shock and vibratory loads.
- I. Each Washer/compactor shall have the manufacturer's name, address, and product identification information on a corrosion resistant nameplate securely affixed to the equipment.

1.6 WARRANTY

- A. The equipment shall be warranted by the manufacturer for a period of 3 years from the date of shipment.

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

1.7 DELIVERY, STORAGE, AND HANDLING

A. Shipping

1. Ship equipment, material, and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.
2. Pack spare parts in containers bearing labels clearly designating contents and equipment for which they are intended.

B. Receiving and storage

1. Store and safeguard equipment, material, and spare parts. All spare parts must be stored in accordance with manufacturer's recommendations.

1.8 OPERATION AND MAINTENANCE MANUALS

- #### A.
1. The manufacturer shall furnish operation and maintenance manuals in accordance with the requirements of section 01300.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- #### A.
- The Washer/compactor shall be in compliance with these specifications and plans and shall be supplied as follows:
1. Kusters Water ProTector™ Model SWP 200 x 700 Washer Compactor was used as the basis of design. Other acceptable manufacturers include Enviro-Care, JWC, Parkson, or Huber. The use of a washer/compactor other than the basis of design will require submittal information per Specification Section 012500 within 30 days of the Notice to Proceed.
 2. Washer/ Compactor shall be from the same manufacturer as the perforated screens.
 3. Manufacturers shall have provided equipment on at least fifteen (15) projects of comparable size and complexity in the past 5 years and at least five (5) projects of similar size and complexity within the last two (2) years.

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

2.2 SCREENINGS WASHER/COMPACTOR

A. DESIGN DATA

TABLE 2.2 A – DESIGN DATA

Item	Value	
	Mendenhall	Juneau Douglas
Number of identical units to be supplied	2	2
Screen channel width	4	3
Max continuous screening volume, cu. ft. / hr	70	70
Min volume reduction, percent	75	75
Min obtained solids content, percent	35 to 40	35 to 40
Minimum Motor Horsepower	2	2
Operational environment, Class/Division	1/1	1/1
Wash water supply, gpm/(pressure [psig])	10 to 20/(40 to 50)	10 to 20/(40 to 50)

B. GENERAL DESIGN REQUIREMENTS

1. The screenings washer/compactor system shall be designed to wash, compress and transport screenings from the perforated plate screens to the screenings bin. The equipment shall be of the latest design and shall be fabricated of materials and in a fashion that will fully perform the functions described below.
2. Wet screening shall enter the screenings washer through an enclosed connecting chute from the discharge of the screen. The screened solids shall be washed and agitated to liquefy fecal matter and to facilitate its return to the influent channel. The connecting chute between the screen and the screenings washer shall provide a completely closed system to protect operating personnel from exposure to wastes.
3. Wet screenings with a minimum dry solids content of 5–10 percent shall enter the washer/compactor through the inlet trough. Excess liquid shall exit through the perforated drainage holes. Drainage of free flowing liquid shall be provided through the integral overflow outlet located beneath the trough. The rolling action provided by the Archimedeian screw and the spray header shall provide additional cleaning of the screenings before the compaction stage and an integral brush attached to the screw shall continuously clean the trough perforations. The screw shall transport all collected washed, compacted screenings into the discharge pipe for conveyance to the drop off point.
4. Equipment furnished under this section shall be designed and selected for installation in areas having a hazardous-area classification of Class 1, Division 1, Group D. The equipment will be subjected to frequent hose-down for cleaning.
5. All four washer/compactors called out in Table 2.2 A shall be identical except for the screenings capture shrouds, which shall be configured for the specific channel width at the two WWTPs (4-feet wide at Mendenhall versus 3-feet wide at Juneau Douglas).

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

C. MATERIALS OF CONSTRUCTION

1. All 316 stainless steel will be used for fabricated parts unless otherwise noted.
2. Inlet hopper: stainless steel.
3. Inlet and outlet flanges: stainless steel.
4. Housing and supports: stainless steel.
5. Discharge pipe: stainless steel
6. Screw: Hardox 400,
7. Anti-rotation/wear bars: High tensile, abrasion resistant steel, minimum Brinnell hardness of 200, 316 stainless steel.
8. All fastener hardware shall be 316 stainless steel.

D. WASHER/COMPACTOR

1. Inlet Hopper
 - a. Each washer/compactor shall be equipped with an inlet hopper to receive screenings directly from a mechanical screen as shown on the Drawings.
 - b. The hopper shall be flanged, gasketed, and bolted to the washer/compactor housing to provide a watertight connection.
 - c. The hopper shall be equipped with a stainless steel spray bar with nozzles to provide wash water to the walls of the inlet hopper and trough if required. The spray bar shall include a ball valve to regulate the wash water flow from the wash zone solenoid valve.
2. Screw Housing
 - a. The screw housing and associated components shall be constructed of stainless steel. The outlet flange shall incorporate a pipe bolt pattern for connection to the discharge pipe.
 - b. The compaction section shall incorporate a dewatering zone to allow the removal of the filtrate during compaction. Wash water inlets shall be provided in the washing zone.
 - c. To prevent wear, the washing zone and compaction zone shall be fitted with a minimum of six anti-rotation/wear bars to provide the washboard/friction contact points for the screenings and to prevent screw contact with the cylindrical wall. Each anti-rotation/wear bar shall be secured to the cylindrical housing with M10-304 stainless steel hex head cap screws and shall be replaceable without removing the screw from the compactor. Each anti-rotation/wear bar shall be made from High tensile, abrasion resistant steel, with a minimum Brinnell hardness of 200.
 - d. The bottom of the housing below the inlet hopper shall contain a stainless steel perforated section for drainage. The perforated section shall have 5 mm round openings on staggered centers. Slotted holes or wedge wire sections in the drainage area are not acceptable as an alternate.
 - e. A drain pan shall be mounted to the bottom of the screw housing and shall be easily removable. The drain pan shall incorporate a 6-inch diameter plain ended drain pipe located beneath the trough to return the wash water and liquefied fecal matter to the influent channel.
3. Wash Water System
 - a. A spray system shall be provided for cleaning the screenings. The spray wash system shall be furnished with a control solenoid valve, flow adjustment ball valve, stainless steel piping and fittings. Piping, fittings and valves shall be 1-inch diameter, minimum. A plant water

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

strainer shall be provided for the incoming plant water supply. The wash water flow and minimum pressure requirements shall be as noted in Table 2.2 A.

- b. The screenings wash system shall be provided to continuously clean the screenings during operation. Wash water will be introduced into washing zone to dissolve and remove organic material.
- c. Solenoid valves shall be 1-inch, minimum, bronze body suitable for 120 VAC operation with an explosion-proof rating. Solenoid valves shall be normally closed and rated for up to 100 psig. Solenoid valves shall be slow close type to minimize water hammer.
- d. Ball valves shall be 1-inch, minimum, bronze body with stainless steel ball and stem and Teflon seats.
- e. A bronze body Y-strainer with replaceable stainless steel internals shall be provided for the incoming plant water supply.

4. Solid Shaft Screw

- a. The Solid shaft screw shall be constructed of alloy steel and it shall have a minimum outside diameter of 7.88 inches. The shaft shall be a minimum of 2-1/2 inches in diameter. Designs incorporating hollow shaft screws for introduction of wash water are not acceptable as an alternate.
- b. The flights shall be cold formed from alloy steel. After fabrication the screw shall be precision machined to ensure that it is concentric along its length. The distance between the flights shall be arranged to allow transportation into the washing zone and compaction in the dewatering zone.
- c. The screw shall have a minimum Brinell hardness of 400.
- d. A stainless steel reinforced brush shall be attached to the solid shaft screw in the drainage area to help prevent debris from blinding the drain. To reduce wear on the wiper, the design shall be such that the screw shall not be allowed to rest in the washer/compactor housing. The screw shall be fully supported and cantilevered off of the thrust bearing.

5. Thrust Bearing

- a. An independent thrust bearing shall be mounted between the drive and the washer/compactor body to fully support the screw and handle the load created during compaction and reversal of the screw.
- b. The thrust bearing shall have a substantial fabricated steel housing and shall utilize tapered roller bearings located between two double lip seals. The screw will be cantilevered off of the thrust bearing to prevent the screw from resting inside the screw housing.
- c. Units submitted without an axial thrust bearing to fully support the cantilevered screw will not be accepted.

6. Support Structures

- a. The support legs shall be integral to the main body of the unit and shall be made of stainless steel.

7. Discharge Chute

- a. The discharge chute shall be mounted to the discharge flange on the washer/compactor body and designed to transport the washed, dewatered and compacted screenings to the appropriate receiving device. The discharge chute shall be constructed of minimum schedule 10, stainless steel pipe and shall be provided with a 90-degree bend as shown on the Contract Drawings.

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

- b. The discharge chute shall have a minimum inside diameter of 8 inches and expand to a minimum of 12 inches.
- c. Outdoor weather protection (Juneau Douglas Plant only)
 - i. Outdoor weather protection for discharge chute to include heat tracing, 2” of fiberglass pipe insulation (Certainteed or Foamglass) with factory-applied all-service jacket, thermostat, and 316 stainless steel.

8. Screening Bagger

- a. The discharge pipe shall be supplied with a bagging device to contain and encase dewatered screenings
- b. The screening bagger shall be fitted with replaceable plastic bags.

9. Drive Assembly

- a. The washer/compactor shall be complete with an integrated drive assembly consisting of a Class 1, Div. 1 electric reversing motor that is close-coupled to a gear reducer.
- b. The motor shall be a minimum two horsepower, 460-volt, 3-phase, 60-Hertz with a service factor of 1.15. The motors shall be rated at 40°C ambient with Class F insulation and shall have a Class B temperature rise at full load. The nominal motor speed shall be 1800 rpm.
- c. The gear reducer shall be a parallel helical gear reducer. The reducer shall have a cast iron housing with a minimum service factor of 1.2.
- d. Gear reducers shall have ball or roller bearings throughout with all moving parts immersed in oil. Gears shall be of alloy steel with threads precision ground and polished after casehardening. Shafts shall be of high strength alloy steel ground to required tolerances.

E. ANCHOR BOLTS

- 1. Furnish all anchor bolts of ample size and strength required to securely anchor each item of equipment.
- 2. Material: 316 stainless steel unless noted otherwise.
- 3. Anchor bolts shall be set by the Contractor. Equipment shall be placed on the foundations, leveled, shimmed, bolted down, and grouted with a non-shrinking grout.

2.3 CONTROLS AND INSTRUMENTATION

A. GENERAL

- 1. Provide all controls necessary for the fully automatic operation of the washer/compactor.
- 2. The washer/compactor shall be cycled on and off by remote control signals from the main control panel. The washer/compactor shall be started by a screen cycle counter generated from the bar screen.
- 3. The control system, both local and main, shall be designed and manufactured by the same company that furnishes the washer/compactor.
- 4. The washer/compactor control panel shall be the supplier’s standard UL listed enclosure and wired for 460-volt, 3-phase, 60-Hz electrical service. The enclosure shall be furnished completely pre-wired and tested, requiring only mounting and connection to field-mounted electrical devices.

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

B. CONTROL PANEL

1. The screen shall be furnished with a 460-volt 3 phase primary control panel in a NEMA 4X stainless steel enclosure suitable for mounting as shown on the Contract Drawings. It shall contain the following items:
 - a. Fusible disconnect switch with door handle.
 - b. Control transformer.
 - c. Reversing starter.
 - d. Process controller complete with LCD operator interface panel providing field settable/adjustable/access to process parameters.
 - e. Cabinet heater with thermostat.
 - f. Elapsed time meter.
 - g. True power sensor/overload.
 - h. Transient voltage surge suppresser.
 - i. Power on pilot light.
 - j. Compactor running pilot light.
 - k. Compactor in auto pilot light.
 - l. Compactor fail pilot light.
 - m. Compactor over-torque pilot light
 - n. Alarm reset pushbutton.
 - o. Alarm silence pushbutton
 - p. Alarm horn
 - q. Phenolic nameplates.
 - r. 600 VAC terminal block.
 - s. U.L. 508A panel label

C. COMPONENTS

1. Enclosure
 - a. Enclosures shall be NEMA 4X, as required, and shall be suitable for wall mounting. Doors shall have corrosion resistant hinges and latches.
 - b. Enclosure shall house the circuit breaker, motor starter, control devices, relays, and terminal blocks.
2. Control Devices
 - a. Pilot devices shall be mounted on the enclosure front panel door.
 - b. The enclosure shall have indicator lights for compactor On, Fail, In Auto, and Over torque.
 - c. Indicator lights shall be LED type.
 - d. Selector switches shall be heavy duty NEMA type.
 - e. Control transformer shall be protected by two primary fuses and one secondary fuse. The 120-volt secondary shall have one leg grounded.
 - f. Auxiliary relay contacts shall be included for the compactor. On, fail, in auto, and over-torque signal outputs. The contacts shall be rated 10 amp, 240 VAC, resistive load.

D. LOCAL CONTROL STATION

1. The compactor shall be furnished with a local control station in a NEMA 7 enclosure suitable for mounting as shown on the Drawings. It shall contain the following items:

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

- a. Compactor hand-off-auto switch.
- b. Compactor forward-off-reverse switch.
- c. Screenings wash system hand-off-auto switch.
- d. Mushroom head E-Stop pushbutton

E. OPERATION

1. Washer/compactor Hand Operation: When the control station HOA selector switch is in the Hand position, the washer/compactor will run continuously. Turning the HOA selector switch to off will stop the unit.
2. Washer/compactor Automatic Operation: When the washer/compactor selector switch is in the auto position, the washer/compactor will cycle on when a start signal is received from the screen. The screenings wash water will turn on and the screw shall run. The washer compactor shall continue operate after the screen is deactivated in accordance with an adjustable off delay timer. The spray wash will run whenever the washer/compactor is running.
3. Screenings Wash System Hand Operation: When the screenings wash selector switch is in the hand position, the spray wash will run continuously. Turning the selector switch to off will stop the spray wash.

F. SAFETY FEATURES

1. When a jam condition occurs in the auto mode the controller shall stop the motor and activate the clearing mode relay. Once the clearing mode is activated the washer/compactor will operate in reverse for a short duration then revert back to normal operation. If the washer compactor is unable to clear the jam after several attempts, the compactor fail alarm will activate and lock out the washer/compactor.
2. If the washer/compactor experiences an over-torque condition during reverse operation of a clearing mode, the fail alarm will activate, and shut down the washer/compactor.
3. If a power failure occurs while the washer/compactor is running, operation shall resume when power is restored.
4. If a power failure occurs while the washer/compactor is in a failed condition, the fail indicator shall reactivate when power is restored.
5. Short-circuit protection requires that a properly sized circuit breaker be provided by the Contractor.
6. Control reset shall be from the main control panel only.

2.4 SPARE PARTS

A. The following spare parts shall be provided for the Mendenhall WWTP:

1. One brush assembly with hardware
2. One set of anti-rotation/wear bars with hardware

B. The following spare parts shall be provided for the Juneau Douglas WWTP:

1. One brush assembly with hardware
2. One set of anti-rotation/wear bars with hardware

3.1 INSTALLATION AND TESTING

- #### A.
- Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify Engineer of any significant deviations.

SECTION 462173 – SCREENINGS WASHER/COMPACTOR

- B. Installation of the equipment shall be in strict accordance with the contract documents and the Manufacturer's instructions and shop drawings. Manufacturer shall supply anchor bolts for the equipment. Contractors shall install the anchor bolts in accordance with the Manufacturer's recommendations.
- C. A minimum of 1 trip and 1 day of factory service by Service Engineer shall be provided to check the installation, start-up and test the equipment, and train the operators in the operation and maintenance of the equipment.
 - 1. Equipment shall not be energized, or "bumped", to check the electrical connection for motor rotation without installation inspection and the Service Engineer present.
 - 2. The Service Engineer shall make all necessary adjustments and settings to the controls.
 - 3. The Service Engineer shall demonstrate proper and sequential operation of the washer/compactor. The washer/compactor shall be operated in both Automatic and Hand mode by the Service Engineer during the start-up and commissioning to demonstrate proper operation of the system.

END OF SECTION